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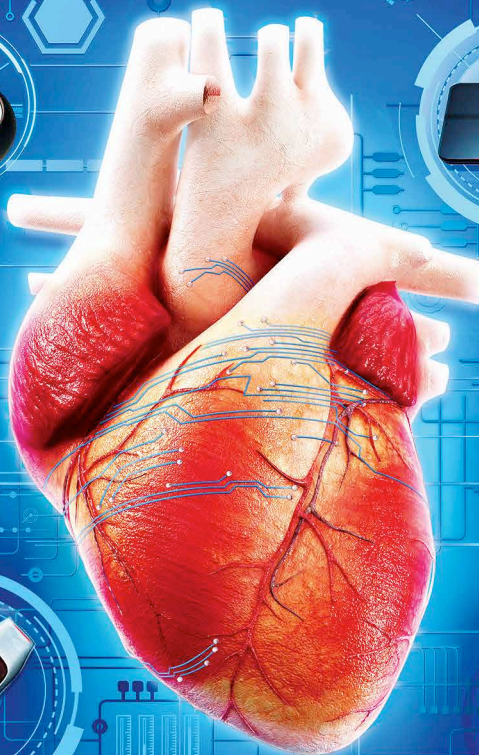
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React Rinse Repeat

With election fever in the air, everyone around me has turned into a soothsayer. Every chai time conversation, every street corner debate, every WhatsApp group chat seems to be about just one thing – who will win the elections? As I write this editorial contemplating my own vote the next day, I feel the need to take a break and move on to lighter, more familiar topics of prediction. Specifically, predictions about technology.

If you were asked to look into your own personal crystal ball and come up with a list of things that you foresee in the future, what would you envision? Flying cars? Robot servants to do your bidding? Best selling novels written by algorithms? As it turns out, the Pew Research Center recently surveyed Americans from all walks of life asking them to do exactly that. Participants were queried on a wide range of potential scientific developments – from near-term advances like drones and wearable technology, to more futuristic possibilities like teleportation or space colonisation.

A peculiar finding emerged. While people were overwhelmingly convinced that a tech-dominated, sci-fi future awaits them, as with politics, not everyone was too sure about the outcome of these changes. Specifically, they weren't sure whether the choices they make or the direction which technology takes mankind would be good or bad. For example, 66 per cent thought it would be a change for the worse if prospective parents could alter the DNA of their children to produce smarter, healthier or more athletic offspring.

But what about near-term predictions about technology? Recently, a company called Frog Design – an industrial design outfit – made quite a few predictions, three of which caught my attention. The first is that anonymity will go mainstream. This one's pretty easy to plot considering what we've learnt from the Snowden leaks, Heartbleed bug and other recent privacy debacles. If things like Snapchat, the self-destructing Boeing Black phone and John McAfee's NSA-proof DCentral device are indicators of what's to come, this one's a certainty. Frog Design says that 2014 will see an influx of platforms catering to a digital experience grounded in anonymity.

The second prediction is about on-demand services. A relatively nondescript start-up in San Francisco called Uber has been making waves recently and was at some point hyped by analysts as an entity that's going to become bigger than Facebook. What's Uber? Well, it's like Meru Cabs on steroids. Frog believes that this "on-demand" model will soon extend across other personal services, not just personal transportation. From home maintenance to dog walking and everything in between, we'll have apps that will connect us to service providers in an instant. Say you need an electrician. A few taps on your smartphone and it tells you a handyman is on his way, only three minutes away.

The last prediction is something I'd spoken about in last month's editorial – a shift towards disconnecting from technology. A section of the population is slowly realising that experiencing life through a four-inch screen isn't all that great. Artists have already started asking concert goers to stop recording their shows and actually experience the moment. Pretty soon, people will set up "dark zones" in their houses that will allow you to sink into a chair, web-free and just think! Who knows, cinema halls might even use network jammers (one can only dream).

The curious thing about these predictions is that they show a tendency of technology coming full circle. Remember back when people first started getting online, they'd take pains to remain as anonymous as possible? We'd have usernames like orbitalenergy@hotmail.com with no personally identifiable data voluntarily proffered. (That account still exists, and no prizes for guessing who it belongs to.) Soon, web giants started pushing people to enter their real names and now you have a reversal towards anonymity.

Back in the day when you wanted something done, a list of service provider numbers noted somewhere was all you had. You didn't have an app to call a chauffeur, but knew how to reach one (Yellow Pages, anyone?). The last prediction – the unplugging movement – brings to mind the era when Television started invading dinner time conversation. Soon it was deemed bad manners and the TV was relegated back to the living room from the kitchen. But for a while, people were struggling and learning to adapt to this new technology. That's the beauty of it. Tech evolves and we evolve to adapt to it. The only constant we can bank on is its tendency to eventually come full circle. 🅳

Siddharth Parwatay
Assistant Editor
siddharth.parwatay@thinkdigit.com

> **"The curious thing about these predictions is that they show a tendency of technology coming full circle"**

Got feedback about this column?
Drop me a line at:
siddharth.parwatay@thinkdigit.com

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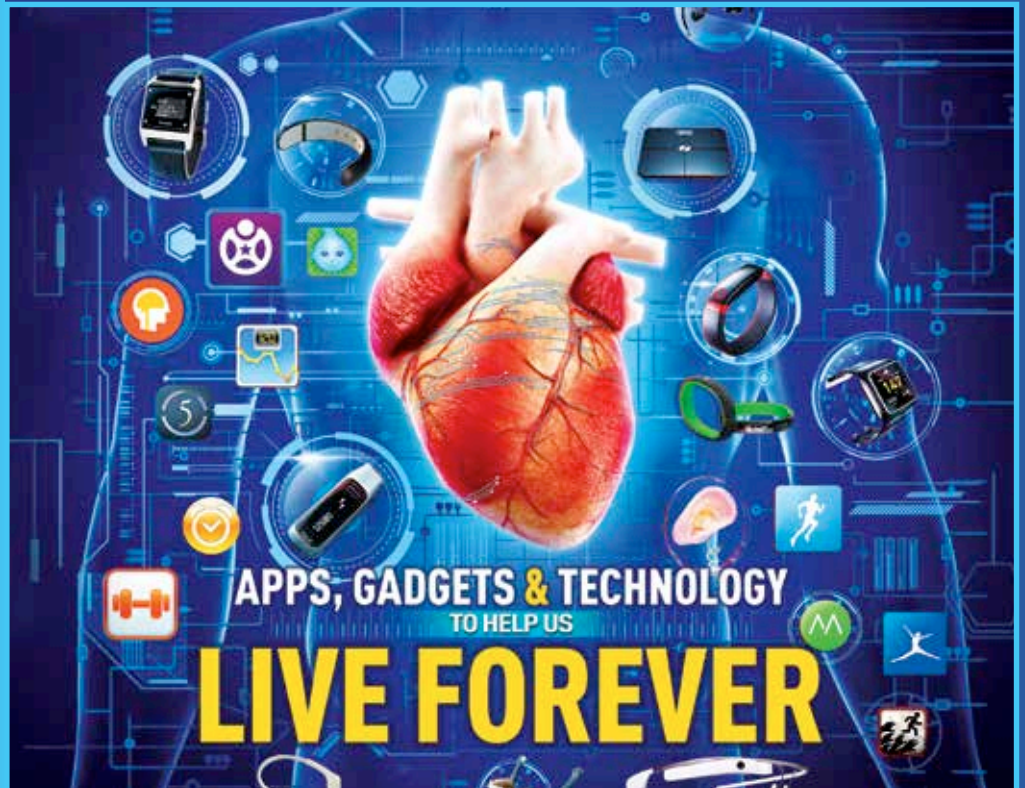
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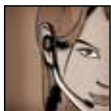
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Point of no return

First, to conclude the cliffhanger of last month's column: I've made it back safely, much to the team's chagrin, and Malaysian Airlines and Boeing 777-200s aren't bad at all.

Before I left on my trip down under, some of us from Digit attended an off-site meeting organised by our company. An off-site, for those who don't already know, is when employees of a company get away to a location away from work and home, get together and work on team building and improving various aspects of themselves and the company.

Amongst a lot of planning, tests, skill improvement exercises and even cricket matches, was a simple exercise to just close your eyes and sit still in silence for 10 minutes with an absolutely empty mind, thinking of nothing at all. Sounds easy? Try it.

I have never failed so miserably in something my entire life as I did this simple exercise. I just couldn't do it, and my mind was wandering and latching on to so many random thoughts at once - wondering whether the issue had reached stands, how my son was getting along without me, whether I had any messages from my wife and wondering how many emails from readers I would have to catch up on afterwards... it was just insane. I even started thinking of story ideas at one point, and felt like I was falling because I couldn't stand the blankness. It's become almost impossible to just switch off any more, because I'm so used to being always on, always connected, always alert.

I'm not alone though. For example, when the net connection is disrupted at office, all of a sudden the whole team is abuzz, wondering what happened, testing various sites, running ping commands and ipconfigs, changing gateways and DNS servers. I have seen even those getting up to take a coffee break sit back down to try and figure out the mystery of dead connection. Riveted to their seats as if watching Hitchcock's finest work, asking "Who killed it, and will we ever find out why?" I should add, I also behave exactly the same, at home or office.

The same happens when the electricity goes out, or the batteries of our phones or gadgets are running low. How many times have you frantically looked for charging ports as soon as your battery is under 10/20 per cent? There's an entire market built around this paranoia - portable chargers.

In fact even when we're all juiced up, everything's working as it should and there's no problems in sight, we sometimes find ourselves looking at our phones just to ensure everything's OK. "No Facebook updates in the last 5 minutes? Is my data plan working?" <turns mobile network off and on just in case>.

Although billions still live everyday life without technology, it's not out of choice. I know we all like to believe that we can choose to live without tech, or even electricity, for that matter, but can we? I doubt it.

Science and technology is helping us improve everything. Not only do we live longer thanks to it (as our cover story this month will outline), but we also have a better quality of life. Yes, technology, like any other tool, can do us both good or harm, depending on whether we use or abuse it. Think of it as a crutch filled with cocaine - we can choose to use the crutch and focus on walking, or use the cocaine and get addicted to going nowhere.

It's easy to choose the latter use of technology, and get addicted to, for example: apps, games, pointless Facebook surfing, 9gag, reddit-ing away your life, watching videos all day long and aimlessly looking at memes (all of the above are fine as short leisure activities).

This will always be the majority use for all technology - pure entertainment, and it's funny that the addicts are perhaps the people who will survive without technology as well, if it came to that. They'd just get another fix from somewhere else.
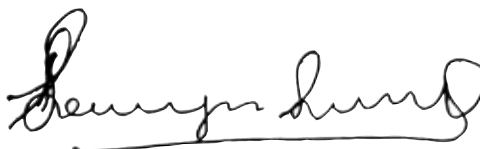
However, there will also always be those who use technology to not just consume but create as well, and push the limits. It's these people who have accepted technology so openly that they cannot live without it, because they're done being fascinated by it, and it's now a crutch they depend on to walk.

I think it's safe for us to assume that any Digit reader sits squarely in the category of creators who cannot function without technology anymore. We're all way past the point of no return, and technology has become an essential ingredient of life for us, and we wouldn't have it any other way. Would we?

Robert Sovereign-Smith
Executive Editor
robert@thinkdigit.com

> "I know we all like to believe that we can choose to live without tech, or even electricity, for that matter, but can we? I doubt it"

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✉ Hey there! I'm Nilay Kulkarni, a 14-year-old boy who's been reading Digit since I was 8. At first, most of the articles went over my head, but gradually I started to understand them. And Now! In my circles, I'm referred to as 'The Geek'. My phone (Xperia E Dual) is rooted and has CM10 installed. I've developed three Android apps, and each and every person in my circle consults me before buying any gadget. They even ask me to root or jailbreak their devices or solve any other technical problem they have. I wanted to thank you! Because of these things, I'm planning to become a full time Android developer after I complete my education. Thank you very much Digit and Team!

–Nilay Kulkarni, Nashik

🇩 Wonderful to hear from you Nilay, and we're glad we could inspire you.

–Jayesh

✉ Hey guys! I've been reading Digit since 2001. Yeah, I was merely 6 years old then, and the magazine was the best cartoon comic I could have with all the game reviews full of images in it. I literally grew up with Digit, witnessing the ever-increasing awesomeness of the magazine. My PC would always be upgraded in the nick of time to be able to run the demos and the freeware given in your CDs and DVDs.

The first thing I did after joining college was to get Ubuntu installed for me and nearly every friend I could convince.

Last night, I was just going through the old CDs/DVDs I'd carried with me here to my hostel, and decided to share about this journey – mine, yours and ours. My journey, that began by interpreting Digit as a comic to it being the best supplement to my life and your journey, from a tech magazine with CDs to being the best tech navigator one could get. The journey is also ours, from being an under-developed nation to being an upcoming tech superpower!

–Shreesh Katyayan

🇩 Your's is a wonderful story Shreesh, and we're glad we could share the journey with you.

–Robert

✉ Hi Robert. I'm a +1 student and this is my first ever letter to you. I had a chance

to read Digit magazine (December issue) in the library and I'm really impressed by your reviews and Fast Track guide. It was useful in making me aware about the latest technology and gadgets. Today, I'm a regular reader of Digit. Now some friends ask me for suggestions before they buy new gadgets. I'm very thankful to Digit and Robert. Keep up the good work, guys.

–Rahman Ibn Ashraf

🇩 Thanks for your mail Rahman, but don't thank me alone, it's the guys in the team that do all the hard work that makes Digit what it is.

–Robert

✉ Hello Digit. I know you guys are bored of reading the same words that 'you guys are doing a great job. I love to read your product. It's a delight', but it's actually true. So let me cut to the chase. Why don't you cover anything on jailbreaking? Why not have an article or tips and tricks on jailbreaking iOS devices? I'm sure readers would love to read about jailbreaking from Digit. This is the first time I'm writing to you guys, and I along with the myriad iOS users would love to see the next month's issue covering anything and everything related to jailbreaking – pros and cons, discussions, best tweaks, etc.

–Rohit Arora

🇩 We keep covering jailbreaking and rooting all the time. Well not all the time but whenever some new update comes from jailbreakers like iPhone Dev Team. Here's a link to an article we have on thinkdigit.com: http://dgit.in/rootjailbrk

It's a complete guide to rooting and jailbreaking.

–Siddharth

✉ Hey guys, I've been reading Digit from the past 1.5 year and I really appreciate your hard work in making people like me aware of latest technologies!

Firstly, I'd like to point out a mistake in your March 2014 issue in the 'World View' section on page no.111 in column Shorts headed under 'Facebook's acquisition of Whatsapp'. Here the deal between FB and Whatsapp is mentioned to be worth $16 billion, whereas the actual price was $19 billion. A small mistake, but worth noticing.

I loved your 'Top 10 of Everything'. It helped me a lot while buying a laptop and selecting the best graphic cards suitable for me within my budget. Even previously, I've bought a Lumia 520 reading its reviews in your magazine. 'Zero Dollar Movies' was the best recommendation in the issue since I'm a huge movie addict and it helped a lot. Another worthy mention is your Tips and Tricks section.

Feedback for the April 2014 issue of Digit

Ubisoft's open worlds
Why is Ubisoft so obsessed with open worlds? Read on to find out
http://dgit.in/asscrow

Wolf-Doom Pairup
Preordering Wolfenstein: The New Order will give you access to Doom 4 Beta. So buy, buy. buy!
http://dgit.in/wnword3

LETTER OF THE MONTH

✉ Hello, this is my first mail to you (Not really, this is like the 10th or 11th one. You didn't reply to the other letters). Before any of those 'suggestions and complains', let me start this email with some praise for your wonderful magazine.

'Hats off' is a term which doesn't even come close to your awesomeness. You guys have been a constant source of knowledge and fun. I started reading – or at least buying – the mag from 2006/2007. Earlier, I only used to play the games on the DVDs, but slowly started reading the mag too. The article choices are great, they're well written and you guys are funny! SKOAR! always cracked me up. I still remember that 'Spider Man 3' article of yours. And the way you replied to the mails! Please do me a favour and reply to this mail (If you plan on doing so) in that Skoar! fashion. I would love it, and so would other readers. Besides Skoar! I really like the Digit Diary. It's amazing how the mag is fun till the end. The

cover stories are always good. Fast Tracks are amazing. Although they're of no use to me, my father always read them (Past tense, yes, sadly.).

Now on to the suggestions and complains:
1. Skoar! I know that you still provide Skoar! digitally, but it's just not the same. Please try to continue that old Skoar!
2. Please proofread the magazine better. Each mag has approximately 15-20 mistakes.
3. It's time to change the 'Letter of the Month' award. Give away other things too – like a jacket, pencil box, etc.
As we're reaching the end of this mail, I'd like to say one more thing: "Keep the awesomeness alive!"

-Laxman Soni

You WIN Nothing!

▣ Yo laxative-man, stop running already! We hear you don't like our T-shirts, so you win nothing as per your request. N ve no ow 2 speel, u jst kneed 2 no ow to reed.

–Anonymous

and isn't, some of the myths and expectations surrounding working as a full-time game designer or developer, how to convince parents who are stuck on the wrong (older) view on video games, and so on. Should you do self-learning and start out without formal coaching or should you enroll in a professional game design course (the likes of which is offered at DSK Supinfocom, for instance), and what are some of the things to avoid when you're hunting for that perfect teaching institute. The article then sums up the state of the Indian gaming industry.

Personally speaking, I'm extremely excited about the gaming industry in India, and I encourage your decision, but advice you to do due diligence and research before taking the plunge into the gaming industry. Unlike the IT and services sector, gaming is increasingly being viewed as part of a burgeoning entertainment sector, with lots of scope for development and improvement. The outlook is extremely bullish and favourable, and I say this based on first-hand experience after attending industry events and talking to industry events in the Indian gaming sector. This space is booming, with not just big offshore studios widening their presence in India, but even the number of local games and studios we're producing.

–Jayesh

I'd like to read a brief article on creating a Windows Store app using XAML, and also want you to throw some light on the topic of "old but still in use technologies".

Wish you best of luck for your next issue. Thanks in advance!

–Jasmeet Chhabra

▣ Actually the deal amount can be looked at in multiple ways. Technically it was $4 billion in cash, $12 billion in Facebook stock and $3 billion worth of stock over the next four years. So $16b in hand and $3b differed. But hey what's a few billion here and there right?

–Siddharth

✉ Hi. I need some help regarding Game/App Development as a career for myself. Is there any future scope in it? I'm really mad about games. Are there any institutions teaching Game Development in

Maharashtra? A final question: how much are game developers paid? Please provide some good information about it.

–Hassan Khatib

▣ Hi Hassan! You're not the only one trying to find advice related to a career in game design or game development. We've responded to many such queries in the last one year, which is why we also commissioned an in-depth article from a professional game designer who studied at India's only gaming school (located in Pune), DSK Supinfocom. You can read the article in its entirety by visiting this link: http://dgit.in/CareerGaming. Also Pune University has a specialized game design course as part of its curriculum, so you would definitely want to check more on that. The article really throws a lot of light on everything that you should know before you decide to earn a living making games. What the job description is

✉ Please cover more Linux-related articles, i.e. Windows and Linux comparisons or Linux for beginners. Although I love using the Linux OS, I had to uninstall it immediately upon installing because the Linux environment is confusing. As everyone knows, Linux is far better than Windows but it's not user friendly.

Please provide products which are useful to middle class families. These can include lower priced products such as headphones, pen drives, memory cards, laptops, sound boxes, cabinets, motherboards, processors etc).

–Paul

▣ We have done Fast Tracks on Linux before which coveres everything from installation to advanced use. We try and cover all sorts of products, and will try to cover more mainstream products.

–Robert

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For the ease and comfort of the international visitors the organizer even offers FREE shuttle buses that zip between airports to show venues, and between the show venues and major hotels.

The future of hardware

Hardware research is all a-buzz this month. Here are some stories indicating hardware changes around the globe
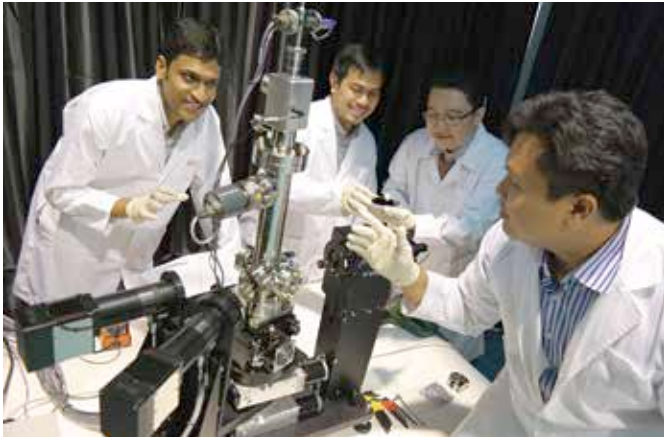
Smaller Hard Drives coming soon?

Newer, smaller hard drives en route

A team of scientists, led by Assistant Professor Andrivo Rusydi from the National University of Singapore, has come up with a new technique to study the interface between materials, allowing them to further develop improved solar cells, superconductors and even smaller hard drives.

Further understanding of materials interfacing will help scientists modify the properties of different materials with greater ease. "If you put two materials together, you can create completely new properties. For instance, two non-conducting, non-magnetic insulators can become conducting and in some cases ferromagnetic and superconducting at their interface. The problem is that we do not fully understand what is happening at the interface yet," says Rusdi.

To understand the physics of condensed matter, researchers are studying the interface between strontium titanate and lanthanum aluminate, insulators that act as conductors at their interface. During the study, scientists found a substantial amount of the charge carriers were missing.

"For this interface, a theory predicts that the conductivity should be tenfold higher than what is observed. So, 90 per cent of the charge carriers - the electrons - are missing," adds Rusydi.

Scientists used high-energy reflectivity coupled with spectroscopic ellipsometry to search the missing charge carriers. They deployed bright synchrotron radiation source at the Singapore Synchrotron Light Source at NUS and Deutsches Elektronen-Synchrotron and floodlighted the interface of the two materials.

"Absorption of synchrotron radiation at specific wavelengths showed that the energy state of the corresponding electrons and unveiled their hiding place in the crystal lattice. It was found that only about 10 per cent of the expected electrons are free to migrate to the interface of the two materials to form a conduction band. The remaining 90 per cent are bound in the molecular lattice at higher energy states that were not visible to light sources used in earlier searches," says the study.

"This came as a surprise," said Asst. Prof Rusydi. "But it also explains why more than just one layer is necessary to fully unfold the interface properties."

He further elaborated, "All the electrons in the material are like small antenna that respond to electromagnetic radiation at different wavelengths, depending on their energy state. If only a part of the electrons migrate to the interface, you need a bigger volume to compensate for the symmetry breaking." The study was published in the journal Nature Communication.

ATM A.I.

Scientists have developed a new technology that will help ATMs release caustic chemicals to attack robbers and vandals. Researchers from ETH University, Zurich have developed a way to contain hydrogen peroxide and manganese dioxide divided by thin plastic layers inside the ATM. If force is applied on the ATM, these plastic layers break and the two chemicals mix which results in the release of oxygen, water vapor and heat, in the shape of foam which can go up to 80 degrees Celsius in temperature. Apart from this, on the application of force on the ATM, the currency notes contained in it are also sprayed with a dye and DNA nanoparticles. The former helps make the currency unusable while the latter helps law enforcement track down the notes.

Wendelin Jan Stark, a professor at ETH University said that the research was inspired by the bombardier beetle, an insect that sprays its attackers

Safer ATMs on the way!

with a chemical, created with the help of enzymes in its body, that can kill ants and intimidate frogs. Apart from ATMs, the research can also be used to help protect other valuable objects in places like museums and art galleries.

ATM attacks are quite common in Europe and have been steadily on the rise in India as well. According to security

MediaTek MT6592

The World's First True Octa-Core Processor for Smartphones
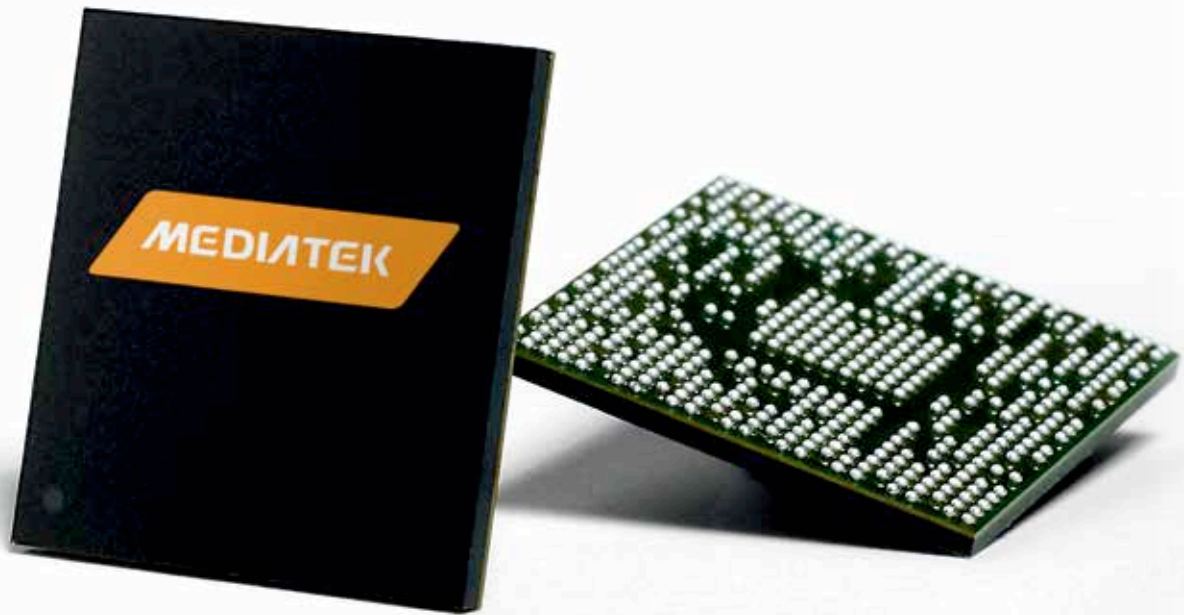
True Octa-Core Mobile Platform

Octa-Core 1.7-2.0GHz
- All 8-cores can run at full speed at the same time for more concurrent apps
- Industry-leading Dual-Cluster/Dual-Active (DCDA) architectural design

Powerful Mali450-MP4 Graphics Core
- Clocked at 700MHz, delivering 152Mtri/s and 2.8 Gpix/s performance
- Providing uncompromised user experience for Full-HD display at 60fps

Advanced Multimedia Features
- 1080p 30fps Video w/ World-first HEVC & VP9 playback support

- ClearMotion Technology : Motion-Blur Free Video Playback as 60 fps
- MHL 2.0 support for multi-screen applications/ultra-portable PC - High-Fidelity 24-bit Audio support

Android v4.2.2 "Jelly Bean" and v5.0 "Key Lime Pie"

Chromium browsing experience on mobile phones/tablets

Multiple-window, laptop-like experience on mobile devices

MEDIATEK

everyday genius

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For Local Enquires: sales.india@mediatek.com / Tel: +91 120 4343900

Dr Band-Aid to the rescue!

reports, ATM theft resulted in losses of 10 million euros (Rs. 85 crores approx.) in the first half of 2013, alone. Hopefully, an efficient security system like this will serve as a deterrent to criminals in the future.

Dr Band-Aid

Engineers from two American universities have developed an electronic patch similar to a band-aid that can stick to a user's skin and relay health information to a phone or computer. The patch includes silicone chips encased in a plastic case and silicone fluid that help it to stay stuck to the skin even through continuous movement.

The research team comprised of engineers from the University of Illinois and Northwestern University and was headed by John Rogers and Yonggang Huang from the former and latter universities respectively. In order to make sure that the wiring inside the patch does not break because of the way human skin is always in motion, the engineers designed them to unfold and fold according to the skin's motion.

With the rising popularity of wearable technology and fitness monitoring devices, the patch could make sense to lot of users. Considering how malleable and

unobtrusive it is, many users would prefer using it instead of wearing another gadget around their wrist or arms.

In the future, the research team wants to add biomechanical sensors to the patch to make it possible for it to analyse a user's sweat and transmit more in-depth health and medical information.

To get a better idea of how the patch works, check out the video: http://dgit.in/ehpch

Enter: Iris Cam

After Glass, Google is working on developing a contact lens with camera and sensors in it. The camera would enable users to take hands-free pictures and help the blind navigate.

According to reports, the internet giant has a patent pending for a camera lens with micro camera containing embedded sensors that can be controlled by blinking. The patent combines ideas from Google Glass smart glasses and Google's tear-scanning smart contact lenses.

The camera lens has sensors that can detect light, colour, faces as well as specific objects. The device could help vision-impaired people navigate by spotting that they are heading for a busy road and telling that

person's smartphone to chirrup a warning as well as inform them when it's safe to cross. The wearable will be controlled by blinking and the lens will communicate to a smartphone or other devices wirelessly.

Google is also working on a contact lens to help diabetics monitor their glucose levels by taking readings from moisture in users' eyes. Project's cofounders, Brian Otis and Babak Parviz said in a blog post: "We're now testing a smart contact lens that's built to measure glucose levels in tears using a tiny wireless chip and miniaturized glucose sensor that are embedded between two layers of soft contact lens material".

At the CES 2014 Innovega has unveiled iOptik augmented reality lenses that interact with a pair of smart glasses to beam a head-up display right into your vision. A company spokesperson stated that the integrated contacts with iOptik glasses fitted with tiny projects, looks quiet similar to regular glasses and users also have an option to get prescription contacts.

ASUS launches new card

ASUS has announced a new high-performance graphics card R9 295X2 in India. The card comes with AMD Radeon R9 series graphics-processing units (GPUs). ASUS claims that the card is equipped with a highly-efficient, hybrid liquid / air cooling system. It also comes with an 8GB of super-fast GDDR5 video memory.

The company says that R9 295X2 users can also benefit from GPU-tweaking with the bundled GPU Tweak tool. The utility will enable users to push the dual GPUs to extreme limits to get the most out of the card. Users will also be able to toggle

video memory clock speeds, voltage levels, cooling-fan speeds and power targets. The card will also come with a GPU Tweak Streaming tool which lets users share on-screen game play with others on the internet in real time.

The R9 dual GPUs run at 1018MHz of clock speed and ASUS claims that the card is able to play games at the latest 4k/UHD (ultra high definition) resolutions of up to 3840x2160 pixels. Users will also be able to connect up to six displays for an immersive experience. The R9 295X2 supports 2560x1600 pixels output resolution through DVI and 3840x2160 pixels resolution through HDMI and DisplayPort.

SPECIFICATIONS:

- **3D chip:** AMD Radeon R9 295X2
- **DirectX version:** DirectX 11.2
- Interface: PCI-Express 3.0 x 16
- **Memory:** 8,192 MB
- **Memory Type:** GDDR5
- **Clock frequency - GPU:** 1,018 MHz
- **Clock frequency - Memory:** 1,250 MHz

ASUS claims that the card doesn't require an assembly and comes with hybrid liquid / air-cooling system. The fan on the card comes with an underlying radiator which dissipates heat from the liquid-cooling pipe work. The dedicated liquid-cooling helps both the GPUs, card's memory chips and regulators stay cool and thereby increasing stability.

Connections

Web Watch
22 In this month's edition of Web Watch we take a look at what Google, Twitter and Facebook are upto

App Watch
24 We bring to you an assortment of apps that you must try out. These include essential tools and some fun stuff too.

The evolving Mobile Age

Modular cellphones, wearables and amping security on them. Phones seem to be in a state of constant evolution.

Update: Project Ara

Project Ara, Google's modular smartphone project, is expected to be available for purchase early next year. The phone is also expected to cost $50 (₹3,000 approx.) and will be available in plain grey colour in order to encourage buyers to customize it. All of this was revealed by Paul Eremenko, the team leader of Project Ara at its first developers conference at Google's Mountain View campus.

Project Ara deals with the development of a "modular" smartphone – a smartphone

Project Ara –The world's first modular cell phone

that a user can upgrade with individual components and parts instead of spending money on an entirely new phone. These components will be of the miniaturised variety and will also rely on 3D printing. Eremenko revealed that the chassis or frame of the Ara smartphone will last around five to six

years and will hold all the various components in place with the help of electro-permanent magnets. The components will communicate with each other using the UniPro standard, a high-speed interface platform developed for use in mobiles.

Eremenko also weighed in on the fact that even though Project Ara supports Android, Android, as yet, does not support the drivers required for modular hardware. He said that because Google owned the project, that problem should be solved soon.

Eremenko also revealed the expected timeline for Project Ara that includes two more developer conferences in July and September of this year respectively. The alpha build of Project Ara is expected in August of this year and the beta build in January 2015, which will be made available for purchase.

A Module Developers Kit for Project Ara has also been unveiled by Google. The Kit has been released by Google's Advanced Technology and Projects (ATAP). Mobile developers who were anxiously waiting for Google to release more details about the project will now get a better idea of what's the possibilities are with the Ara components. Project Ara is basically a concept of building a customized smartphone with modular components with the user deciding which components he/she would want (just like building an assembled PC). Google hung on to Motorola Mobility's ATAP division after selling Motorola to Lenovo.

Contents of the MDK:
It details how Google is considering different sets of configurations for different sized metal endoskeletons. The endoskeleton is basically a single board which will hold all the components of the phone together.

The Project Ara smartphone will come in three different sizes: a mini, medium and large (In future) sizes.

Google is currently working on different design of rib crosses on the endoskeleton.

Google notes that Ara smartphones cannot have vertical "spines or vertically configured modules for front panelling. All front-facing modules must run horizontal and won't have an end to lean on and will therefore use EPM and a ball-spring

plunger assembly to ensure they remain in place.

The EPMs (Electro-Permanent Magnets) which keeps the

Recently, Phonebloks had uploaded a video which revealed the team working on Project Ara (http://dgit.in/pbltara) The MDK of Project Ara can be downloaded from http://dgit.in/mdkara.

modules of the Ara phone in place will have "two selectable states: the attach state and release state, corresponding to high and low levels of magnetic force."

Ara devices will most likely be compatible with most standard apps and ATAP has encouraged developers "to pay attention to application stability and graceful behavior in light dynamically varying availability of hardware resources (as with hot-plug, for instance)."

The iWatch (and other wearables)

According to reports, Apple has received samples of flexible PCBs from leading Flex-

Your smart gadgets deserve nothing but the smartest protection.
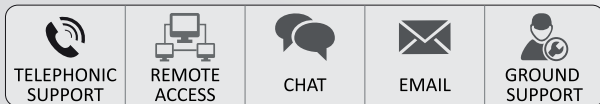
Mobile watch

28
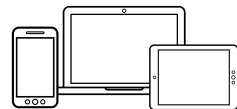
Security Watch
It's a dangerous world out there full of trojans, exploits, malware and other baddies.

CTIA
The Wireless Association®

Smartphone kill-switches
Multiple device makers have agreed to include kill-switches in their devices to help curb thefts
http://dgit.in/SmartKill

Apple's entry into wearable tech?

ible PCB suppliers for its next generation iWatch. The reports also suggest that Apple may launch the iWatch in the third quarter this year.

Apple has reportedly received these PCBs from Flexium Interconnect, Carrer Technology and Zhen Ding Technology Holding. Reports suggest that the tech giant will examine the parts before approving them for the iWatch. Zhen Ding is Apple's largest supplier of printed circuit boards, and plans to spend over $100 million to add production capacity. The PCB manufacturer expects orders not only for the iWatch, but also for the iPhone 6 and iPhone phablet.

Flexium plans on spending nearly $50 million to $66 million to increase production of its mid-range to high-end products which will lead to a 20% increase in revenue for the company. Carrier Technology is also planning to expand production in China and Taiwan and will spend $33 million on the project this year.

Previous reports about Apple's iWatch reveal that the wearable device may use solar panels and a magnetic induction charging mechanism. The New York Times reports, that

the solar charging technology may overcome battery life problems. NYT also says that Apple is working on wireless charging technology using magnetic induction. Apple has also filed iWatch trademarks in Japan and Russia.

Apart from Apple, Motorola and LG are also planning to launch their Android wear based smartwatches this year. Motorola Moto 360 and LG G Watch will support features like "Ok Google" assistant and will be compatible with a wide range of devices. The devices are expected to be launched over the summer.

According to other reports, Samsung is working on a new variant of its Galaxy Gear 2 smartwatch that will support integrated telephony functionality. The smartwatch will come with an integrated USIM module, that will let you make calls without the help of a synced smartphone.

Anti-theft remote kill switch coming soon to all smartphones

Google, Nokia, Samsung, HTC and Motorola, among other large phone makers, have agreed to introduce a built-in anti-theft feature in their

phones that will allow users to remotely wipe data and lock a stolen device. The feature is expected to be introduced in all smartphones after July 2015 thanks to increased pressure from American politicians. If users do manage to reclaim their lost devices then the feature will allow them to restore data that has been wiped out.

However, as per the discussions between the companies, the proposed feature will be 'opt-in' which means that users will have to actively go into their phone settings and turn it on. This could mean that users who don't have knowledge of the feature will still not turn it on or may choose not to if the feature is hidden behind scores of menus and sub-menus.

Android users can currently already remotely lock and wipe data from a stolen device by turning on

SGS5 sensor – flawed?

Android Device Manager in their phone's settings. Apple also introduced the Activation Lock feature in iOS 7 that offers similar abilities. We're not sure how the proposed feature will differ from the existing options but if it means that the security options take centre-stage due to the proposal, then we're all for it.

Researchers bypass the S5's fingerprint sensor

SRLabs points out that using fingerprint as credentials for local user authentication has two flaws as compared to the traditional password system.

First up is the limited revocation, which means if a fingerprint gets stolen, there's no way to change it. Second is the credential spread. "Users leave copies of their fingerprints everywhere; including on the devices they protect. Fingerprints are not fit for secure local user authentication as long as spoofs (fake fingers) can be produced from these pervasive copies," said the firm.

In the meanwhile, PayPal has issued a statement, saying the company has taken the SRLabs findings seriously.

"The scan unlocks a secure cryptographic key that serves as a password replacement for

the phone," the statement read. "We can simply deactivate the key from a lost or stolen device, and you can create a new one. PayPal also uses sophisticated fraud and risk management tools to try to prevent fraud before it happens. However, in the rare instances that it does, you are covered by our purchase protection policy."

Of laws and numbers

Laws and business-related studies and figures seem to be all people are talking about with respect to the online world this month

Facebook Money

Facebook is reportedly looking at e-money services; including the ability for people to make peer-to-peer money transfers. It has already applied for an e-money license in Ireland, allowing Facebook to make online transfers using money stored on Facebook.

According to reports, Facebook has spoken to several consumer-payment companies, companies, as well as several of their competitors. "I would be surprised if Facebook's conversations were only limited to those three," He added.

Facebook has offered Azimo $10 million to recruit a co-founder as a director of business development. Azimo's CEO and co-founder, Michael Kent declined to comment on the news but said, "We talk to

Facebook Banking

including TransferWise, Moni Technologies and Azimo among others. Though, the social networking giant declined to comment on the report for now.

"My impression is that Facebook is still trying to get a sense of the market, and see whether it would suit them better going off and doing it themselves or to work in partnership with others," Mike Laven, CEO of Currency Cloud, the London-based startup that powers payments at the back-end for all three of these

everyone and are lucky enough to get a bunch of interesting offers and approaches coming up although we prefer to keep those to ourselves. It would be very cool if Facebook and others got into money transfer, though, wouldn't it? Could be truly transformational to an industry that has ripped off hard-working migrants for years."

The move represents a challenge as well as a huge opportunity for Facebook. The networking giant's last quarterly

earnings for Q4 2013 showed a total average revenue of $2.14 per user, but only $0.20 of the total came from non-advertising sources. This will also help Facebook generate revenue from Whatsapp which it acquired with a strict 'no-ads' policy.

Cyber India: 2020

The digital universe in India is predicted to double in size every two years and grow ninefold between 2013 and 2020, from 326 exabytes to 2.8 zettabytes, says a new research conducted by IDC and tech giant EMC. Globally, Digital Universe is set to hit 44 trillion gigabytes by 2020, rising from 4.4 trillion gigabytes in 2013.

Currently, 60% of data in the digital universe is attributed to mature markets such as Germany, Japan, and the United States, but by 2020, the percentage will flip, and emerging markets including India, Brazil,China, Mexico and Russia will account for the majority of data, says the report.

"India's Digital Universe is growing fast driven by increasing digitisation across business and government; and a steady rise in capitalization of the social and mobile phenomenon

by everyone. It's full of untapped potential and once unlocked it promises to inform us in ways that can improve lives, find remedies to incurable diseases, redefine industries, discover new markets, help solve local community challenges such as hunger and poverty – the possibilities are endless." EMC India and SAARC President Rajesh Janey is quoted as saying.

According to the report, wide adoption of wireless tech along with rise in Internet consumption have played a pivotal role in massive growth in the digital universe. For India, increased digitisation across sectors including business and government along with growth in social and mobile usage have helped drive India's Digital Universe.

The study also found that that more than 50% of the Digital Universe in India needs protection. "This is significant especially if we look in the context of India ranking 4th in terms of most phishing attacks globally in 2013. 4.4 trillion gigabytes of data created in 2013, less than half the data that needed protection received protection, things most at risk are Corporate financial data, Personally identifiable information (PII), Medical

> "China already accounts for 14 per cent of the digital universe. Though US' share has declined as the other emerging markets have grown, it is still 26 per cent. India's share is also growing from 3 per cent in 2010 to 6 per cent in 2020."
>
> – EMC India and SAARC President Rajesh Janey

records and User account information. Organisations based in India (80%) are more likely to have experienced data loss and/or systems downtime within the past year, than those overall across Asia Pacific and Japan (71%)," says the study.

The report also sheds light on growth of Internet of Things (IoT), which is predicted to contribute up to 10 percent of total data generated in India by 2020. Currently, data from these connected device have about 4 percent share in the total data in India.

Big Brother Google

Google Inc. has updated its 'Terms of Service' to include automatic scanning of incoming and outgoing emails to create targeted ads, customized search results and more.

'nuff said!

The changes follow recent legal challenges that the internet giant is facing over its handling of email from privacy groups. Microsoft's recent "Don't Get Scroogled" campaign draws notice to Google's email-scanning practices and states that unlike Google, Microsoft Outlook.com doesn't

go through users emails for keywords to target users.

In March, a US judge decided not to combine several lawsuits that the internet giant is facing for violating users privacy. Google defended that Gmail users have signed the terms of service and therefore already agreed to have their e-mails read. The change in terms of service may be a move to prevent similar lawsuits in the future.

Google's updated 'terms of service' added a paragraph stating that "our automated systems analyze your content (including e-mails) to provide you personally relevant product features, such as customized search results, tailored advertising, and spam and malware detection. This analysis occurs as the content is sent, received, and when it is stored."

Google spokesman Matt Kallman said in a statement that, "We want our policies to be simple and easy for users to understand. These changes will give people even greater clarity and are based on feedback we've received over the last few months."

Google had made the last update to its Terms of Service in October 2013 and included the internet giant's use of Google Account holders' profile names, photos, and actions, to help with displaying ads and for other commercial purposes.

"Business don't need to wade through the vast amounts of data but instead can extract tremendous value by focusing on high-value, "target rich" data that accounts for 1.7 per cent of the current Digital Universe," IDC India MD Jaideep Mehta said.

Must-have apps for the month

This time around, we check out an assortment of utilities, games and navigations apps

Evernote Food

Evernote Food is a food log app developed by the makers of Evernote, the notepad app that helps you remember everything. And in this case, it's main focus is on helping you remember how you can get your hands on your favourite food.

Evernote Food, a free app, helps you keep track of the food you love. From recipes to restaurants, this app is dedicated to helping foodies document it all. The home screen is divided into four tabs: Explore Recipes, My Cookbook, Restaurants and My Meals. Simple, yet it covers all the categories you'll need.

The 'Explore Recipes' section includes a list of preselected recipes by Evernote. Selecting a recipe here will take you to the blog that it was saved from. You can mark recipes here that you want to try as favourites i.e. "clip" them, and they get added to 'My Cookbook' so that you can find them later.

My Cookbook is a section where you can access saved recipes or enter your own from time to time, making it a consolidated collection of tried and tested recipes for easy access. You can even access your cookbook section from the Evernote app, which is available for all your devices.

Location-based data in 'Restaurants' is powered by

Zombies, Run!

Foursquare. It remembers places you've eaten at – particularly useful in marking the restaurants to visit again and keep your distance from. You can search for nearby restaurants, which is especially useful for travellers exploring a new place.

The 'My Meals' section in Evernote helps you keep track of individual meals that you've eaten. There are fields here to be filled such as meal title, place, cuisine, tag, meal notes, date, time and place. You can add pictures, and thankfully,

Evernote allows you to select what resolution you want the picture in so as to save on space.

All in all, a great app for both, the serious foodies as well as the casual food lover.

Android: http://dgit.in/1icmB7R
iOS: http://dgit.in/1fOhOpF

Zombies, Run!

No, *Zombies, Run!* is not another zombie game. It's a fitness and health app and a unique new way of getting people to exercise.

Zombies, Run! is an immersive running game. Before you begin your morning run, start the app and plug in your earphones and just 100 yards away from you the zombies take over. The extremely creative story line dictates the task you must perform through audio. These tasks are called "missions", which you must complete before preset time intervals. During these intervals, you can listen to music saved on your phone. The music fades out as the app announces that you've collected vital items for your mission such as food, water, medicine and even underwear.

There are also "challenges" to overcome where the app tracks your running speed and requires you to outrun zombies to win. As long as you're running faster than the zombies you won't be eaten. You can share your run logs and

Evernote Food – iPad edition

Music Downloader

route logs with friends online via Zombielink. The route tracking part works with GPS. If you're running in an indoor track or on a treadmill, then you can use the app with the accelerometer to keep track of your speed.

Zombies, Run! is available on the App Store and Play store for $3.99 (₹244) and on the Windows Phone for $1.99 (₹121).

Android: http://dgit.in/1icNGld
iOS: http://dgit.in/1jvRvDA

Music Downloader
Published by Paolo Basilicata, Music Downloader is an app exclusive to Windows Phones. Available for ₹70, the app lets you download songs and music directly from your smartphone. You can also watch YouTube

Poweramp

videos and then download the audio. It provides an option to link songs to each of your contacts to serve as customisable ringtones.

There's also the ability to create playlists and play your music directly from the app or let it play in the background with its background playlist feature. The background picture for each playlist/song is customisable making it easy to identify.

Music Downloader allows you to stream the song online and listen to it before going ahead and downloading it. It uses SoundCloud as its source to allow users to download music freely and legally.

Windows Phone:
http://dgit.in/1hcZLLu

Poweramp

Poweramp, a powerful music player, is available as a trial version for Android phones on the Play store. Once you're satisfied you can purchase the unlocker for the full version. The UI is clean and easy to use. The controls are big and well placed so that even the most novice user feels at ease using the app.

What's great about Poweramp is that it supports all the possible music formats including MP3, MP4/MP4a, WMA, OGG, FLAC, WAV, APE, TTA, WV, AIFF and MPC — basically, almost anything and everything an average user would play on his device on a daily basis, and then, some.

Albums are listed by their cover photos and in case any are missing a cover picture the app offers to download one for you. You can set the folders in the file system from within which the app should look for music, thereby preventing random audio clips from being played.

You can set up different profiles according to the sound output you're using.

The processing options are numerous. It has a 10-band equaliser that can be used individually in each song as well as knobs and sliders to control the treble, bass and balance. With so many available options and great sound to top it all, there's no doubt that Poweramp is the best music player app available.

Android:
http://dgit.in/1mAjjwU

Sygic & MapmyIndia: GPS Navigation

Sygic & MapmyIndia: GPS Navigation is a one of a kind, voice-based, 3D navigation system. The best thing about it is that the app doesn't requires online connectivity to work. It stores the maps offline to your phone for regular use. The offline GPS is extremely useful if you're travelling in unfamiliar parts of India and don't have an active 2G or 3G connection. There's no way a weak signal will leave you stranded if you have this app.

Since you have a 3D view of the map, the navigation app is more realistic and immersive. The colourful animations ensure an enjoyable experience while you navigate through towering buildings and congested roads.

MapmyIndia also offers you a voice guidance service to ensure that you are taking the shortest route and don't miss a turn or go in the wrong direction. It even gives you weather updates while you're on the move.

A very helpful feature of this app is the ability to search by house number or

MapmyIndia GPS Navigation

OverDrive Media Console

POI (Place of Interest). Over 10.33 million registered POIs for 50 cites in India allow you to obtain turn-by-turn navigation right upto the very doorstep of your destination. The millions of registered places of interest include petrol pumps, coffee shops, restaurants and so on. Each have a rating and telephone number, so you can accordingly decide where to go.

It provides a list of emergency numbers to call, if the need arises.

As with most apps these days, you can connect to Facebook or Twitter and let your friends know where you're headed. If you're struggling to remember the address of a place you've been to and have a photo that you've taken there, simply enter it into the map. It will use the EXIF data from the photo to find the geological co-ordinates and come up with a route to guide you there. If

your friends are also using the app, you can message or mail them and even map a route to their co-ordinates, assuming that they're nearby.

Sygic & MapmyIndia is an free to use app that has every conceivable function that you could want in a navigation app, even ones that you haven't thought of yet.

iOS: http://dgit.in/1f1sUdR

OverDrive Media Console

OverDrive Media Console is an e-reader and library app for your e-books and audio books. More than 18,000 public libraries worldwide, including colleges and schools, share their titles via OverDrive. It's very similar to a real library where you can borrow books for a certain period of time. If a book you want has already been checked out, you can be put it on a waiting list and receive it in a couple of days as soon as it's available again. However unlike a library, once the expiration date on the book passes you no longer have possession of it. Hence no late fee. You can search for libraries by address zip code or region.

Using your digital library card and the 'Get Books' option, you can peruse the online library website and choose which book you would like to check out.

The app is constantly updating with new features, and recent updates included a dictionary, early return periods and background file downloads. The only limitation, for now is the fact that this free app is only available for Windows Phone.

Windows Phone:
http://dgit.in/1icOsif

Heartbleed hackers
Hackers are on the lookout for Heartbleed affected websites to get easier targets
http://dgit.in/HackBleed

Zeus cozies up to India
India has been found to be the third most attacked nation by the Zeus malware that steals sensitive information
http://dgit.in/1stEqSE

Heartbleed, and more

Heartbleed has sent alarm bells ringing across the world fearing millions of passwords, credit card numbers and other sensitive information open to hackers. We take a detailed look at the Heartbleed bug and other important developments in the security segment.

Heartbleed – a recently uncovered security bug – has triggered a panic globally. While many of you want to believe Heartbleed OpenSSL vulnerability is overblown, it appears the bug is much worse than our imagination. In fact, Heartbleed is being considered as the biggest and most widespread vulnerabilities in the history of the modern web.

Heartbleed is a bug within open source protocol "OpenSSL", which is widely used to encrypt web communications. Several web giants like Google, Amazon, Yahoo etc. use the protocol.

Researchers from security testing and software company Codenomicon and Google, who found the vulnerability, explain that Heartbleed allows stealing information protected, under normal conditions, by the SSL/TLS encryption used to secure the Internet. SSL/TLS provides communication security and privacy over the Internet for applications such as web, email, instant messaging (IM) and some virtual private networks (VPNs).

"The Heartbleed bug allows anyone on the Internet to read the memory of the systems protected by the vulnerable versions of the OpenSSL software. This compromises the secret keys used to identify the service providers and to encrypt the traffic and the actual content. This allows attackers to eavesdrop on communications, steal data directly from the services and users and to impersonate services and users," add researchers.

A fix for OpenSSL has already been released and deployed. However, Operating system vendors and distribution, appliance vendors, independent software vendors have to adopt the fix and notify their users. Service providers and users have to install the fix as it becomes available for the operating systems, networked appliances and software they use.

Major services such as Google have already released security patches in this regard. While BlackBerry has plans to release a security patch for BBM, Twitter in an update says it is monitoring the situation.

Did the NSA know about it?

A Bloomberg report citing unidentified sources alleged the US' National Security Agency (NSA) knew about the heartbleed vulnerability for at least two years and used it regularly to gather critical information.

NSA, however, denied this, stating that they became aware of the vulnerability only after it was made public in a cyber security report.

"The Federal government relies on OpenSSL to protect the privacy of users of government websites and other online services. This Administration takes seriously its responsibility to help maintain an open, interoperable, secure and reliable Internet. If the Federal government, including the intelligence community, had discovered this vulnerability prior to last week, it would have been disclosed to the community responsible for OpenSSL," says the security agency in a statement.

Kaspersky Labs claims that it has uncovered evidence of a few hacker groups being involved in state-sponsored cyber espionage were running such scans.

"Shortly after news of the Heartbleed Bug first surfaced, Kaspersky Lab uncovered evidence that a few hacking groups believed to be involved in state-sponsored cyber espionage were running such scans. Later, the Team at Kaspersky Lab identified such scans coming from 'tens' of actors. The numbers were gradually increasing and this was even more evident when security software company Rapid7 released a free tool for conducting such scans. This problem is insidious and devices besides servers could be at risk because they run software programs with vulnerable OpenSSL code built into them," said Kurt Baumgartner, Researcher - Kaspersky Lab in a statement.

Alerts in Indian cyberspace

The Indian cybersecurity sleuths issued an alert against Heartbleed:

"A remote attacker could exploit this vulnerability by submitting crafted TLS or DTLS heartbeat packets to an affected device to retrieve sensitive information, such as private keys, user name and passwords or contents of encrypted traffic from process memory. By leveraging this information, an attacker may be able to decrypt, spoof, or perform man-in-the-middle attacks," says the Computer Emergency Response Team of India (CERT-In) in its latest advisory.

The heartbleed bug

Stricter internet control
China call for a tougher control over in the internet at a recent meet with many asian countries
http://dgit.in/MoarControl

Greater Heartbleed
Heartbleed gets worse with attackers using it to make fake websites appear completely authentic **http://dgit.in/BleedMore**

Security watch

Phishers using AAP and Arvind Kejriwal as bait: Symantec

Symantec, which spotted a website that spoofs Facebook appearances claims phishers are using Kejriwal and his party as bait to attract users to submit their login credentials on a fake Facebook page. The phishing site was hosted on servers based in Lansing, Michigan in the US.

The website 'Unite With Us Against Corruption' features a poster of the Aam Aadmi Party along with a fake Facebook "like" button. The site's background image features a picture of the party's leader Arvind Kejriwal and his Twitter tagline: "Political revolution in India has begun. Bharat jaldi badlega."

Phishers use Kejriwal to dupe people

"Phishers frequently use the same template to host different applications but this time, they forgot to change the reference to cute baby pictures. After the user enters their login credentials, the phishing site redirects the user to an acknowledgment page. The Web page then asks the user to click another "like" button. How-

Are fingerprint scanners so vulnerable?

ever, the button is just a dummy and does not perform any functions. If users fell victim to the phishing site by entering their personal data, phishers would have successfully stolen their confidential information for identity theft purposes." points out Symantec in a blog post.

Fingerprint sensor hacked

Back in September last year, German researchers managed to crack the protection around Apple's fingerprint sensor on the iPhone 5S. Researchers used "fake fingerprint", which could be put onto a thin film and used with a real finger to unlock the device. And now, the fingerprint sensor on Samsung's new Galaxy S5 has been cracked with the same trick.

Germany-based SRLabs released a video demonstrating the trick. Researchers used a "wood glue spoof", made from mould of a fingerprint smudge left on smartphone screen. According to SRLabs, the fingerprint sensor in the S5 is shoddier than what was found in the iPhone 5S.

Facebook changes its privacy features... Again!

Facebook is going to tweak its privacy features again based on user feedback. The company plans to bring three major changes which are currently in development and testing phase. Some reports suggest that the changes might already to visible to some users on the website. Facebook says that it conducts more than 80 trillion privacy checks per day to ensure that users haven't shared their posts with wrong people accidentally. The social network is infamous for changing its privacy policy every now and then.

"Some people have felt Facebook privacy has changed too much in the past, or we haven't communicated as well as we could have," said Michael Novak, Facebook product manager. "Now we're thinking about privacy not just as a set of controls or settings, but as a set of experiences that help people feel comfortable."

Facebook's new privacy features include Audience selector, new style sharing settings and Privacy checkup.

Facebook has moved the audience selector to the top of the mobile interface right above the status. Earlier, it was placed right above the keyboard next to smiley, location and other icons. The new change also elaborates the sharing setting as it gives a proper title to whom you are sharing your content with, such as "Friends" and "Public".

All of you Facebook users must be familiar with the "Public" and "Friends" options in the drop down menu that you select during sharing your status. Facebook will start elaborating these terms from now on and explain what those terms really mean. A new dropdown menu will be added which contains small descriptions such as "Anyone on or off Facebook" and "Your friends on Facebook."

Another change that Facebook will bring is a new "privacy checkup" pop-up which will ask people who haven't changed their privacy setting from Public for some time now.

Most importantly, Facebook will incorporate the option of making cover photos private.

Tech @ Work

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Industry connect
We interview Mr Rajiv Bapna,
Founder and Director of Amkette
and Mr Ravi Manik of Broadcom

Grid Autosport Announced
The next Grid game, 'Grid Autosport' claims to be
high on authenticity. Announces a June release.
http://dgit.in/gridajune

Elementary, my dear

Get clued into the super-secret world of cyber forensics. Here's how you can become a digital detective.

Vaibhav Kaushal
readersletters@thinkdigit.com

Cyber Forensics (or 'Digital Forensics') deals with evidence found on computers and digital storage media that's related to crime scene investigations. If the idea of tracing back a crime to unravel the truth gets your adrenaline pumping, this is the job for you. While the skills required to collect digital evidence and data may be difficult to acquire, once you've mastered them, you can proudly call yourself the Sherlock Holmes of

cyber crime. Though on the façade, digital forensics may appear different from real-world forensics, the sciences are quite similar at the conceptual level.

Information retrieval

Gathering evidence without contaminating the scene is a key part of the process. If you contaminate the source of evidence, the rest of the case is on an unsure track already. Which is why it is of foremost importance that evidence media – called "exhibit" in legal terminology – is examined with care. This means that the investigator must take a

raw image of the media because doing so might reveal the tracks of the crime. If the original image doesn't match this duplicate image at a later stage of analysis, forensics experts will know.

The devil is in the details, so let us break down for you how information retrieval works:

- **Data storage:** This part involves maintaining a file structure index and allocating actual data somewhere else. Technically, a B-Tree is maintained for storing the directory structure on each partition (letting users know which file and folder is inside which file/folder). The space for this B-Tree index is normally preallocated.

  When you normally delete a file, it's sent to your Trash/Recycle Bin which

is just another folder maintained exclusively by your operating system. When you delete the file from your recycle bin, it remains on your computer because the only thing the operating system deletes is the entry from the folder structure (the B-Tree Index); the data remains in place. This leaves the window to retrieve deleted data open. This is the window that data-recovery tools use. Undoubtedly, data retrieval in crime scene investigation is of higher importance than mere recovery of photos, thus the demand for highly skilled recruits.

- **Physical storage:** Data stored on a hard disk is stored as a sequence of bits, and each bit is physically stored by altering the magnetic value of a very tiny point on the disk. As imperfect as the world is, the magnetic value on the disk doesn't reflect a perfect binary value. For example, if the original state of a bit was at perfect 0, firing an electromagnetic pulse corresponding to 1 will cause the value to come to 0.92. Now, if you fire an electromagnetic signal to set that value to 0, it would come to a state that would probably indicate a value of 0.1 and then again you fire the pulse to set the bit to 1. This time, it goes to 0.95. Now, these values are fairly away from 0.5 and are easy to be determined as 1 or 0. However, if you notice the numbers above, a particular bit value can represent fair number of value overwrites on the same place. The accuracy of guessing the right value after x number of over-writes decreases as x increases. There are tools that do this fairly well. For one of these tools to work, they would need the exact magnetic value on the disk platter for each bit.

Mac OS X lets you remove the files in Trash securely without a third-party tool (just press Command key to show the option)

Not a lot of thought is required to conclude that to safely erase data from a disk. You'd need to overwrite the same disk portion where the data was stored, multiple times. The more random these values and more the number of overwrites, the lower the chance of correctly guessing the original value. The process of copying the bit-level detail of magnetic values on the disk is called "imaging". This it does by taking a snapshot of the entire disk/partition and saving it as a file. There are tools available for this process and a typical imaging session takes a lot of time because of the excruciating level of detail required. Speaking technically, imaging must always be done on the evidence-disk (the disk on which the evidence of crime is suspected to be present) in the read-only mode.

Information/Data interpretation

Once the disk image has been taken, the next task is to understand what the data means. This step involves many tools and in-depth comprehension of the way different pieces of software interact with each other to trace back the circumstances of the felony. You may also be required to understand the operation of the OS and/or certain applications, which might have been used to commit the crime. While data interpretation is a complex process, we'll lightly touch upon it to give you an idea of the work involved in this step:

1. **Know the OS:** Data logged by operating systems sometimes plays a key role in determining what happened. Depending on the OS, the investigation areas might drastically change. Take Windows, for example; it stores a decent log of things that you try to do on the system. Activities such as installing an application and failed network login attempts are logged, and they can give a boost to an investigator's perception of what happened. Sometimes, one has to look into the registry to ascertain the tools that were used or their settings (many tools on Windows store their settings in registry).

2. **Fish for hidden file content:** The data stored on the disk makes up the largest part of the investigation. A number of times you may have to look at a stockpile of files that may appear useless to their original user, but will eventually prove quite useful. Auto-save information saved by Microsoft Word or backup files generated when editing files by Linux OS are some of the mildest examples. The good as well as bad thing about these files is that they're not visible to a user and normally just left on the disk by the OS or the program that creates them. In case they're deleted, the normal dele-tion method is used. This would be the same as deleting a file from Trash or Recycle Bin, which means they can be eventually recovered.

3. **Rely on tools to assist you:** At this point, you're probably wondering how you'll be able to read a Word docu-ment's auto-save backup file. If you try to read the file in its raw form, your brain is bound to cheat you. That's because it isn't a plain text file. Registry is one of the creators of such a file. Interpreting the file will be impos-sible if you rely on your brains alone. You'll need tools that can interpret the data you found on the disk. A simple example, here – MS Word can open a Word file recovered from a disk.

Tools, formats and rights

For dealing with data, you'll need appro-priate tools at each step. For example, if you want to extract the disk image from an evidence disk, there are many tools that can help you get the image. To create an image as well there are multiple tools available, from free and well known tools such as the 'dd' command on Linux to a complete set of forensic tools such as EnCase. Oftentimes, a single tool can't be relied upon and one might need to, say, create an image using different tools.

File formats are crucial largely because they're involved at almost every level of the investigation process. From extracting images to reading the data, one needs to deal with an extremely vast set of formats. Hypothetically, if you took the disk image using EnCase, then you would need

EnCase to read the format in which the image file was stored. Assuming that your evidence disk was taken from an iMac machine, you'd need a way to read the HFS+ file system used by Mac OS X. Once the data is extracted, you'd again need software to read the data. If it's a .dwg file, only AutoCAD would be able to open that file. You'd have to deal with a plethora of formats all the way.

Lastly, you can't simply start off with a forensic investigation and not have the required rights. you need to be a part of the police force or an investigative agency authorised to handle the case. And of course, you must have the right to use the software/tools involved.

inspect the patterns of data destruction as well trace malwares that may have deleted themselves after their mission was complete. Forensics experts are certainly a necessity here.

• **Government and Police:** Crime inves-tigations conducted by intelligence agencies, police and cyber security cells often require a forensics expert to help them walk a tightrope without falling off. With time, as electronic media takes over our lives, forensics is supposed to take over a large share of crime and thus, investigative processes.

• **Private Auditing Companies:** There are companies that dedicate themselves to the job of Forensics Consultation

Keep an eye on your security

Careers in Cyber Forensics

It's by the virtue of the career opportuni-ties that the attractiveness of a discipline is determined. Though not a popular field, Digital Forensics has opportuni-ties in both the private and public sector. Interestingly, there are positions in both sectors where one needs to use this knowl-edge to destroy data, as well as recover it.

• **Revenue Department:** Organisations dealing with money directly, both pri-vate and public need to trace financial crimes. This involves digging the data graves on the disk and creating the timeline of who did what and in what order – challenging, interesting and intellectually rewarding.

• **Malware Analysis:** Companies trying to create anti-viruses often need to

needed by other entities. You guessed it right. These are private detectives.

• **Trainer:** There certainly is a lack of talent in this field. Trainers are required at all of the prior mentioned organisations. And as it happens in many cases, being a trainer on rare and intellectually challenging cases is quite rewarding.

That being said, Cyber Forensics is an ever-changing landscape. New types of storage media and software are introduced all the time, ensuring new challenges to overcome keeping those in the field on their toes. You can rest assured that the environment will keep you updated on the latest in technology and in touch with a very wide array of technology. 🔲

Broadcom on NFC adoption and its role in the Indian market

We interview Mr. Ravi Manik, Director, Corporate Business Development at Broadcom, to get his views on what is the future on NFC and its importance in the Indian context as per Broadcom.

Soham Raninga
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Broadcom recently introduced the next-generation of near field communication (NFC) controllers designed to deliver low cost solutions for mass market smartphones and wearable gadgets. We interview Mr. Ravi Manik, Director, Corporate Business Development, India & South-East Asia at Broadcom, to get his views on what is the future on NFC and its importance in the Indian context as per Broadcom.

Broadcom's plan of bringing NFC to affordable device segment sounds like a good initiative. But, is there a demand in the affordable segment for NFC chips?
Broadcom actually sees more people wanting to use simplified pairing enabled by NFC on affordable smartphones. As mobile payments are rolled out on an international scale it's only a matter of time before NFC for mobile payments becomes more commonplace on affordable smartphones. ABI Research predicts that over three and a half billion NFC-enabled devices will ship over the next five years.

While the BCM20795 is a standalone NFC solution, are you planning combo solutions based on the new power efficient NFC chip?
We announced the industry's first NFC Quad-combo in late 2012, which combines NFC, Wi-Fi, Bluetooth and FM on a single die. More information can be found in the press release here. As for future announcements, Broadcom does not comment on our product roadmap.

NFC as a technology seems to have failed to take-off when compared to the expecta-

Ravi Manik, Director, Corporate Business Development, Broadcom

tions. A lot of which has to do with NFC payment mechanisms not yet going mass market. Would you agree to this? If NFC one of those solutions that is still hunting and looking for a problem to solve? Or, what in your opinion is stifling the growth of NFC tech among smartphones?
Mobile payments are still continuing to move forward and Broadcom has the technology in place to support mobile payments when they take off. Broadcom's NFC technology is certified for all payment schemes, including SIM-based, embedded and cloud-based secure elements (e.g. HCE), as well as a combination of these secure elements within the same device. This offers a significant advantage as various mobile payment methods are introduced on an international scale. As the first vendor to support the NFC Forum's latest specifications, Broadcom also ensures compliance with all current standards.

A lot is said about NFC being plagued by security concerns, would you agree? How is

Broadcom handling security on their latest low-cost NFC solution?
Broadcom's standards-based software stack implements NFC Forum specifications, including NFC Controller interface (NCI), to support multiple operating systems. As a testament to its certified solutions, Broadcom recently contributed its NFC software stack into the Android 4.2 operating system. In the context of mobile payments, the NFC security is just as stringent as EMV cards, requiring same levels of security certification. All of Broadcom's NFC solutions for mobile payments undergo certification.

Bluetooth LE seems to offer a competing solution to NFC, though not a direct replacement. Apple's adoption of BLE for iBeacons in its stores seem to point towards BLE gaining edge over NFC for mobile payments. Apple has categorically expressed preference for BLE due to its range advantage. What are your thoughts on the same?
We do not comment on other companies' product strategies.

NFC tags were supposed to change the way in which we seek and communicate with devices and even shop around in malls. What are your thoughts on the concept?
NFC tags as used in consumer marketing, such as in "smart posters", have been slower to take off than expected, but are expected to grow. For example, Samsung markets TecTiles NFC tags for consumer/small business applications.

Coming back to the recently announced low-cost energy efficient NFC solution, which Indian vendors are you working with?
We do not talk about customers unless they are announced publicly.
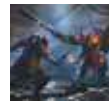
Interview: Amkette's transformation to a lifestyle tech brand

Amkette gives us a glimpse of how the brand has evolved and shares its future plans on developing unique products for Indian consumers.

Soham Raninga
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We interview Mr. Rajiv Bapna, Founder and Director, Amkette. Mr. Bapna takes us through the evolution of Amkette from a brand famous for floppy disk to a brand now focused on pioneering acoustics and offering unique lifestyle products.

Amkette has transformed itself from being an IT peripherals company to a lifestyle brand, focusing on A/V entertainment. Why this shift and how has the journey been so far?

Amkette began its journey as a storage technology pioneer over 25 years ago and over the years transformed itself to meet the challenges of times yet keeping its core strengths alive. Since the beginning, Amkette had focused on R & D and innovations based on consumer insights. Even today, they remain the core DNA of Amkette. No wonder, all Amkette products are defined by distinctive design, innovative technology, affordable pricing and satisfying customer experience.

Today Amkette specializes in 4 technology areas; wireless, audio, multimedia and storage. A year ago, we introduced a path breaking multimedia product, named EVO TV. We have extended our expertise in multimedia to digital audio and are introducing a range of audio products for the current mobile-generation. Some of the exceptionally successful products have been Amkette Metal Speakers and Free Spirit Headphones. Our recent introduction

Rajiv Bapna,
Founder and Director, Amkette

has been a tangle-free earphones with metallic sound chamber to create superior bass.

We are enjoying what we do and so far journey has been encouraging.

The EVO TV is probably the most popular product in your portfolio, are you planning to expand the line-up and offer more options?

EVO TV was one of the most well-received products from Amkette in the market. We are planning to expand the product line as we are planning to come out with two new variants of the product which are more advanced and better suited for the changing needs of our audience. Some special app products are also in the pipeline the EVO TV.

Does Amkette have an R&D center in India? If yes, where is it and what kind of work does it focus on?

Yes Amkette has its R&D centres in India. Amkette's focussed R&D opera-

tions happen at two places: Delhi and Bangalore. The design and development of the products happens in Delhi whereas the software is developed in Bangalore.

What is Amkette doing differently compared to other competing brands to specifically cater to Indian audience? What is its USP?

All Amkette products are designed and developed after extensive consumer feedback. Therefore, each product from Amkette has a unique story for consumers. This, coupled with our core promise of cutting-edge technology, contemporary product design and affordable pricing makes Amkette a unique brand. This is particularly so in India, where consumers seek high quality products at a reasonable prices. As an example, Amkette Atom Earphones are very reasonably priced headphones which offer not only tangle free wires, but also a superior Metallic Sound Chamber.

What future trends do you see in the field of technology, particularly with respect to the market that Amkette is catering to?

Technology is moving at a fast pace. We pride ourselves in moving with technology and always work on a 12 months product roadmap. At this moment, we are particularly excited with portable audio and multimedia technologies on one hand and convergence of screens through wireless technology on the other. In both areas, we have strong technological base. Please stay tuned with many exciting products from Amkette in next 6 to 12 months.

INTEL REALSENSE:
USING COMMON SENSES FOR COMPUTING

We've become used to communicating with our computer devices using keyboards, mice and other hardware controllers. Using these devices, our computing experience has grown exponentially over the past decade, but it may finally be time to get rid of them and say hello to a more natural way of interaction. If we look at the potential future of technology, we realize that it is high time we identified new

SOME OF INTEL® REALSENSE™ TECHNOLOGY'S HIGHLIGHTS INCLUDE AN INTEGRATED 3D CAMERA THAT HAS A BEST-IN-CLASS DEPTH SENSOR

dimensions of interacting with our devices in such a way that it makes our experience even more immersive and real. Moving in that direction, depth perception is an important aspect of that functionality. Intel has been taking the lead in that direction with its RealSense™ integrated hardware, which – in conjunction with the Perceptual Computing SDK – allows developers to create richer experiences. This is expected to revolutionize the way we interact with content
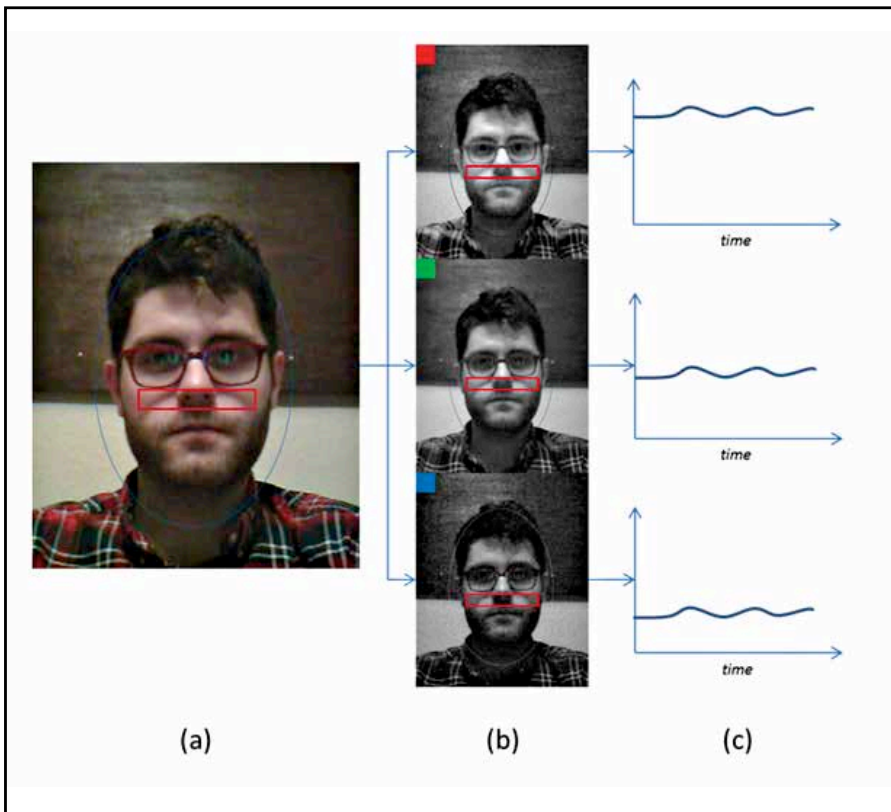
First stage of the pulse estimator pipleline to build waveforms after image analysis
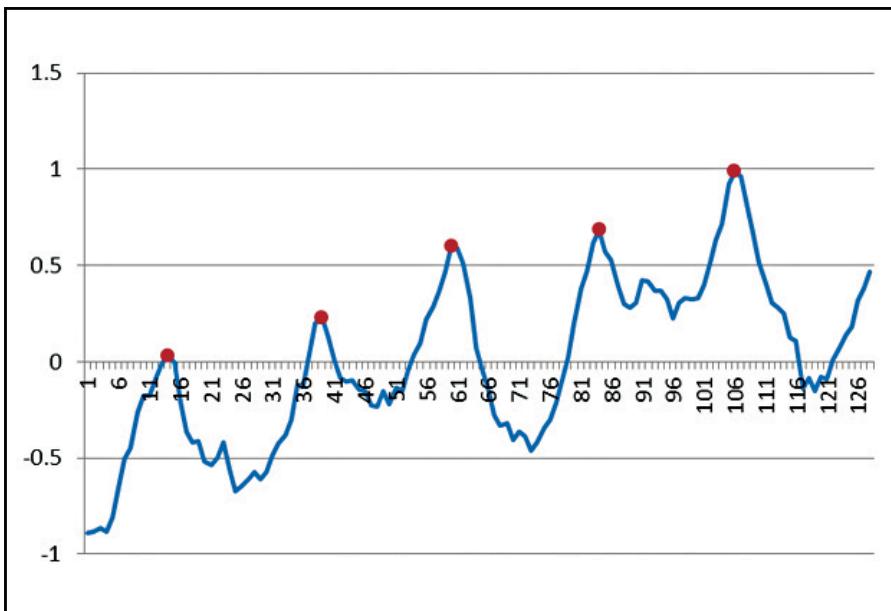
Second stage of the pulse estimator with the processed waveform and identified features

like games and entertainment. The Perceptual Computing SDK is expected to eventually evolve into the RealSense™ SDK.

Some of Intel® RealSense™ Technology's highlights include an integrated 3D camera that has a best-in-class depth sensor, allowing new ways to interact in gaming, entertainment, and content creation. Additionally, it allows finger tracking and recognizes facial expressions among numerous other features. This may seem trivial when you imagine it, but it's actually more than just gesture recognition. The

Nuance Dragon Assistant provides a voice-based natural language processing interface so that users can seamlessly interact using their voice. This allows a personalized conversational flow for interacting with the application, and can be integrated using the Intel RealSense™ technology on Intel-based devices. This year, there have also been a variety of partnership announcements with Microsoft for Skype video calling and collaborations with organizations such as Scholastic for developing educational software in addition to others such as AutoDesk, DreamWorks, Tencent, metaio etc.

WHAT'S NEW?

Intel has been working on the Perceptual Computing SDK since a long time. It started as a library for pattern detection and recognition algorithms. With the development and release of the new RealSense™ hardware, there are some new additions to the Perceptual Computing SDK. These new additions allow even more flexibility and data to be available for further integration with your computing devices.

The new Pulse estimator module, which allows you to measure and determine the user's heart rates intuitively, is the newest feature in the camera. Although pulse estimation with excess motion is an issue, it can still measure the pulse rate seamlessly if the right settings are used, and that too without too many contraptions. Pulse estimation module is basically composed of a two-stage pipeline where the first stage receives input image sequences from the camera and in combination with the face tracking algorithm narrows down the face as a region of interest and further narrows down a part of the face as a sub-range. The sampling functions then divide the incoming image into individual color channels and perform a spatial average of all the pixels that fall within the dimensions of the sub-range. The sampler arrives at a single value for each color channel of the original frame, and logs these values over the course of many frames to build a "waveform" for each color channel. The second stage of the pipeline involves processing these samples to identify features of the waveform and thus estimate the pulse rate. For a detailed overview of all the functions and data structures that allow access to this data, you can visit *https://software.intel.com/sites/landingpage/perceptual_computing/documentation/html/* for the SDK documentation.

The emotion detection module is another addition. It provides additional feedback by

Privacy Notification

allows features such as usage co-ordination, application co-ordination, privacy notification etc. It has been built in such a way that the loosely coupled interfaces provide room for integrating newer features without changing the structure too much – thus allowing for an extension of the usage modes in the future, since the software development kit is only expected to grow further during the course of time as we find new ways of capturing real-time data.

The SDK allows multiple applications to use the data at the same time, by defining one application as the master, which is allowed to control the hardware settings. All other applications using the hardware act as the slave for the master application. This is similar to applications using computing resources, i.e. the application with its window in focus will receive the highest priority while those running in the background can stop doing unimportant work.

The privacy notification module performs the task of informing the end user whenever any potentially identifiable information is accessed and used. This information includes:

• Raw color or depth data from the camera
• Raw microphone data
• Face recognition data
• Face-based emotion detection data
• Face-based age detection data

Whenever a new user tries to use the application for the first time, a privacy notification dialog box is shown.

Apart from the above modules, the SDK has various algorithms available for usage:

• **Speech Recognition:** This allows for a specific application to understand pre-determined keywords spoken by the user.
• **Facial Analysis:** The face tracking module helps in determining the facial features and

analyzing the user's emotions and reacting according to the real-time data without the user even having to actually do anything. This module provides intensity and evidence as the parameters which have an inverse relationship. While intensity provides data about the intensity of the perceived emotion, the evidence provides information in the form of a base 10 logarithmic scale on the probability of a particular expression being present.

The latest SDK has also been updated to enable compatibility with Nuance Dragon Assistant 3, which is supported on Windows 8 systems.

BREAKDOWN OF THE PERCEPTUAL COMPUTING SDK

The Perceptual Computing SDK acts like an interface to help developers make the most of the integrated RealSense™ hardware. It provides pre-existing interfaces to algorithms, so that they can make the best use of these features and focus on developing the application rather than the algorithms for such interfaces, which usually

turn out to be very complex and time consuming, if written from scratch. The SDK supports a combination of various usage modes such as Speech Recognition, Facial Analysis, Emotion Sensing, Depth Tracking and Augmented Reality. Many of these features are possible with the help of the unique integrated camera specially built for capturing all this data. The SDK easily

Intel Perceptual Computing SDK Architecture

ARPedia allows you to pick up things in Virtual Reality and put them at diiferent places to get more information

also performing facial recognition, i.e. associating the face to a person's identity.

- **Close-Range Depth Tracking:** The close-range depth tracking module helps with identification of things such as gesture recognition, hand/finger tracking and similar interactivity using the integrated 3D camera.
- **Augmented Reality:** This feature allows you to combine data gathered from the 3D integrated camera with a superimposed image to provide you with a virtual experience.

CREATIVE INTERACTIVE GESTURE CAMERA

The Creative Interactive Gesture Camera is a specially designed piece of hardware with depth sensitivity and microphone features. It is best used for close-range interaction. This camera is made to be coupled with the Intel Perceptual Computing SDK and can be ordered from the Intel website at *http://click.intel.com/intelsdk/ Creative_Interactive_Gesture_Camera_Developer_Kit-P2061.aspx.*

The specifications available for this camera are as follows:

- **Maximum RGB camera resolution:** 720p
- **Maximum IR depth resolution:** QVGA (320 x 240)
- **Synchronization:** RGB + depth frame sync
- **Frame rate:** 30 fps
- **Field of View (FOV):** 73 degree diagonal
- **Range:** 0.5ft - 3.25ft
- **Microphone:** Dual array
- **Size:** 4.27in x 2.03in x 2.11in
- **Weight:** 9.56 oz
- **Power:** Single USB 2.0 (power < 2.5w)

INTERFACE GUIDELINES
DESIGN PHILOSOPY

- The software should be reality inspired but not an exact clone of reality because the virtual environment can afford to relax the rules to sometimes make things easier.
- Literal design metaphors can be used in a much better way rather than abstract symbols in a perceptual environment.
- The intuitive nature of an application is very important in helping a new user adopt it and easily get around the interface.
- Contextually appropriate interactions help ensure that the interactions match the context.

- Identifying the strengths of the new modalities of interaction helps you design according to the appropriate methods of interaction.

MINIMIZING FATIGUE

- Make the interactions less complex and easier to perform.
- Gestures should be short lasting, so that they can be performed quickly.
- Precise input should never be a mandatory requirement, as that only makes it difficult to match the expected gesture as small variations are expected to occur.
- Repeated gestures should be avoided so that the user does not get frustrated quickly.

FACE TRACKING GUIDELINES

- Expect more expressions in the SDK in the future. Currently, smiles and winks can be detected.
- Natural expressions will be difficult to detect in front of a computer. Users should be prompted to show exaggerated expressions.
- Give feedback to the user to ensure they're in a typical working distance away from the computer, for optimal feature detection.
- Give feedback to the user about any orientation or lighting issues – provide error messages or recommendations.
- For optimal tracking, have ambient light or light facing the user's face (avoid shadows).
- Try to make the interface background as close to white as possible (the screen can serve as a second light to ensure good reading).

Head of the Order allows fully integrated experience with intricate gesture recognition to conjure spells

- Notify the user if they're moving too fast to properly track facial features.

VISUAL FEEDBACK GUIDELINES

- Avoid delay between the user's input (whether it's gesture, voice, or anything else) and the visual feedback on the display.
- Smoothen movements. Apply a filter to the user's movements, if necessary, to prevent jarring visual movements.
- Combine different kinds of feedback. This can convince the user that the interactions are more realistic.

- Show what is actionable. You don't want the user trying to interact with something that's not interactable.
- Show the current state of the system. Is the current object selected? If so, what can you do to show this visually? Ideas include using different colors, tilting the object, orienting the object differently and changing object size.
- Show recognition of commands or interactions. This will let the user know whether they're on the right or wrong track.
- Show progress. For example, you could show an animation or a timer for short timespans.

- Consider physics. Think about the kind of physics that you want to use to convey a more realistic and satisfying experience to the user. For example, you could simulate magnetic snapping to an object to make selection easier. While the user is panning through a list, you could accelerate the list movement and slow it down after the user has finished panning.

INTEL® REALSENSE™ APP CHALLENGE 2014

Intel is offering more than $1,000,000 in cash apart from marketing opportunities for your

Intel® RealSense™
App Challenge 2014

JOIN THE MOVEMENT.
BREAK BARRIERS. MAKE HISTORY.

The new Intel® RealSense™ 3D Camera & SDK empower developers to create apps that use every facet of human & computer interaction – including facial recognition, gesture control and voice activation.

Compete for your share of $1,000,000 in cash, marketing opportunities and more!

DEVELOPMENT CATEGORIES
Submit your Intel® RealSense™ app ideas into the following categories:

GAMING & PLAY   LEARNING & EDUTAINMENT   INTERACT NATURALLY   IMMERSIVE COLLABORATION & CREATION   OPEN INNOVATION

CHALLENGE OVERVIEW
Competing developers are granted access to Intel's® RealSense™ technology in order to design and showcase groundbreaking new demos.

Qualifying Participants
Professional and Student Developers who are residents of one of the participating countries

Prizes
Upto $1,000,000 in Cash, Marketing Opportunities and more...

Resources Provided
Finalists may receive Intel® RealSense™ 3D Camera and SDK, and Intel® Developer Zone resources

Estimated Timeline
May 2014 – Ideation phase begins
July 2014 – Development phase begins
2014 end – Winners to be announced

VISIT: https://software.intel.com/sites/campaigns/realsensechallenge/ **TO PARTICIPATE**

RealSense™ application. It should be based on one of the following categories:

- Gaming & Play
- Learning & Edutainment
- Interact Naturally
- Immersion, Collaboration and Creation
- Open Innovation

The estimated timeline for this challenge is as follows. The Ideation phase will begin in May 2014 with the Development phase set to kick off in July 2014. Subsequently, the winners are expected to be announced near the end of 2014. For more information and alerts related to this challenge, go to: *https://software.intel.com/sites/campaigns/realsensechallenge/*

PERCEPTUAL COMPUTING CHALLENGE WINNERS SHOWCASE
ARPEDIA

As part of its Perceptual Computing campaign last year, Intel had announced the Perceptual Computing Challenge. The winners of the Phase 2 of this challenge in the 'Creative User Experience' category were announced some time back and their applications were demoed at CES 2014. Six team members from the Beijing University of Technology developed an application called 'ARPedia' using the Augmented Reality features. The application's 3D models were built using Maya 3D while Unity 3D was used to complete the application logic

and render scenes. The application uses hand gestures, voice and touch commands and augmented reality integration to develop an encyclopedia similar to Wikipedia that responds to these newer modes of interaction.

For example, the demo showed that users could pick up a Tyrannosaurus Rex image and place it at different parts of the screen to know about different types of details related to this dinosaur. The application has very good interactions and builds an immersive experience by evoking involvement of the user with the virtual environment.

For a case study related to this application, you can visit the page here: *https://software.intel.com/en-us/articles/arpedia-case-study*

HEAD OF THE ORDER

Head of the Order is a spell casting game developed by Jacob and Melissa Pennock from Unicorn Forest Games. Last year, it took the top prize in the Intel Perceptual Computing Challenge. The game succeeds since it requires zero physical contact. Opponent players can play it in beautiful indoor and outdoor environments and create spells involving fire, ice and shields using hand gestures.

Jacob developed his own gesture recognition system to improve the accuracy of the established algorithms and successfully used his HyperGlyph library in multiple games. The hand rendering system also allows the game to

represent the image of the hands on the screen. There are a number of other innovative features in the game such as 'Gesture Sequencing' to perform unique actions once gestures are performed in a particular sequence. For more information related to this game, visit the case study at: *https://software.intel.com/en-us/articles/head-of-the-order-case-study*

In conclusion, the Intel® RealSense™ technology provides an innovative framework spanning hardware as well as software to take the lead in developing innovative ways of interacting with computers. Going forward, we can expect to see more and more interfaces in desktop as well as mobile platforms which will surpass the traditional methods to include more natural ways of interacting with software. This will not only make things easier, but will also allow us to capture more data such as heart pulses and let the software react to minor cues such as emotions or facial expressions. Just like the new age touchscreen phones, which replaced the hardware keyboard in earlier phones, RealSense™ hardware is expected to revolutionize the way we see input devices today. With the current push towards making things smaller and more portable, it has already become a challenge to figure out a way to integrate all this hardware in every form factor possible but Intel is working hard to ensure that we see this technology everywhere around us. ■

worldview

OUR PICK OF THE BEST TECH ARTICLES FROM AROUND THE GLOBE

IGNORANCE IS 40 MILLION CREDIT CARD NUMBERS

Inspite of having a million-dollar security system in place to detect malware, Target couldn't stop Russian hackers from stealing nearly 40 million credit card numbers. The security software worked fine – in fact it raised an alarm when it detected fraudulent activity. But the alarm, it seems, was completely ignored.
http://dgit.in/wvTarget

THE BUSINESS OF BITTORRENT

Most people know Bittorrent as a free (and illegal) way to download movies and music, but Bittorrent is a legitimate business - a business that's fending off attacks from movie studios and music labels while trying to figure out how to make money.
http://dgit.in/wvBitTorrent

THE PROBLEM WITH SILICON VALLEY

Silicon Valley is many things - a hotseat for innovation, a place for entrepreneurs to strike gold and (allegedly) a meritocracy where anyone can succeed if they make an effort. Beneath this facade, lies an ugly fact - the industry is alarmingly ageist, with a belief that only hip, young people can build the next big thing.
http://dgit.in/wvSiliconValley

[ReadWriteWeb Corner]

THE BATTLE FOR YOUR HOMESCREEN

As the app market saturates, real estate on your iPhone's homescreen is becoming more and more coveted. Apple, Google and Facebook are locked in a fight to own as many of those app icons on your homescreen as possible - and Google seems to be winning.
http://dgit.in/wvHomescreen

Roll your own VPN, Raspberry Pi style
Privacy is the web's current 'trending topic' and encrypting your web traffic is important now, more than ever. If you'd rather not use a VPN provider, you can hack your own solution using a Raspberry Pi running the open source OpenVPN service.
http://dgit.in/wvVPN

Chromecast and Music Streaming
Google's $35 Chromecast is a great way to stream videos to TV, but it can also act as a great home audio streaming device. Hook up the Chromecast to your HDTV, and use your Android device as a remote to play your favourite tunes through your home theatre system.
http://dgit.in/wvChromecast

Open Source Startups Disappearing
Everyone loves to love Open Source – often touted as the holy grail of software development. But when did you last see an Open Source startup? Yes, RedHat set the bar by being a $1 billion Open Source-focused company. But the startups trying to emulate them is rapidly dwindling.
http://dgit.in/wvOpenSource

LOL OMG ROFL IDK

Net speak is a natural extension of written language for us Internet folk. Yet, it has been scorned upon by the purists. Rather than degrading it, Internet slang may actually be contributing to the evolution of language, allowing us to express ourselves better.
http://dgit.in/wvLOL

REDDIT BREAKING NEWS

Reddit is the Internet's darling. A potpourri of ideas, information and entertainment that can be a powerful tool to spread alerts. It has a community nature that, on multiple occasions, is the first to alert netizens to news across the globe. It continues to grow in importance.
http://dgit.in/wvReddit

ICE STATION

What if we told you that you could build a solar power station on the South Pole? A team of researchers is out to do just that. The experiments conducted there have high energy demands. Satisfying them are a set of green power stations that convert solar and wind energy to electricity.
http://dgit.in/wvSouthPole

COMMENT CAREFULLY

Justin Carter, a 17 year old, is facing 10 years in prison for a sarcastic comment on Facebook. Carter claimed to want to shoot kindergarten students (presumably) as part of a joke exchange with a friend. In the wake of the Connecticut shooting, the cops deemed this a "terrorist threat".
http://dgit.in/wvFBComment

5 budget ultraportable laptops for students

If you're seeking a thin, light, small form factor laptop to carry to school or college, take a pick from our recommendations from Acer, Apple, Dell, Lenovo and HP.

- By Jayesh Shinde

Education isn't cheap and being a student isn't exactly a cakewalk – we get that. We were students too, not long ago, and understand your pain. What wouldn't we give for a lightweight, decent laptop to carry to classes instead of traditional laptops, which were nothing short of dull, dreary boxes suspectedly made out of blocks of lead, for all we cared!

Times have changed. Technology has improved. And prices have gone down. Unlike the netbooks of circa. 2008-2010, the tiny, lightweight ultraportable laptops mentioned below either offer adequate performance or a unique combination of features to compensate performance (or both) to fit your expectations. And they won't burn a hole through your wallet.

1) Acer Aspire V5-123 (Price: ₹24,719)

Sporting a 11.6-inch display and 1366x768 pixel resolution, the Acer Aspire V5-123 is a diminutive but worthwhile entry-level ultraportable laptop to consider purely from a portability and note-taking perspective. It has a 1.6-GHz Intel Celeron processor, 4GB of RAM, 500GB hard drive, and onboard Intel HD graphics. It comes with Windows 8 installed and 1 year of international warranty. Its keyboard and touchpad take some getting used to but are eventually good to type on.

2) Lenovo IdeaPad S210 Touch (Price: ₹28,421)

Another 11.6-inch ultraportable laptop, the IdeaPad S210 is the successor of the 10-inch netbook IdeaPad S100 netbook. Its multi-touch display is a key feature. It allows you to interact with the laptop much more intuitively (and doodle during an especially boring lecture). The S210 sports a 1.6GHz Intel Celeron 1017U processor with 2MB cache (greater than the Aspire V5-123 mentioned above), 2GB RAM, 500GB hard drive, and onboard Intel graphics. Its keyboard and touchpad aren't the best ones we've seen on a Lenovo laptop, but they make do.

3) Dell Inspiron 11-3000 (Price: ₹32,200)

The updated Inspiron 11-3000 is a great looking ultraportable and perhaps the ideal machine for students who don't do anything more than web browsing, emails, media playback and the occasional video chat. It offers very good battery life for someone who needs a machine on the go. But that is pretty much it. It falls short on power for tasks any heavier than that. It does offer a good configuration and feature for the price, and one year accidental damage protection cover and premium phone support.

4) HP Pavilion TouchSmart 11-e006AU (Price: ₹29,900)

Not far behind the Dell Inspiron 11 (in terms of looks), the HP Pavilion TouchSmart 11 ultraportable is also a head-turner, with a sleek build and appealing looks. It, too, offers a touch-enabled 11.6-inch display, and comes fitted with an AMD dual-core APU – the A4-1250 clocked at 1 GHz. There's 4GB of RAM, 500GB hard drive and onboard AMD Radeon HD 8210 graphics (which is better than competing laptops, but still not gaming worthy). This machine is lightweight, and can do one task at a time sufficiently well.

5) Acer or HP Chromebook (Price: ₹22,999 and ₹26,990)

A Chromebook demands a specific user who is willing to give up the comfort of a Windows machine to try something different. While the Chrome OS found on the 11-inch Acer and 14-inch HP Chromebooks is no match to the versatility of Windows, it has its merits if you work completely in the cloud and need an uncomplicated, fast, no-nonsense machine to work on. We've found them to be more responsive than Windows machines priced similarly and offer better battery life.

A HISTORY OF GMAIL

Gmail is nearly ubiquitous today. Many of today's netizens can't remember email before Gmail. However in the nearly three years that led up to its launch, many doubts were cast over it. Time details the history of Gmail on its 10th anniversary, when privacy concerns have re-emerged.
http://dgit.in/wvGmail

REMEMBER WALKMAN?

The iPod's been around for nearly 13 years, so you may not remember its predecessors. Like the Sony Walkman TPS-L2 the very first Walkman ever, launched in 1979. The device opened the market for portable music players.
http://dgit.in/wvWalkman

PING!

One of the clues towards the location of lost MH370 flight was an incomplete 'ping' sent out by the aircraft. A ping is an electrical signal sent out by one device to get in touch with another, and its use has spilled over into colloquial English. But the use of the ping predates modern history, and even goes as far as World War II!
http://dgit.in/wvPing

TMI ON THE INTERNET

The Internet, particularly social media seems to be optimised for sharing every last detail of your life with others. In such a set-up, is there such a thing as sharing too much? Does the fact that you opt-in to these status updates, tweets or photos somehow prevent you from complaining about it?
http://dgit.in/wvUnfollow

Why the new Google Camera app isn't all that great

Simply put, the new Google Camera app is a step forward but also a giant leap in the reverse direction. Here's why.

– By Siddharth Parwatay

Last month, Google launched Google Camera, a new app for Android phones and tablets which Google claims "makes it easy to take quick photos and videos." Google also says that "being behind the lens just got more fun with new creative picture modes."

The app also adds Lens Blur feature, Improved Panorama and Photo Sphere images that can capture images of up to 50 megapixels! All great... But...

Where are my settings?

The new app lets you swipe in from the edge of the screen to reveal new "cool" features or photo modes. But what about regular... ahem... humdrum settings like self-timer, scene modes, white balance? In a quest for simplicity, Google has gone ahead and ditched these – in my opinion "essential settings." The only setting that you can bring back is Exposure but that too by going into advanced settings by tapping on the cog icon while the lens blur and panorama overlay are on.

100% viewfinder coverage

The previous app showed a 16:9 crop from a 4:3 sensor, just to fill the screen. Thus you only saw a part of an image in the viewfinder, whereas the actual captured images would be bigger. Now with the current update, what you see is what you get – a good thing. A step in the right direction. But did you really need that extra large capture button? I understand that you need to fill the extra space left from showing a 4:3 image on a 16:9 screen, but couldn't you use that space for on-screen settings? Is it worth having a shutter button on one-fifth of your screen? Ugh.

Lens Blur performance is hazy

Bad pun aside, shooting in lens blur mode isn't easy. It takes some getting used to and more than 50% of the time you will need to take the shot again. Once a shot is taken successfully, it takes a long time to process/render.

After that, on viewing the image with lens blur mode, you get an option to shift focus, allowing you to bring the desired part of the frame in focus and blur the rest. The feature works pretty fine for a software-based implementation. The slider at the bottom to adjust the blur intensity is a nice touch. Here are some samples with focus being shifted to dif-

Focus shifted on the blue Digit magazine cover (left) and focus shifted on the white DGT cover (right)

Focus shifted on the pencils close to the camera (left) and focus shifted on the pencils away from the camera (right)

ferent parts of the frame and comparison to the original frame shot with lens blur mode:

Note that the main image that you shoot with lens blur mode isn't the one you are supposed to use. You are expected to review the image and then choose the focus points and blur levels to get the desired image effect that you envisioned.

Verdict: You could either roll back the changes the update brings by going to "My Apps" in the Play Store and uninstall the app/update. That will bring back your camera app to previous stock versions, with all the settings and customization options.

You could also check out some of the top alternative camera apps that you can try out on your Android smartphone here: http://dgit.in/dcamapps

SMARTER EVERY DAY

Why does a cat always land on its feet? What's it like to fire an AK-47 underwater? How does beatboxing work? Pro-

viding the answers to these and many more commonplace phenomenon is Destin, with his bite-sized videos that demonstrate science concepts using examples from everyday life, in his YouTube channel, Smarter Every Day.

http://dgit.in/SmarterEveryDay

(QR Code)

For a list of all the links from this section, head over to

http://dgit.in/wvmay2014

Or point your phone to the QR code above

(PRODUCT LAUNCHES)

SAMSUNG GALAXY S5

The latest Samsung's Galaxy saw its international launch, with the Samsung Galaxy S5. The water-resistant phone boasts of a heart rate monitor and ships with top of the line specs - a full HD display powered by a quad core CPU, 2 GB of RAM and a 16MP camera.
Price: ₹51,500 onwards

HTC ONE (M8)

HTC received rave reviews for its HTC One famed for its best in class build quality. This year, the next launch improves on the original device, featuring a Snapdragon 801 processor, Android 4.4.2, a microSD card slot and the same UltraPixel camera.
Price : ₹40,000+ (approx)

DELL CHROMEBOOK 11

Not to be left out, Dell launched a Chromebook, with great build quality and an all-day battery that might get you to take it seriously. It's powered by an Intel processor and sports upto 4GB of RAM and 16GB of on-board SSD storage.
Price :Rs. 18,000 (approx)

WORDJUMBLE

ABSOLUTE TIMEPASS

P	H	Y	M	S	H	S	K	D	D	Q	W	U	M	I	N	U	G	I	N
D	M	J	H	R	O	T	A	R	E	L	E	C	P	P	A	E	Y	B	J
M	Q	I	T	N	F	M	G	U	B	A	C	K	L	I	G	H	T	C	U
K	Y	A	I	E	P	C	Y	N	U	P	C	T	U	D	X	H	C	M	P
I	E	C	R	W	X	N	B	S	I	I	G	L	O	E	K	Z	V	H	Z
N	M	I	O	S	C	V	W	C	R	W	U	Q	F	O	N	X	E	U
M	K	A	G	F	D	R	X	E	A	P	E	H	N	G	D	O	G	A	F
J	W	E	L	Y	G	N	I	P	Y	T	O	T	O	R	P	H	N	R	S
S	T	Y	A	K	P	C	H	O	K	I	I	A	S	J	E	D	I	T	I
D	F	P	X	A	M	C	W	R	D	I	M	M	F	U	F	K	R	B	F
B	F	T	N	E	I	L	C	N	I	H	T	P	L	E	L	J	E	L	O
G	B	A	J	X	E	G	V	Q	G	E	Y	A	O	W	S	C	T	E	J
Y	R	E	U	Q	J	S	J	I	I	C	R	I	H	Y	M	G	L	E	D
T	V	E	O	L	R	F	P	A	S	I	M	G	K	U	Q	L	I	D	Q
I	X	N	O	I	T	A	D	N	E	M	M	O	C	E	R	U	F	V	B

There are 10 technology terms hidden in this word grid. Find them all.

Top 3 YouTube Picks

Make sure your boss doesn't catch you goofing off with one of these videos playing on your screen

Rachel, Chandler and Win 95
Matthew Perry and Jennifer Aniston starred in a (hilarious) instructional video for Microsoft Windows 95 back in the day of the classics.
http://dgit.in/wvWindows95

Arnie Smash!
He's is a big, muscular guy, so you wouldn't put it past him to own a tank. But what if he decided to drive his tank over other things?
http://dgit.in/wvCrush

The many British accents.
Everyone loves a good British accent. Philip Barker gives you a tour of the accents along with their unique inflections commonly heard in the UK.
http://dgit.in/wvBritishAccents

Top Tech giants join hands to launch Core Infrastructure Initiative

>>In a bid to secure major open source components and projects, the biggest technology shapers of today have released the "Core Infrastructure Initiative" through the Linux Foundation>

Funding for open source projects that constitute critical elements of the global information infrastructure has always been neglected until recently when the technology behemoths of today came together to provide funds and support for such open source projects. Companies like Google, Microsoft, Intel, Facebook, Cisco and many others formed the "Core Infrastructure Initiative" to support this cause through the medium of the Linux Foundation. This initiative aims to search, identify and fund open source projects that are already used extensively in core computing and internet functions.

CORE INFRASTRUCTURE INITIATIVE

This doesn't come as a surprise considering the internet is currently recuperating from the Heartbleed vulnerability. This crisis is thought to be the actual reason that pushed the launch of this initiative. Basically, the Heartbleed Bug is a serious vulnerability in the popular OpenSSL (Secure Socket Layer) cryptographic software library's implementation of the TLD/DTLS (trans-

port layer security protocols) heartbeat extension. If this vulnerability is exploited, it leads to the leak of memory contents from the server to the client and from the client to the server. According to Heartbleed.com, "this vulnerability allows anyone on the internet to read the memory of the systems protected by the vulnerable versions of the OpenSSL software library. Doing so, compromises the secret keys used to identify the service providers and to encrypt the traffic, the names and passwords of the users and the actual content. This allows attackers to eavesdrop communications, steal data directly from the services and users and to impersonate services and users".

The only way to stop this leak or fix this vulnerability was to use the newly released fixed version of the OpenSSL software library which has now been deployed and hence the OpenSSL library will be among the first projects that will be supported by the Core Infrastructure Initiative. As the vulnerability impacted almost every aspect of current technology, the trust in SSL which forms the basic core fibres of the internet was disconcerted.

The presence of such diverse members from the industry

is exactly what an initiative like this needs. Steve Lipner, partner director of software at Microsoft was quoted saying: "Security is an industry-wide concern requiring industry-

wide collaboration". While Chris DiBona, director of engineering for open source at Google added: "We believe that an open-source approach to online security will ensure that code is constantly improving, making the web a safer place for us all".
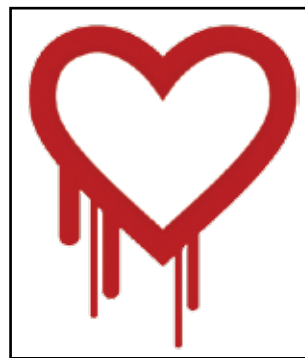
As for whom and how the funds will be allotted, will be the look-out of Linux Foundation's group of founding members, open source developers and industry stakeholders. The funds generated through this initiative will also go towards security audits where they're needed the most that is for fixing flaws found in widely used segments of code. It isn't

the first time that initiatives such as this one have been implemented. Previously there have been many programs that offered a reward for finding and fixing security bugs online. Reward based programs encourage security experts to devote their time and focus on doing something for the greater good which benefits the community as a whole and provides the developers financial support.

The Linux Foundation also highlighted that this initiative is not interested in funding "closed-sourcing" projects. Supporting developers who work on open source projects under the community guidelines is what is the need of the hour and the Core Infrastructure Initiative will see to it. A recent study by Coverity Open Scan has found that the quality of open source code is much better than that of proprietary code. This is precisely why it becomes extremely necessary to protect and support the interests and projects of people involved in development of applications that are open source.

If you're interested in this cause and want to hop in on the bandwagon, you can join this initiative or donate funds here: http://dgit.in/CII_Donate. >

How a recommendation engine works

>>One of the principal factors towards driving sales is by using these complex algorithmic wonders, we take a look at how they work>

A common thing to notice on websites is a simple list that mentions things that you may like. If it is a shopping website then based on the product you were looking at, the website will indicate some other similar products which you might wish to buy. Let's say, you buy a game console on an ecommerce website, the very next thing you'll see is stuff that other people who've purchased the same console have bought as well. It may be an extra controller or the most popular game for that console at the moment.

Shifting away from commerce, you could be listening to some music or perhaps be renting a movie, you're bound to see another "stuff you'll like" listing. Some may consider it intrusive, some may consider it a boon but the fact is that these things work. Sometimes they're so eerily spot on that you'd wonder if the "machines" have been observing you all your life. There has been one instance where Target, a popular store in the US started recommending a teenage girl things that pregnant women tend to buy. It was only when the father of the girl noticed this that he complained. Little did he know that his daughter was pregnant and her shopping patterns actually gave it away. On a subconscious level, she was buying or simply looking at things that pregnant ladies would, this made Target's website recommend things of similar nature. We're, of course, talking about recommendation engines.

Recommendation engines are complex programs that analyse patterns to deduce a signature for each customer. This in turn is used to sort out all products and come out with a few products that the customer will most likely purchase. There are different approaches to getting a recommendation engine working and they have also been included in CMS packages as part of the ecommerce platform. The origin of the concept on the web is a bit hazy but the there are two primary forms of approaching the concept.

Approaches

Content-based filtering

This approach relies on take each product and using as many parameters as possible to describe it. Take a mobile phone for example, it can be a candy bar or a flip phone. This is one parameter, the pixel density of the screen becomes another parameter, then you have the battery capacity, screen-size, Wi-Fi protocols supported, basebands supported, weight, colour, etc. the list goes on and on. The more you break down a product the more parameters you have to fiddle with. These parameters are then given weights, or you could say are appropriated a level or importance on a relative scale. The product category is often given the highest weight, so if you were looking at mobile phones then the recommender system is likely to recommend mobile phones and not sanitary

Recommendation engines choose for you

products. These systems may provide the user to rate products, this way all the parameters of a rated product are assigned a greater weightage that a non-rated product's parameters. This in turn improves accuracy. All these parameters are then used to create a user profile and each time you check out another product this profile gets modified. Suffice to say, the system learns more about you the more you use it.

Popular platforms that use content-based filtering: IMDB, Rotten Tomatoes and Pandora.

Collaborative filtering

This method as the name suggests, requires a certain amount of participation. This method relies upon directly learning about the customer which may require active or passive participation. Active forms include asking the customer to give feedback for each item viewed, either in the form of a slider or a points system. The five star rating that is seen in most places does just that. Passive participation involves observing what all items the customer has viewed and which of them have been purchased. Then sniffing the customer's cookies in the web-browser also helps draw patterns about the user. All of these methods are used in the generation of a user's profile.

Popular platforms that use collaborative filtering: Pandora, MySpace and Facebook.

Problems faced by these systems

You must have guessed by now that these systems depend on having plenty of information to work with. However, when a user is new there doesn't exist any profile and even if the user does surf through a few items it is simply not enough to generate a profile. This scenario is called a Cold Start. And it affects both

content-based and collaborative filtering. Another problem is that of Scalability, when there are simply a huge number of products to choose from, filtering and processing a recommendation list will consume not only time but also computational power. Excess time taken would lead to poor page load time and an increased computational power affects the working of the entire website and other sites which may be hosted on and sharing the same resources. These problems have led to a change in the kind of approaches towards making a recommender system and thus, arose the hybrid system.

Hybrid filtering
Needless to say, this method works towards overcoming the drawbacks of the aforementioned methods. A hybrid system can be more accurate than either of the methods. They can overcome the problem of Cold Start or that of Scalability by using a different algorithm for each scenario.

Algorithms
The whole concept comes under machine learning, specifically Collective Intelligence. They make use of multiple algorithms at different stages to generate recommendations. Data Mining algorithms are use to generate the user profile while clustering algorithms are used to shortlist recommendations. Some of the commonly used algorithms are:
- Similarity (Jaccard index & Tanimoto coefficient)
- k Nearest Neighbour algorithm
- n-Dimensional Euclidean distance
- k-means algorithm
- Bayes Theorem
- Singular Value Decomposition

We'll look into one of these algorithms which is very basic and easy to understand. Clustering of data is one of the first steps towards generating categories which can be then used to generate recommendations. A recommendation engine is based on many such algorithms.

K-means clustering algorithm
On the left, we get to see unclustered data. Consider this to be the initial state of all the parameters of every product that the user has looked at so far. This may be a cluster of a hundred products or simply one. Out of these parameters, certain groups may be identified visually but for a computer that is not the case. The algorithm simply associates a few points as the mean. These can
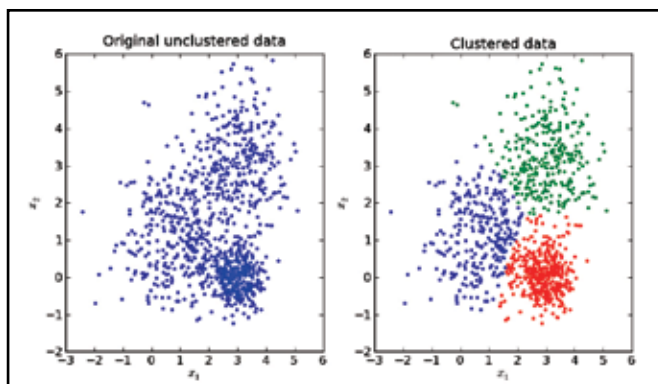
Purchase history affects recommendations more than anything

found at the centre of each coloured cluster as seen on the right. From this mean point, the distance to all data points are calculated and then based on which points are closest, a small cluster is formed. It is quite possible that during the formation of such a cluster, the mean might not be a feasible point and thus it may be moved, removed or even a new mean point could be added. After multiple iterations we obtain the cluster on the right. This data set could be indicative of which products are the most popular and thus are more likely to get recommended to all customers. This way, a cold start problem can be easily resolved.

A combination of many algorithms
A recommender system is by no means simple, it has a lot of different algorithms working towards producing just one result. A commonly known system that used a lot many algorithms was the one used by Netflix back in 2007, called Cinematch. Over 170 algorithms were used for each individual result. However, this was not enough and Netflix introduced a prize for $1,000,000 to anyone who could improve the accuracy of their system by 10%. This may seem to be a minor improvement but that 10% was more than enough to make good for the $1,000,000 prize money they were giving away. Going on a meta level increases the accuracy of a system. So if you were to start describing each parameter with another parameter then another dimension comes into the picture. "User Generated Tags" a feature implemented by Steam, the online game distribution platform is one such thing. It is a form of collaborative filtering where user inputs are random. These tags may be used by other customers and they'll be recommended all the games that have the tags that they used.

How valuable are they?
The answer to this question depends on a lot many parameters. Primarily, it depends on how big your inventory is. Then it comes to breaking down the products into varying categories and then describing them with as many parameters as possible. All of this while maintaining consistency between the parameters. For example, for two different phones describing the screen of one screen using "surface area" and the other by using "diagonal length" gets you no way of associating the two. Then you need to have a big enough inventory to start off. It is a fact that each individual customer is only interested in a small fraction of products that a store offers. Having a recommender system otherwise ends up giving less returns in the long run. However, if none of these issues plagues your enterprise then you might see a surge of up to 60% in sales. Netflix revealed that about

Three clusters obtained using the k-means algorithm

The multiple ways an engine figures out what you like

60% of their rentals are thanks to the recommendations given by Cinematch. Adding a social aspect helps tremendously, people tend to value the opinions of people they know and trust. This is one of the reasons why things go viral on social networks. Tapping the power of a social network becomes a huge driving factor.

Make your own recommender system

While you can find recommender systems available in the form of plugins, they are restricted to allow tags that suit their filters. This adds a little restriction to the system and will most probably affect your sales. So it is best to create your own recommender system for your website which is customised for the environment. There are plenty of open source recommender projects or libraries which can be used to create your own system and here are a few that should help you get started.

LensKit

It is a framework for creating a collaborative filtering recommender system. It also provides the infrastructure for you to compare your recommender system with others that have used the same algorithm.
http://dgit.in/Lenskit

Crab

Another framework that enables user and item-based collaborative filtering. It's based on Python and integrates seamlessly with popular scientific python libraries.
http://dgit.in/CrabRecommend

MyMediaLite

This is a library consisting of multiple algorithms which you can use to generate a recommender system and implements rating prediction based on collaborative filtering.
http://dgit.in/MyMediaLite

Recommenderlab

This is an testing environment that allows you to prototype and test your system. It provides feedback in the form of accuracy of each recommendations.
http://dgit.in/RecommenderLab

Neo4j

Primarily a graph database, Neo4j is helpful for new users to get familiar with the functioning of a recommendation engine. You can view each query executed as a graph. Here is a demonstration video wherein Neo4j is used to create a recommendation engine.
http://dgit.in/Neo4jDemo >

Neo4j graph database in action

*the source code

GaussianFace

>>Computer scientists from the Chinese University of Hong Kong have developed GaussianFace, a facial recognition software that finally outperforms humans. Humans have an efficiency of 97.53 percent and this software boasts of an efficiency of 98.52 percent.

http://dgit.in/GauFac

Cryptol

>>Cryptol is a domain-specific language for representing cryptographic algorithms. An implementation done using Cryptol is more similar to its mathematical representation than an implementation done using any general purpose language.

http://dgit.in/Cryptol

Netflix Roulette

>>Netflix has made its Roulette API open so you no longer need any keys to query the API. Now you can get all sorts of information that Netflix stores about individual movies and series using a simple query and build your own website using the same.

http://dgit.in/NetflixRoulette

Digital life

52 **Windows 8 worth it?**
With all the hulabaloo around the recent upgrade controversy, we weigh the pros and cons of going in for the upgrade

55 **How to fake social stardom**
Do you like fame? Then read on to learn how to go about gaining some internet fame the easy way by following these easy tips

Bose SIE2i Headphones

Before you start protesting that this isn't a health gadget, hear us out. For all you jogging fans out there who are tired of their normal in-ear headphones, the Bose SIE2i is well worth considering, if you can afford it that is. As a dedicated sports headphone, these have special tips that keep them secure in your ears while you move. Don't worry of damaging them with a bit of moisture, because again the Bose SIE2i are weather and sweat resistant, and they're a real handful if you aren't exercising within the confines of a gym. They also have shorter cords, preventing them from getting tangled up while you're in the thick of things. What's more, this Bose pair also packs in very good audio performance.

Designed to help you lead a healthy life

Microsoft Xbox 360 Kinect Tracking Bundle

Who says that you have to step out in the sun to burn calories and get fit? And why should getting fit involve buying yourself some fancy gadget? If you own a Microsoft Xbox 360 console, just buy a Kinect motion tracker and you're in business to burn fat and stay in shape by exercising right in your home, in front of your television. The Kinect motion sensor is compatible with a range of exercise games that offer surprisingly good workouts that actually work, no kidding. Check out Nike+ Kinect and Adidas miCoach Kinect, both of which offer workouts, fitness plans and performance tracking. Gaming and fitness is a potent combination that's bound to work.

Sony SmartBand

The Japanese technology manufacturer claims that its SmartBand isn't just an activity tracker, but a lot more than that. Recently launched, the Sony SmartBand "offers life empowerment by logging daily activities". Apart from tracking your movements and logging it in like any other activity monitor, the SmartBand from Sony also logs other interesting things that perhaps contribute to your fitness regimen subconsciously; stuff like the music you listened to and where you've been at a certain time of the day, etc. through its Lifelog Android smartphone app. The data it gathers is always readily available for you to mine. And did we mention that these smartbands are rather attractive to look at? It certainly helps they're stylish, too.

Withings Aura

A good night's sleep, every night, can save you a lifetime's suffering, and this device aims to enhance your sleep and spare you the trouble. The $300 Aura has two gadgets that work in combination: a movement sensor that sits beneath your mattress and an LED lamp that moderates the light (intensity, colour, etc) in your room so as to give you a peaceful night's sleep. The sleep sensor sits below your mattress to monitor your breathing, heart rate and motion to analyze your sleep state. It's connected to the LED lamp through a wire. The data tracked by the sleep and movement sensor can be uploaded to the cloud (or accessed through a smart device) to analyze your sleeping pattern, and ultimately help you sleep better than ever.

Skulpt Aim

No one wants to be fat, especially those who're trying to be fit and stay active. To learn your body's fat content, check out the Skulpt Aim. You can measure body fat and its composition simply by holding this wireless device in close contact with different parts of the body. Great for those trying to get in shape, we think, and especially find out fat content and its distribution around your body. This device is quite small and portable, about the size of a smartphone, so you should have absolutely no problem carrying it around wherever you go to conclusively prove to others (and yourself) just how much fat you're carrying around.

Did you know...
The global version of Galaxy S5 is powered
by Snapdragon 801 processor, while the
Indian version employs Exynos

YouTube banned in Turkey
After an audio leak of a discussion of possible military
operations in Syria, YouTube remains banned in Turkey
despite court rulings **http://dgit.in/1hDpIPO**n

Is Windows 8 finally
worth the upgrade?

Quick question: What do Windows 8 and Justin Bieber have in common? Well, apart from provoking extreme emotions, both give you the feeling that they haven't quite matured yet

Paanini N Navilekar
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Windows 7 was great. So great, in fact, that it quickly overtook its predecessor, the venerable Windows XP, to become the most used desktop OS in just two years. It improved on the mistakes of Vista and brought back the stability and reliability of Windows XP – something desktop users recognised and embraced. Things were going great. There were no more Blue Screens of Death, it was more secure and it ran just about anything you threw at it. We take for granted some of its newly introduced features – to the extend that it's impossible to remember a time when they didn't exist. Things such as 'AeroSnap', which would maximise a window simply by dragging it to the top edge of the screen, 'Jump Lists', which allowed you to pin your most used files to the application itself, libraries for organising all of your media and universal search right from within the Start menu are features you don't know you need until you've used them. It was almost too good to last.

Windows 8 shortcomings

Microsoft had been trying to carve off a chunk of the mobile phone market with Windows Phone 7, but the fact that it was struggling was confirmed when it tried to shove the same 'Metro' (later, Modern) UI down our throats in the form of Windows 8. In the days leading up to the Windows 8 release, leaked screenshots and rumours showed what appeared to be a radical departure from the age-old desktop metaphor. Gone was the familiar
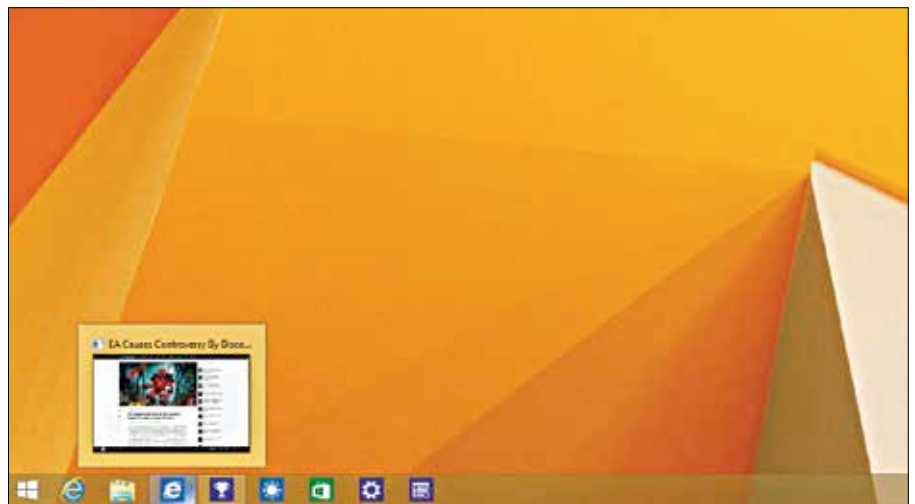
Windows 8 apps can now be pinned to the taskbar

Start button and the My Computer and Recycle Bin icons, which were replaced by large, bold and flat icons. The layout suggested a touch-first approach, so it came as no surprise to anyone that desktop users began to feel neglected by a company they'd stood behind for more than a decade.

To start with, the Windows 8 setup required you to sign in using a Microsoft/Outlook/Hotmail account. Having your sacred PC forcefully tied to a cloud account (one that most of us had forgotten

A handy notification informs you of newly installed apps instead of auto-adding them to the Start menu

about, to be honest) wasn't seen as a friendly move. On signing in, you were greeted by brightly coloured tiles, most of which accomplished nothing a browser couldn't do. 'Apps' to check your mail, read the news, check the weather or look up directions on a map were redundant – these were things a Google search could do just as well, if not better. If you finally made it past the mess of a Start screen (Just WHY a desktop user would want horizontal scrolling is beyond us) and got to the 'traditional' desktop, you'd be in for a mild shock. The Start button in the bottom-left corner is missing – a signature feature of Windows that had been a comforting presence since the days of Windows 95. Clicking on what should have been the Start button (or the Windows key, for power users) would lead you back to the Start screen. If you thought this was your only hurdle, good luck trying to do something as basic as shutting down or restarting your PC. We were embarrassed

Happy b'day, Tetris!
Tetris turns 30 on 6 June. Created by Alexey Pajitnov, the game was first released in 1984

Protests against Twitter
Greenpeace protested outside Twitter's corporate headquarters in the hope of a commitment from the company to go green **http://dgit.in/1lMJP3k**

Feature

Microsoft abandons Windows 8.1

Yes, you read that correctly. Microsoft's way of ensuring that everyone on Windows 8.1 upgrades to the newest release is by cutting off support for Windows 8.1. Starting May 13th, 2014, Windows 8.1 will no longer receive updates or patches from Microsoft. Yes, Update 1 is a free upgrade, and yes, it offers substantial improvements, but we believe this policy will probably hurt consumers rather than help them. Companies that have business critical software running on Windows 8.1 will need time to test for compatibility before they take the leap. While Update 1 doesn't introduce any radical changes on the kernel or system level, system administrators will be (understandably) hesitant to take a risk. Microsoft's upgrade window of four weeks is too short a timeframe, and cutting off support at a time when security vulnerabilities like Heartbleed are making the news may not be the best move. In fact, servers running Windows 8.1 have been asked by Microsoft to hold off from updating as a bug in the newest release prevents WSUS 3.2 (Windows Server Update Services) from working over SSL, and the process fails. Microsoft is working on a fix, of course, but this appears to be highly irresponsible behaviour from Microsoft. For more information about this vulnerability and possible workarounds, visit **http://dgit.in/WSUS32**

when we couldn't figure it out on the first try, but it turns out we weren't the only ones. If your mouse pointer lingered on one of the right-hand side corners, (such as while closing a window or going back to the desktop) you'd end up activating one of the 'hot corners' that would bring up the Charms menu. This housed shortcuts to Search, Settings, Devices and a Share option, which might have been useful on a tablet, but was downright annoying on a desktop.

Windows 8 apps now have a title bar to quickly minimise or close apps

The resulting outcry over Windows 8 was pretty loud – some compared it to Windows Vista while others said they preferred DOS (no, really). Microsoft was listening, so they tried to address some of users' woes in the next point release. Windows 8.1 included a Start button, but this was a case of treating the symptom rather than the cause. Clicking on this new Start button would bring you back to the abomination that was the Start screen, so a real Start menu was still lacking. One notable improvement, though, was that Windows now included an option to boot straight to the desktop, if you'd rather avoid the Start screen. This, coupled with one of the many third-party replacements for the Start menu meant that Windows 8.1 was now usable again.

Windows 8.1 Update 1

Windows' newest 8.1 iteration, Update 1, improves on the operating system's attempt at making Windows 8 usable by adding many subtle features and enhancements, many of which are aimed at desktop users. Announced at Microsoft's Build 2014 conference, Windows 8.1 Update 1 (can we just call it Windows 8.1.1 already?) brings the much needed improvements for mouse and keyboard- driven interaction on the Start screen. Scrolling through the list of tiles is easier and feels more natural, and the size of the app icons in the app list can be made smaller to accommodate more of them on a large desktop display. The full-screen Windows 8 apps can now be pinned to the Windows taskbar, which is now ever present (it auto-hides if you're using a full screen app). Modern app also has a title bar which lets you conveniently minimise or close an app without hunting around for the right gesture. For those of you who

Right-clicking on a tile brings up a handy contextual menu

spend a lot of time on the Start screen (if you're using a touch-enabled laptop, for instance) you'll be pleased to find a power button and a search button on the Start screen with this update.

What really caught our attention with this update, though, is that Windows has become much smarter and more responsive. It recognises the type of device it's running on – desktop PC, server, tablet or

smartphone – by means of a setting in the firmware that's specified by the manufacturer. This setting, called the Power Platform Role, tells Windows what type of device it's running on, and Windows adjusts itself accordingly. If you're using a desktop, for instance, Windows will automatically boot to the desktop, skipping the Start screen entirely. (This, and all other defaults can be changed by the user). That's one setting less for someone who's setting up a new Windows 8 machine. Similarly, the Search and Power icons on the Start screen aren't universal – their presence depends on the size of the screen, and is a privilege reserved only for devices with generous amounts of screen real estate. Smaller tablets won't see the setting, but larger tablets and laptops/desktops, will. The improved behaviour of Windows 8 apps shows just how much thought Microsoft has put into this update. For instance, only apps started with a mouse or a keyboard will have the Windows taskbar/title bar integration. If an app is started with a touch gesture, (even on a touchscreen laptop) it won't sport this feature, as the system assumes you're using the device as a tablet rather than a PC.

The annoying Hot Corners feature has been fixed in Windows 8.1 Update 1, which introduces a small (but significant) delay on mouseover before popping up the Charms menu.

Windows 8.1 Update 1 is, without doubt, the best iteration of Windows 8 so far, improving the operating system on nearly all fronts. The only area that could use some attention is the Start menu, but Microsoft is rumoured to be working on a Start menu replacement for its next update.

A handy disk usage analyser shows you what's taking up space

8 Changes in Windows 8.1 Update 1

1 Access the taskbar from anywhere
The taskbar now auto-hides when you're running a Windows 8 app that's been started using a keyboard/mouse. This allows quick access to your open apps, the time, Wi-Fi signal strength and your battery-level, among other things.

2 Minimise/close full screen Windows 8 apps
Similarly, an auto-hidden title bar means that Windows 8 apps can be minimised or closed with ease, as opposed to guessing the right mouse gesture in Windows 8/8.1.

3 Pin Windows 8 apps to the desktop taskbar
Windows 8 apps are now more desktop-friendly, and can be pinned to the taskbar alongside regular Windows programs.

4 Boot to desktop – by default
Windows will now directly boot to the desktop on PCs and laptops, skipping the Start screen entirely. If you'd rather have it the old way, you can change this setting.

5 Right-click menu on Start screen
Right-clicking on a tile on the Start screen now gives you the option of pinning it to the Start screen or taskbar, or even completely uninstalling it. We can't believe this feature didn't exist earlier!

6 Be notified about app installations
It's small details like this one that show how much effort Microsoft is really putting into improving Windows 8's usability. Earlier, installing a new app or program would automatically add it to the Start screen, which would lead to the Start screen getting cluttered pretty quickly. That doesn't seem to be the case anymore though, as a subtle notification informs the user of any newly installed apps with a link to the app drawer.

7 Find Power and Search buttons easily
We're not sure why this wasn't always the case with Windows 8, but the Start screen finally shows a Power and a Search button – so, no more fiddling around with the mouse trying find the correct pixel that will shut down your PC. The visibility of these buttons depends on the size and type of your device – smaller tablets and phones won't show them, while bigger devices like laptops and desktops will.

8 Decrease app size
Another subtle improvement, the size of the app icons in the app drawer can now be decreased, allowing a greater number of apps to fit on the screen.

For now, one of the many Start menu replacements such as Start 8 or Classic Shell will do just fine. The better desktop integration for Windows 8 apps vis-a-vis the auto-hidden taskbar and title bar is a great step towards making Windows 8 apps more visible and accessible for desktop users. So far, the Windows 8 Store has been all but neglected by desktop users, but we're hoping this update will change that and encourage developers to make better apps, now that they have a wider audience.

Should you upgrade?
The big question is, of course – should you update? The answer's slightly complicated. If you're perfectly happy with your Windows 7 setup and don't want to go through the hassle of reinstalling your apps and reconfiguring your settings, there's no need to update (particularly if your business has critical applications that depend on Windows 7 and would require extensive testing/rewriting to ensure compatibility). Windows 7 will be supported until at least 2016, by which time Windows 9 should be out. If, however, you were previously on the fence about the upgrade, we say go for it. Windows 8 has finally reached a point where most of the annoying niggles have been ironed out. It's also generally snappier than Windows 7 running on the same hardware, so there's no real reason to hold back. **d**

THE PLAYBOOK TO
SOCIAL MEDIA
STARDOM

Faking it has never been so easy

Samir Alam
readersletters@thinkdigit.com

Break-up diva Taylor Swift has over 52 million Twitter followers – a world record – with pop icon (for lack of a better word) Justin Bieber coming in at No.2 with just over 51 million Twitter followers. But guess what? Most of these followers don't even exist. According to Fake Follower Check, Taylor has nearly 53 per cent fake or inactive followers reducing her total to just over 21 million, and Justin Bieber leads the way with 58 per cent fake or inactive followers bringing him down to nearly 18 million actual followers. Shame!

Most high profile personalities, from Modi to Shakira, have been found faking their way into social stardom. Whether it's by buying Facebook likes and shares or Twitter followers, many celebrities have been accused of cheating their way to the top of the ranks. However, such hefty purchases aren't for everyone. Though whatever may be your reason, business or pleasure, it's always handy to have a few thousand people take notice when you make a post. So read on to discover the simple steps you can take to "fake" your way to social media stardom without having to spend a single buck.

Profile makeover
So you've set up your social media account – Twitter, Facebook, Quora, whatever – but how do you gain those followers? Well, it all begins with your profile. People rarely follow faceless entities online without a very good reason so craft a profile that not only gives you an online identity but also strategically attracts followers. SEO techniques can help you here and you don't have to be an expert. All you have to do is use words that are critical to people discovering your existence. Different social media platforms have different parameters to fill out for your profile – from elegantly succinct Twitter with its 160 characters to Facebook's encyclopedic lists of preferences and likes. In all cases, the basic bio is your main concern.

Whether you just want to sell your personal brand or push your business, having a brief, witty and easy-to-read bio that relates to your interests will grab people's attention. Decide your online personality and express it in short brief sentences that use simple one-word descriptors like "Journalist" or "Programmer". This can do wonders in making you more discoverable.

On Quora, be sure to boost your 'Recognised Topic Biographies' as they add more authority to your profile. Also, add to your

academic and non-academic fields and encourage people you know (in real life even) to endorse them.

There's a great search tool for Twitter called Followerwonk many users employ to exclusively search bios in detail. And with even Google scanning through these profiles with emphasis on hashtags, feel free to add hashtags to your profile bio, where appropriate. Of course, it also helps to be funny but that's not a deal breaker.

Don't forget the power of a good profile picture in attracting followers. People like to know who they're following even if they don't recognise them. A clean and decent image is your best bet. If you want to keep your face private, then opt for iconic images like logos or symbols that best represent you.

Go get your followers

Once you've done all this, you'll probably wonder when you'll attract your first follower. Well, you don't have to wait for them to come to you. You can go to them. Start advertising yourself on other social media platforms immediately. Invite the old crowd to the new platform and encourage them to follow you. Sending out polite, well worded email to family and friends can even get you some pity followers. A good start.

The next step is to subliminally influence unsuspecting strangers. Start by including your new social media tag in everything, from email to business cards. Let your social media location find its way unobtrusively onto the internet in comment streams on blogs and YouTube. Make it your own personal sign off. Not
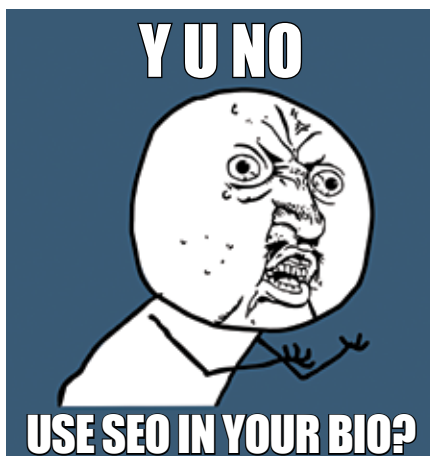
only does this technique work in a subtle way (saving you from looking pushy), but it can also lead to surprising followers down the road since the internet never really erases anything. Even lame YouTube comments. Be sure to mention your social media credentials on your LinkedIn or Glassdoor profile as well. It never hurts to have a CEO among your followers.

You can also start creating a few attractive images that carry a funny quote along with your social media watermark using freely available templates. Upload them on image-sharing websites like Imgur or Instagram for further exposure.

The Bait and Switch

You can begin your journey to stardom by following a few key people who are very active online – usually not mainstream celebrities but social media "influencers" – and easily discoverable through Google searches. Look for people who are even vaguely related to your interests and have a large number of followers. So if you're interested in movies, avoid following politicians (unless it's Arnold Schwarzenegger). This way you'll have greater access to people who're more likely to find you relevant and worth following back. Of course, they're just as likely to unfollow you later, but it gives you enough time to be visible to their followers. Followerwonk is again useful here.

As a rule of thumb, if someone follows you, follow them right back. Even on forums such as Quora, this reciprocity is a necessary courtesy otherwise you risk being unfollowed. If you want to improve your Edgerank or Klout scores as a part of your social media dominance, then tweaking your "followers to following" ratio is also important. Be careful of how quickly you unfollow users who follow you. Platforms like Twitter have systems to detect this kind of behaviour, and you risk being barred from the service. Take at least five days before unfollowing someone.

Another important aspect of Twitter is its 2,000 followers limit. You can only follow up to 2,000 people (unlimited

people can follow you, so no worries) after which you need to fulfil an unknown ratio of "followers to following" to move up. So once you reach this limit, if you want to follow someone new, you'll have to

unfollow someone first. A delicate choice, so try to first pick people who're less likely to realise you've unfollowed them (read: family and friends).

Social scavenging

Another helpful trick to find more followers is by scavenging the list of members who already follow you. Keep an eye out for people who are more into retweeting on Twitter, UpVoting answers on Quora or distributing likes on Facebook. Such people are more likely to follow someone if they're followed first. Shoot off a complimentary message and follow them and if they think you're sufficiently impressive, they'll follow you back.

Also be on the lookout for "whales" i.e. people who follow thousands of accounts. These are a goldmine if you want to get an instant follow back. Quora is one website where these whales can be found with ease. Don't follow them. Instead follow the accounts that follow these whales back. Here's an account as an example: http://www.quora.com/Martin-Stojcevski-8 . As we

go to print, this particular profile is following 46,684 members. Yes, it's probably a bot. But here's something strange – such a ridiculous profile has 2,077 people following it. These are the people you must target. Follow them and you're assured a follow-back, then simply unfollow! Mean, but effective.

You'll be sure to experience a sudden surge in your Quora followership overnight. This nifty trick will make your profile look impressive to everyone as you go about the business of answering questions on Quora. And if you're serious about participating on the forum, you can only expect the numbers to rise if your answers are intelligent or thought-provoking enough.

Also make it a habit to like, share, upvote, comment and retweet other people's interesting content. Do this mainly with content shared by a mainstream celebrity and you may just be able to weasel your way into their stream and improve your visibility without much effort. It's also recommended that you compliment, respond or positively comment on stuff shared by journalists and public relations people – they're more than happy to follow you and rarely have the time to unfollow you later.

Hashtag hopping

This is one of the easiest tricks in the game. Make hashtags a part of your online vocabulary and understand how to best discover and use them. The #discover option and the "Who To Follow" suggestions on Twitter are a great barometer of what people are interested in on any platform. Learn to embed trending hashtags nonchalantly into the flow of your content. Mention topics and hashtags in your status messages, tweets and even the questions you choose to answer on Quora. Of course,

you shouldn't add hashtags to your Quora until others are doing it first. You'd just look weird otherwise.

Freely use hashtags to chime in about ongoing events that are being discussed online. For example, if there's an IPL cricket match you'll find #IPL or some variation of it being floated around on the site. Join in the discussion and mention about such big events on your content feed. This will ensure that your name pops up on a highly viewed search list increasing your likelihood of being discovered. You're free to pick and choose your event. The closer it is to your tastes and profile, the more likely you are to gain new followers. The same trend applies to Quora votes, where your UpVotes across a number of questions highlight you to other viewers.

Catch a celeb

An easy way to boost your follower numbers is by engaging a bonafide celebrity in a public interaction. Whether they retweet your post or respond to your comment, any form of interaction gives you centre-stage exposure and instantly adds credibility to your brand. Start using the @message option to send compliments or support to celebrities and even risk asking them for a retweet of your messages. A little bit of gentle stalking doesn't hurt, so don't be afraid to send them a message up to twice a week. It's also highly advisable to find indie scale celebrities on Facebook and send them a friend request. You'll be surprised how often they say yes – just be sure to like their work beforehand.

Content and timing

Content is king, so start sharing links to blogs, lists, news, events and anything of relevance. It's important to avoid spammy content and focus on legitimate sources to retain your credibility and followers. When in doubt, just follow these two simple rules – don't share things that wastes people's time and share things that make your followers' lives better. Also, don't be afraid to express your opinions so your followers know there's human being behind that beautiful profile pic and not some bot.

Research has found that images and videos are more likely to attract attention and gain followers. Viral videos will also

do wonders for your likability online, so be on a lookout for those. Breaking news stories are another great way to make yourself relevant.

On more interactive platforms like Facebook or Quora, limit posts to twice or thrice a day so people don't think of you as a spammer. Occasionally, get in the habit of posting proactive messages such as

opinion seeking questions, go through the responses and like or reply to them to keep your engagement going with people who don't follow you.

And finally, don't mess up the timing! Knowing when to share is half the battle won. The best times to share updates, tweets or answers is when people are free to read them, so focus on the time just before work hours, during breaks and after work for maximum exposure. Maintaining this sort of schedule can be easier if you use a social media manager like Hootsuite, which can help you schedule your day's tweets in advance. Keep track of what your followers are finding interesting by observing the retweets, likes and upvotes. You can reshare the popular content again weeks or months later to impress your new followers.

Reign with honour

The long-term key to success in the social media sphere is the same as it is in real life – politeness and engagement. Best of luck on your conquests and be sure to follow Digit everywhere!

APPS, GADGETS & TECHNOLOGY TO HELP US

LIVE FOREVER

Technology has invaded all facets of our lives, and there's no getting away from this reality. We have to live in this increasingly digital world that we've created. And that only begins with harnessing technology to lead a healthy life.

In the pages that follow, we take you on a journey to understanding how technology's bad for your health if you're stuck back in time. We tell you about breakthrough gadgets, apps and services that are helping us get back in shape better than ever before. And we leave you with a glimpse of the future that a combination of technology and medicine are creating for us. It's an exciting journey.

LIVE LONG AND PROSPER

Our quest to realize our body and mind's true health potential begins with keeping the harmful effects of our interaction with technology at bay

Jayesh Shinde

Kartik Kulkarni is a bemused young man. Born in the '80s, he's part of the generation that first-hand saw the explosion of digital technology into our homes, here in India and around the world. As technology broke one formidable barrier after another – be it in the way Kartik communicated, seeked information, entertained himself and got things done to live his life – he couldn't help but notice that the world was coming together, becoming smaller and getting in his reach better than ever before. Kulkarni admits, with a wry smile, a reality that not only him but everyone faced while adjusting and adapting to life in the digital age. Health. Not just physical but mental health.

From getting his first computer in the mid '90s as a teenager, getting hooked on to reading technology magazines, slowly substituting the time spent outdoors playing real sports with video games on the television or his PC, and other such digital digressions. Slowly but surely, Kartik's life was taking a major turn onto the digital highway. Consuming an overwhelming amount of digital content at an early age made Kartik innately different than his parents' generation in more ways than one. Later in the new millennium, as smart devices started cropping up and the internet became accessible to one and all, Kartik Kulkarni, much like Alice (in Wonderland) fell even deeper

Working those late nights and not grabbing enough sleep can impact you adversely

into the rabbit hole of the digital era, until he realized that there's no escaping from it. He was mesmerized by technology at first, marvelling at its novelty and slowly getting enamoured by its ubiquity.

Kartik started suffering from the side-effects of adjusting to an overdependent tech lifestyle. Hours spent playing video games and working on his PC led to a rapid deterioration of his eyesight and

he attracted spectacles while still in his teens. An increasingly sedentary lifestyle became the dominating feature of Kartik's existence, where he started putting on weight and growing sideways much more than was desirable – the lean and fit boy who conquered the district trophy by playing a crucial role in his school's winning cricket team was lost in the shadows. Online friends became the dominating

FACEBOOK IS BAD FOR PSYCHE

Late last year, a University of Michigan research and study concluded that using Facebook can reduce young adults' sense of well-being and satisfaction with life, according to a BBC report. The research that tracked participants' behaviour for two weeks concluded that "checking Facebook made people feel worse about both issues, and the more they browsed, the worse they felt." While the largest social network does a great job of connecting people, Facebook can have negative psychological consequences too. And their rate is increasing as more and people are embracing it and spend more time on it.

Web isn't all good

On the Web's 25th anniversary, according to a study by Pew Research Center, 15 per cent of Internet users feel that the Web has been bad for society and bad for them personally as well. The research group confirms noticing a trend of rising issues over the years that tend to gnaw at people about online life, according to Lee Rainie,

director of the center's Internet and American Life Project.

The Web is notorious for increasing the digital divide between the "haves" and the "have-nots", increasing instances of online bullying, encouraging to communicate only with like-minded people, and more. Major concerns abound regarding the Web's ability to spread misinformation, the loss of privacy, and the loss of real human contact in favor of virtual interactions, according to the study. Read more here: http://dgit.in/1i7Ukcw

Raising digital natives

Children of this generation are automatically digital natives, born in a world of smart-phones and the internet. Research suggests what we label as "addiction" to technology – with kids and infants – may actually be normal. However, care should be taken that kids interact with the physical environment around them to live and learn, and not just be stuck inside a house glued to a screen all the time (and get obese). A word of caution to parents raising kids in today's age, is to monitor kids' exposure to technology to prevent some of the obvious side-effects to getting exposed to too much too soon.

A research (funded by the European Commission's Safe Internet Programme) called 'Net Children Go Mobile' monitored internet activity among 9-16 year olds in Ireland, UK, Italy, Portugal, Denmark, Romania and Belgium, and found that double the amount of children surveyed said they had encountered upsetting things online than those surveyed two years previous. This needs to change, obviously.

factor of Kartik's life as real-life social gatherings, with friends, relatives, and even his own family started to reduce in frequency. Later when Kartik grew older and started working in the IT sector, he realized that he was getting sucked deeper and deeper into the rabbit hole. And any hopes of escaping it were fast evaporating. There was no end in sight from this cushy, comfortable existence.

Technology works against your health

Probably not right down to the tee, but all of us born before the turn of the century can relate to Kartik's story in some shape or form. It is probably the greatest irony of our times that in an age where technology is breaking new ground in every possible way, trying to make our life easier and comfortable beyond belief, us humans are ill-equipped to enjoy the benefits of all this technological wonder to the fullest, probably getting paralyzed by an overbearing dependence on it. And it's costing us our health.

Isolation, depression, stress, poor sleeping habits and obesity are just some

of the ill-effects of a lifestyle that hasn't successfully adjusted to its overdependence on technology and the digital age of the 21st century. Constant distraction, shortened attention spans, addiction and reduced eyesight and hearing are also some other companions of a life spent constantly plugged in.

There's a growing sense of concern amongst our race that technology has made our existence cushier, way more

WE NEED TO ANALYZE HOW TECHNOLOGY IS IMPACTING US, RIGHT FROM THE CHAIR WE SIT ON WHILE AT OUR PC TO HOW MANY HOURS WE'RE STARING AT DIGITAL SCREENS

comfortable than how we're supposed to exist and live in this world. There's an overbearing sense of fatigue on all things digital, and a recognition of its harmful effects on human health (in the absence of precautions and a balanced lifestyle, of course). The technological marvels we all heralded in raptures, hinged our cosy

comfortable existence on, are in fact contributing to our poor shape, deteriorating health and a myriad of physiological and psychological problems. Somewhere the lifestyle we're leading doesn't agree with our constitution. We need to bring about a radical change either in our life or the technology we're building to ensure mankind doesn't fall off the wagon and devolve into something pitiful or a mass of blob.

Somehow, somewhere, not just Kartik Kulkarni, but all of us who're glued to our smartphones, tablets, PCs, more than we should be, need a course correction. We need to learn to co-exist with the technology that we use without letting it adversely affect our mind and body. We need to reclaim lost ground, and there's a lot of work to be done on that front. We need to put technology to work in ways that we shall remain untouched by its harmful effects.

And the answer doesn't involve unplugging yourself. Or throwing that smartphone or tablet away. Welcome to a new dawn in consumerized healthcare solutions that will help you reclaim your lost health back.

TECH THAT HEALS

Wearable gadgets are the next big thing, and equipped with sensors that help track our health, they're the key to a healthy life in the modern age

Jayesh Shinde

While technology's overdose is clearly unsettling our physiological and psychological constitution, there's no reason to feel our cause is doomed, that our existence is threatened, or fear us devolving into lesser beings. Just as Kartik's misgivings about the ill-effects of an overdependence on technology were steeped in reality, so is another inevitable truth from which there's no running away: Technology can break us, and there's technology that can fix us too. Here's how 21st century technology is helping us solve a 21st century health problem.

Gadgets to the rescue

Living a healthy lifestyle is easier than ever before thanks to an array of wearable devices (paired with fitness apps) and other specialty smart products that let you track your health better than ever before. The best part about these innovations are that they're quite affordable, being almost as expensive or cheaper to that next smartphone you're eying for purchase. If you care for your health, wearables can help you track it better.

We're glad to say that the recent explosion of wearable technology is leading the charge of getting consumer technology into the profitable and underserved

Wearable wristbands, smartwatches are bringing technology and health closer together

healthcare sector. The smartphone and tablets boom is over, and most of these products are fast getting commoditized. However, leveraging their widespread appeal, hardware firepower, and established ecosystem are a new wave of connected devices that aren't much more than accessories. They're small, unobtrusive, portable and easy to not notice – but equipped with special sensors, these wearable gadgets are leading the charge of democratizing healthcare, giving you

the tools and means to monitor and track your health, and in some cases even offer advice (like a doctor would).

Not just gadgets made out of metal or plastic, but smart clothes – socks and shirts, smart beds, and other non-traditional avenues of technological application is being witnessed. Given this new reality that's staring us in the face, and the ease of using devices without making an effort (in a way), this is enhancing the appeal of wearables. And its application in the personal healthcare sector is a natural evolution of the segment.

What's more, equipped with geeky, cool-looking wearable devices that double up as fitness trackers and activity monitors, getting in shape was never more fashionable. If you've seen gymnasiums and joggers' park, you'd know what we mean. When the world around you is slowly waking up to the reality of leading a healthier life by harnessing day-to-day technology, what's stopping you from taking the plunge? 🄳

FUTURE OF WEARABLES AND HEALTHCARE

U.K.-based Juniper Research is expecting the number of wearable devices shipped will rise from about 13 million in 2013 to 130 million in 2018, and market to jump from $1.4 billion in 2013 to $19 billion in 2018. There are reports predicting shipments of between 90 to 100 million pieces of wearable gadgets in 2014 alone. But how many of these will impact the personal healthcare market? Just to give you an idea, according to a GigaOm report, ABI Research estimates the global market for wearables in health and fitness could reach up to 170 million devices by 2017. With such high stakes and big money on the line, it's safe to assume that wearable tech isn't a fad, but a reality from this year onwards. And its inclination towards the health sector is quite natural and all but stands to revolutionize the personal healthcare system around the world.

G(ADG)ET BACK IN SHAPE!

Beyond the obvious suspects, these lesser-known but equally great devices will help you take better care of yourself

Jayesh Shinde

We aren't mentioning the usual suspects that everyone, and even your granny knows about – stuff like the Fitbit Fuelband, Google Glasses, Galaxy Gear, and a zillion other smartwatches. If you're looking to hop back on the wagon and try and regain control of your health and fitness, look no further than these devices mentioned below. It's time to huff and puff your way to a more improved you.

1) Garmin VivoFit

This smart wristband is unanimously regarded as the best in the business of tracking your fitness, with its ease of use, abundant features and above-average performance. It can count your steps, calories expended, sets goals and track heart rate; it's waterproof and lasts for a year on a single battery charge. It syncs data to the cloud wirelessly without interfacing through a PC. If you only want to buy one device – and one device only – to set your misshaped health life in order, just close your eyes and purchase the VivoFit.

2) Qardio

This startup helps you track your blood pressure and heart, with two specialized devices. Qardio Arm is about the size of a spectacles box, which can be tucked away in a suit. More importantly it's Apple-esque design makes the device accessible and easy to use – just strap it on and monitor your BP on an iOS device. Similarly, the Qardio Core is a strap-on that goes around your chest and promises to give medical-grade cardiovascular monitoring technology, with remote monitoring features.

3) Withings Smart Body Analyzer

In the digital age, a traditional weighing scale just wouldn't cut it. Weight watchers, behold what's popularly being dubbed as the best smart digital scale ever. This not only tracks your weight, but also heart rate, body fat and general well being, helping you stay on track of your fitness goals (indirectly). Combine all that with an improved app that's easy to consume and handy, and the Smart Body Analyzer becomes the unbeatable choice of more advanced data metrics to help you lose weight.

4) Basis B1

Recently acquired by Intel, Basis' B1 is a wristband that is a little bit different from all the rest. If you love data, and lots of it, you're gonna love this device. Not only does it track and measure your Heart Beat, Steps, and Calories but also Skin Temperature, Perspiration level, Sleep Quality and Sleep Time. Data never lies, so this helps to ring in positive lifestyle.

5) Valencell Performtek iriverON

This company essentially has a truckload of patents in sensor technology geared towards monitoring fitness and accurately tracking real-time health parameters, and it claims to be the best in the business. It's iriverON headset is one of a kind tapping into the unique physiology of the ear, retrieving more accurate health and fitness metrics with earbuds than with other devices, especially when moving around and/or engaging in physical activity. Sensor data can be viewed live through applications on their iPhone, Android phones, or other smartphone devices.

6) Interaxon Muse Headband

This product here is hard to believe isn't sci-fi. This brain sensing headband from Interaxon, Muse promises to truly unlock the power of your thought and mind and use it for the better. It detects your brain's activity at every moment and you can track it through a smartphone or tablet device. Where a lot of wearable devices are focusing heavily towards keeping the body in shape, this one keeps the mind healthy as well.

7) Sensoria Fitness Sock

A combination of e-textile, a snap-on anklet and mobile apps to track your workout, the Sensoria Fitness Sock analyzes your foot to keep you fit as a fiddle. Filled with sensors, Sock can tell you if you've been sitting idle for too long and prompt you to go for a walk and also offers some advanced features like stride gauge, foot landing analyzer, etc.

APPS TO UNLOCK YOUR HEALTH

Who said you have to buy a funky new gadget to stay in shape or track your fitness? The following Android and iOS apps allow you to unlock the hidden potential of your smartphone and tablet in the truest sense of the word, and deliver a healthy makeover to your life in no time. You don't need any other app apart from the following ten:

Jayesh Shinde

1 Fitocracy: This is not just an app, it's a fitness gamification network unlike any other within the grasp of your smartphone or tablet. The greatest thing that this app has done for us is to make the job of staying in shape less daunting and a fun activity, not unlike playing a game on your smart device, and a group activity (to some extent). Who thought staying in shape was like playing a real-life game, eh? Don't waste any time and just install it on your smart device and give it a try.
http://dgit.in/fitocracy1

2 Sleep Cycle: If we don't get enough sleep, it adversely affects our health. And if you have trouble sleeping, this brilliant iPhone app claims to work like a charm and helps you get your sleep cycle in order. Install the app on your phone, turn it on and keep it next to you while you sleep. The app will analyze your sleep pattern through its built-in accelerometer that detects your movement, sounds, and other actions while you're asleep. This helps the app understand which state of sleep you're suspended in. And when the app detects your floating back to a lighter sleep state, the app will ring an alarm and wake you up.
http://dgit.in/slcycios

3 RunKeeper: With over 20 million users worldwide, this is the most popular running app on the planet for a reason – it's simple and it works. This app lets you log distance with GPS tracking, set goals, track progress, and beat previous records. It sets reminders to work out, and also recommends an in-app training plan for several race types of running modes. It also tracks your heart-rate, and shares your runs on social media platforms. Also... it's free. What else do you need?
http://dgit.in/rnkpran

4 Zombie Run! : This is about the funnest jogging game that you're ever going to take part in, trust us. The key objective here is to make jogging part of a larger, real-world simulation around the game, as you were. You're assigned missions to gather supplies (which involves stepping out, burning calories) and your movements are tracked through GPS or accelerometer. The app has audio instructions played out at key intervals while its playing your jogging playlist. An advanced feature in the game

called "Zombie Chases" involves flat out sprinting for most part, and not for the faint-hearted. Your successes and failures are tracked. Ready for some fun?
http://dgit.in/1mJjXZd

5 Moves: Don't fret if you think you aren't really ready to start running around to get back in shape. Even if it's walking that you resort to, check out Moves. The app has a pedometer which tracks the number of steps you take in a day (aim towards a healthy 10k per day), calculates calories burnt while sitting idle, and basically does a very good job of staying out of your hair and tracking your steps-related data in the background, plotting a map of your daily activities. And thus Moves is self-described as an automatic diary of your life, one step at a time.
http://dgit.in/moves0514

6 Calorie Counter: What good is a fitness regimen that discounts lean, healthy food intake? While you're trying hard to reduce weight, it's equally important to monitor what you consume, and Calorie Counter is a fine app that lets you do just that. With over 3 million food items in its database, this app lets you break down exactly what you consume down to its nutrient value. Not just that, it lets you create your own custom foods and recipe calculator. It recommends exercises, generates progress reports based on customized goals and your diet profile. It's a comprehensive dieting app that you must try.
http://dgit.in/calcountan

7 Hot5: If your constant excuse to skip exercise is that you don't get enough time for it, this nifty little app blows that theory right out of the door. Hot5 is an iOS app designed for quick, intense five minute workouts that you can perform even while on the go. It solves the problem of sitting for too long at your desk by providing an easy-to-do array of exercises that's designed to get you up and moving. From gentle stretching and power yoga to intense cardio and strength training, aided by tutorials, this app has it all. What's your excuse now?
http://dgit.in/hot5ios

8 Pact: What if we told you that you can get paid for losing weight and getting in shape? No kidding! If the prospect of living longer by getting back in shape and improving the quality of life isn't incentive enough, this app (formerly known as GymPact) offers probably the second best reason for you to give it a try – get paid. To use the app you need to make a "pact" with it – exercise, log meals online, or eat only veggies for a month, and so on. You deduct an amount that you're willing to lose if you fail to honour this pact. If you win, you get paid certain amount collected from other users who failed to honour their pacts. Fun, isn't it?
http://dgit.in/pactapp

9 Lumosity: This is an app that claims to stimulate your brain and keep it fit and healthy. There are a variety of short games that the app offers – number based, some involving flashcards, and so on. Each of the games is meant to train one of five core cognitive functions: working memory, flexibility/agility, attention span, problem-solving, and processing speed. After creating a profile and setting your limit of games, you can start whenever you have time to kill. A good app to get your brain up and running, so to speak.
http://dgit.in/lumosios

10 Personal Zen: This is a game that promises to drive away anxiety and calm your mind within 25 minutes, and it's all the rage for stressed out netizens trying to calm their nerves. Created by psychology professors, it is set in a garden where two faces – one happy and one angry – drop into the ground. You're encouraged to trace a line left by the happy face in the grass. There's scientific data suggesting that as you play more, your eyes get tuned to searching out the happy face, and ignore the angry one. With serene music that calms the nerves down even further, this game's worth checking out
http://dgit.in/prsnlznios

TO IMMORTALITY AND BEYOND

Our quest to harness the good things about technology to counter its negatives on our health and well-being doesn't just stop at buying new fitness trackers or planning out a health regimen on your smartphone. Far from it. Humanity's in this for the long haul, and has its eyes firmly set on discovering the elixir of life and unlocking physical immortality. Here's some of the steps to prolonging our health to a whole new level.

Jayesh Shinde

Remember Dr. Curt Connors from The Amazing Spider Man? A scientific genius, mad beyond belief, who tries to re-engineer humans to become virtually immortal. He says, "I spent my life as a scientist trying to create a world without weakness, without outcasts. I sought to create a stronger human being, but there's no such thing. Human beings are weak, pathetic, feeble-minded creatures. Why be a human at all when we can be so much more? Faster, stronger, smarter."

Regeneration

Turns out Dr. Connors' wish could be closer to reality than we think – obviously with a far less dramatic effect. We aren't far from the day when humanity will get past the physical limitations of our bodies, either by fixing it beyond any damage, much like lizards that heal their epidermis. Research into undying jellyfish with regenerative cells is helping scientists understand how to make the body last longer than its shelf life. Hydra, a jellyfish species, repairs almost all its cells and regenerates periodically, without aging. James Vaupel, Director, Laboratory of Survival and Longevity at the Max Planck Institute for Demographic Research in Rostock, Germany, claims its a fundamentally different survival strategy than humans. In an interview to the BBC, Vaupel explains, "Hydras allocate resources primarily toward repair. Humans, by contrast, primarily direct resources toward reproduc-

tion, it's a different survival strategy at a species level." This only means that we can't self-heal without outside help. He also believes that senescence or biological aging can be slowed down rapidly in humans and gives a 50 per cent chance of close to negligible aging becoming a reality in our lifetime.

But if all cells "rust from oxygen exposure" and are going to suffer from inevitable destruction, however delayed it may be, what could be the next best thing than harnessing the phenomenon of 3D printing to print your tissues and organs and theoretically continue to exist forever?

Scientists have succeeded in achieving some amazing breakthroughs recently. Tissue engineering research has led to printing out a fully beating, three-dimen-

3D printed or lab-grown organs and prosthetics will prolong our life

sional, two-chamber mouse heart using a modified desktop, inkjet printer. By filling the ink cartridge with cells, they've been able to "publish" functional human kidneys. We're taking technology into places that's truly unlocking the secrets of our physiology like never before.

Just in the last few months, we have witnessed scientific feats like growing human ears on the backs of mice and implant culture-grown lungs into rats. 3D printing ears, lungs, and even tissue samples for use in humans. Thanks to recent advancements in stem cell research, British scientists have successfully created artificial blood that can be administered to anyone, by growing RBCs from fibroblasts that have been reprogrammed into mature red blood cells in the lab. The blood, developed by researchers at the University of Edinburgh and the Scottish National Blood Transfusion Service (SNBTS), would be Type O negative, also known as universal donor blood, which currently comprises just 7 percent of the blood donor pool.

Experts in the field are unanimous in their prediction that in the near future, whenever we need replacement body parts, whether it's a tissue culture or a major organ, we'll just use rejection-proof artificial organs grown in laboratories using our own cells. "By putting in the

parts you need, you'll be able to extend life by several decades," explains Anthony Atala, director of the Wake Forest Institute for Regenerative Medicine. "We may even push that up to 120, 130 years."

Downloading memories

The above mentioned techniques on our path to immortality have overwhelming odds restricted by our physiology. Our body's programmed to degenerate. But is that also true of our mind?

Less than a year ago, Berger and Sam Deadwyler at Wake Forest University successfully conducted experiments in which

"new" memory. This has worked successfully in rats and monkeys, while human trials are yet to begin.

At the Massachusetts Institute of Technology, Ed Boyden leads the Synthetic Neurobiology Group, which is building new tools to explore the brain. Boyden and his colleagues have found a protein in algae that is able to convert light into electricity. When this protein, called channelrhodopsin, is introduced into certain neurons, it's triggered by light to create distinctive patterns they can be translated into electrical impulses and then mapped – resulting in a computer code of a memory. This opens up a whole new range of technologies in the field of brain and memory research, digitizing data and even offloading it to some extent.

The biggest roadblock to downloading memories right now is that they seem to disappear when not in use. Unlike memories in a microchip which can be accessed any time, if the human brain isn't actively triggering a memory, one can't really download or copy it, according to Ted Berger, a neuroscientist at the University of Southern California. And unless we get past this hurdle, the reality of completely offloading the contents of our brain can't be achieved.

Even Stephen Hawking believes that downloading data from the brain is an inevitable eventuality. "I think the brain is like a program in the mind, which is like a computer, so it's theoretically possible to copy the brain onto a computer and so provide a form of life after death," he said, according to a report in Guardian last September. "However, this is way beyond

"There's this whole other aspect of intelligence which is new thoughts, new ideas, creativity, these are things that we don't even understand fully among us humans yet, much less how to get that into a robot."
- James McLurkin, Asst. Prof of Computer Science, Rice University, USA

they actually inserted memories into the brains of rats by stimulating certain parts of the hippocampus with electrical signals. Berger said they have also been able to disable the hippocampus, in effect blocking the memory, and then electronically stimulating certain areas to create a

our present capabilities." But don't be disappointed just yet.

The Avatar Project

This is the most ambitious endeavour towards achieving immortality of the mind, perhaps not the body. And it hints

towards cybernetics immortality, where we create a neo-humanity and truly take control of our evolution beyond the grasp of nature's biosphere. And that, according to various schools of thoughts, is the only true way for us to become truly immortal. And the Avatar Project is the first major step in that direction.

The Avatar Project is the brainchild of Russian billionaire, Dmitry Itskov, who isn't unlike Peter Weyland from the movie Prometheus – both want to be immortal. While Weyland looked at the stars for answers, Itskov's putting his trust in neuroscientists, neuroengineers and futurists to allow him to "live" forever. Not just him, but everyone. Eventually.

The Avatar Project seeks to conquer death in four stages by 2045. Stage one deals with the creation of a robot that can be controlled by our brains (through a brain-machine interface) by 2020; Stage two takes things further when a human brain can be transplanted into a synthetic body by 2025; Stage three is where the boundaries between humans and robots blur, and it will be achieved after the contents of a person's brain can be uploaded into a synthetic one by 2035. The last and final stage of the project, slated to end by 2045, results with the completion of a full-blown Avatar, a hologram that will replace bodies completely and allow us humans to live forever.

This may sound like a hoax, but it actually isn't. Itskov's vision is backed not only by his own deep pockets but also other tech luminaries – Itskov's ambitious roadmap is supported by visionaries like roboticist Hiroshi Ishiguro, Google's director of engineering, Ray Kurzweil, and chairman of the X-Prize

Visit 2045.com to see how the Avatar Project is creating the stuff of sci-fi. Unbelievable.

Foundation, Peter Diamandis. Even the Dalai Lama has given his blessings and endorsed Itskov's vision, when he said in a press release, "We should carry out these experiments with a full sense of responsibility and respect for life that will only benefit humanity, benefit others."

Ray Kurzweil, Google's director of engineering and a self-confessed futurist, said at a WSJ conference recently that "We're going to expand who we are. We're going to become more non-biological." Calling the human body a "software process," Kurzweil believes that in the future humanity will no longer be limited to its physical form and be able to upload our consciousness into a cloud and use nanobots to recreate our physical bodies at will. And as humans start becoming more like machines, AI advancements

will make machines increasingly more human. This convergence is what Kurzweil calls "singularity."

Food for thought
So we are trying to achieve immortality by slowing down biological aging of the human body, by supplementing the human body with fresh, new lab-grown organs, and ultimately escape the constraints of our physical cage – arguably the best piece of intelligent life form that evolution has produced to rule the earth with – and exist in the form of a digital entity for eternity. And from the looks of it, all this doesn't seem to be the stuff of sci-fi at all.

So the question we put to you is this: Excited or petrified? And how will you start preparing for your immortal life? <img>

ERUDITION

Being a technology magazine requires catering to more than just the regular tech geek; for there can be no technology without the great minds that dared to dream up the ideas that we consider part of modern science today. The greatest (and truly coolest) things that science has done for us have been, on some level, the wild fantasies of people who either had the foresight to see what mankind was capable of, or had the vivid, insane imagination to imagine the impossible as plausible. Our newest section 'Tales from the Void' deals with fiction – of the scientific kind.
Feliĉa Legado!

Prakrit Dhondiyal
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] "You're not what I expected, to be honest."

Godric put his coffee down in response.

"That's alright, you're not what I expected, either." said Godric, grinning and leaned back in his chair. Celeste laughed. She had an unusual laugh. Godric liked it.

She's much smarter than she actually lets on.

It had been a while since he could sit down and have an intellectual conversation with someone. It felt good. He could feel his brain cells grinding through the settled rust after all this time.

"Are you still with me?"

Godric shook his thoughts aside.

"My apologies. I have a very slippery mind."

She waved it off. "I understand. My brother Deigratia is exactly the same. I'm used to it. But tell me –" She leaned in over the table, "What are you working on? It's clear that you're very unlike the other pretentious programmers here. I find it hard to believe that someone who spends so much time in his own world has nothing worth talking about."

Godric sighed. "I've been through way too many rejections from up top, to be frank. This place doesn't open up to new ideas."

Celeste chuckled.

"Sounds more like you're in a rut."

"You could say that."

"Alright then – throw an idea my way. Maybe I can tell you where you're going wrong."

"I don't know... My ideas border on the radical. And over-the-top. And honestly, just a little insane."

"I like a little insanity, now and then."

Godric looked at the eager expression on Celeste's face, quietly contemplating her suggestion.

"Come on, tell me."

Godric gave in. "Alright. There is a program I'm working on. I'm stuck, but I'll show you what I have."

"Now that sounds like a plan."

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"Endless?"

"Well, not really endless. But it does have a virtually infinite number of possible outcomes. The program analyses over seven hundred trillion probabilities for every scenario, and that was based on the last time I tested it. I've been tweaking the source code to make it more efficient, and above all, make the program a lot more realistic. While other computer programs have the potential to answer questions that they are asked, getting them to respond and continue after the question to formulate an entire conversation like a person does, hasn't been this close to being possible. Interacting with this program is much like talking to a physical being. It lives, learns, and adapts at almost the same speed as one of us would."

"And you made this?"

"Well, yes. I tinker with the program, occasionally. The only thing is, I fail to see how this would help me in game design. Why would anyone care about a superiorly interactive computer program? Well, unless they're very, very lonely."

Celeste skimmed through the endless lines of code, at a speed common to programmers of her calibre. She had to admit, it was brilliant.

"Well, what's the problem, then?"

Godric shuffled in his chair uncomfortably. "Battlestar Games hasn't been very agreeable when it comes to my ideas. This isn't what we do."

"No, Battlestar simply revamps old successful games and releases them to the masses."

"It's what the people want!"

"You know better." Celeste actually looked a little angry, now. "You shouldn't give up on something close to you simply because you're worried about failing."

She turned and walked out of Godric's room. Godric followed.

"I'm sorry. I didn't mean to offend you."

Celeste sighed. "I'm not offended. Just disappointed."

To Godric, that seemed worse.

"You have some great ideas. And you're smart. Don't waste your talent because you think people won't agree with you. Make them agree. Do you remember the old days?"

"What old days?"

"When gaming was about fresh new ideas. New technology. Gaming was a product of cutting-edge technology."

"When it was responsible for uniting the planet."

"Yes!"

"20 years before I was born."

Celeste waved his comment off. "I mean what we've read. When gaming became our lives. Games were fresh. innovative."

"Downright kloniko. Yes, I do know what you mean."

"Exactly. You're not the only one in a rut, Godric. The word's been in a rut for nearly a decade. We need something new. And this could be it."

Godric fell silent for a few moments, mulling over her suggestion. He agreed with her about the world being in a rut. He'd thought about it himself, usually with close friends over a mug of ale. But Godric had never had the hubris of considering leading the change himself.

"You really think so?" he asked, quietly.

"Well, no, not really." She grinned. "But anything's possible. Why disregard the dream simply because it's difficult?"

Godric laughed. "You're insane."

"Told you." She smiled back.

]] What's taking them so long?

Godric straightened his tie and paced the corridor outside the Praetor's office.

I should have pitched it better. Kuhr'vat!

"Godric. Relax."

Godric stopped and glared at Cain, "You could have been more supportive in there, you know."

Cain lay back on the recliner, seemingly unconcerned. "Hey, I said it's kloniko, didn't I?"

"Kloniko. Sure. Why would I be worried? It has your stamp of 'kloniko'! That must have swayed them, for sure." Godric snapped

back, "You know, considering you wrote the story behind the
game, I'd expect you to be a little more active."

"Tad'moh, lod'ni. You're wayyy too tense." He stretched a little
more, his ease, making Godric uneasy, in turn. The nervous game
maker let out another curse under his breath and continued with
his pacing.

I wasn't confident enough. I should've been more prepared.

The great doors opened and the Prefect – the Praetor's aide
– walked out. He looked around and saw Godric and Cain. He
walked up to them. "I'm sorry to keep you waiting."

"That's fine, engard."

"I'm sorry, boy. The Praetor wasn't very impressed with the focus
group results."

He saw the look on Godric's face, and added, "It's not that the idea
wasn't impressive. Your characters are really very life-like. But
realism isn't enough for a game to be a success."

Cain spoke up. "Was it the story?"

"No, not at all. In fact, they found the story rather enthralling."

Cain beamed. Godric refrained the urge to punch him in the face.

"I'm sorry, Godric. Why don't you try something more... traditional?"

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"Traditional. Gah!"

Godric had spent the last plasm raving about what he thought
about the Gaming Commision. Celeste sat on his couch, waiting
for him to finish.

"And Cain? That shlok'ahk could use a few slaps himself."

"Hey! Mind your language."

"Sorry."

"Don't say it unless you mean it. And you know it wasn't Cain's
fault. His writing was amazing."

"I know, I know. I'm just venting."

Celeste laughed. "Yes, I noticed. But you should take his advice
and calm down, just a little."

Godric kept fuming, but he did mellow out a little.

"Good. Now – when I hit a wall, I generally take a step back and
look at what I'm doing. That's generally how I find out what I did
wrong. Or what I can do better. Think you can handle that?"

"Maybe."

"Come on, Godric. Give it a try."

So he tried. "Okay, I had a full-fledged game. The story obviously
wasn't the problem. The pragmatizer made my characters look
exceptionally life-like, and with my Harte engine, they were open-
ended and extremely realistic and interactive."

"Were they?"

"Of course they were. They never reacted in a predictable way. No
two conversations in the game are the same. The characters react
to the gamer's own statements and actions accordingly."

"True, but does that make them anything like real people?"

"Close enough! I should know, I've spent quarks perfecting their
interactive algorithms!"

"What makes us different from computer programs?"

Godric was a little taken aback by the sudden question. "What do
you mean?"

"We could try making programs more and more realistic, we could
try making them more in our image, to invoke a sense of realism
in the inanimate. But they will always be missing something –
something that sets the creator apart from the creation. What is it
that makes us different?"

Godric began to think. What is she aiming at? "Well... several things,
actually. But if I had to pick one, I'd say it would be our ability to
make choices based on what we feel and think. To gauge a situation
based on experience and feeling, rather than cold hard facts."

"Free will."

"Yes, free will."

"Then there's the answer to your question. You want to make the
next big game? Show people a game that they're not entirely in
control of. Let the program think for itself. Make its own decisions.
Thrive, live, exist in its own little bubble of a code. Let the program
believe that it is the centre of its universe."

"But where's the game in that?"

"The game's free will is an illusion. Even though it can make
decisions on its own, exist on its own, players shall be the ones
calling the shots, controlling the different aspects of the program.
Winning depends on the ultimate outcome of the game. Either the
gamers will do a great job, and the program shall exist 'til the end
of time, or they will get negligent, and the program will crash of
its own accord. Either way – this program will change the way we
see gaming. Completely."

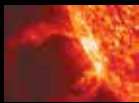Godric was dumbstruck. "That's... brilliant."

"I have my moments."

"But it won't work."

"Why?"

"Free will is great, but it ties-in with self-awareness. What would
happen if the program started questioning its very existence?"

"Hmm." It was Celeste's turn to look thoughtful. "I didn't think of
that." she admitted.

"Unless…" Godric went to his computer and started typing frantically. Celeste went up behind him and looked at his screen. "What are you —"

"Shhh. Just give me a few specs. I think I have it."

So Celeste waited, curious but patient. She took a book off his shelf and settled down on his bed, knowing that it'll take him more than a few specs to do whatever was on his mind. But she understood. About a quatre later, the typing stopped. Celeste looked up to see Godric reading the code off his screen, as if double-checking his calculations. She put the book down and walked up to him, reading what he'd come up with. It looked like – "Wait… what?"

))) "You did what?" The Praetor looked shocked.

Godric smiled. "Yes, sir."

"This, I have to see." He got up from his chair and took the data module Godric had brought with him. He walked up to his gaming console and plugged it in. Then hesitated.

"You're sure this is safe?"

Godric laughed. "It won't bite, engard. Computer. Run program." The room dissolved around them. They now stood on a hillside, overlooking a blue lake. A man stood in front of them, smiling.

"Godric! Good to see you again!"

"And you, Sam. How are you?"

The farmer snickered "The same old. It's harvest, so busy, busy."

Godric smiled back, "We won't take too long, then. I presume you know Praetor Walrik?"

"Of course!" Sam touched his forehead with his index finger, with the tip of his thumb resting on his nose. "Haoh-ni, Praetor." The Praetor looked flummoxed, but with due credit, didn't forget his manners. He mirrored the farmer's gesture. "Haoh-ni." Godric grinned and took a spec to enjoy the moment. Then moved on to business.

"So tell me, Sam. Do you know about the Havala?"

"Of course." He turned to the Praetor. "You and Godric are Havalans. Inhabitants of Gamesverse."

"And do you know what you are?"

"Yes. I'm a human. Part of a computer-generated world created by you, Godric."

The Praetor decided to speak. "And how does that make you feel?"

"Feel? Enlightened, to be honest. It's not every day that a species can claim to coming face-to-face with their creators."

The Praetor stared at the program in front of him. "Extraordinary!"

Godric stepped in. "They know what they are. Knowledge of us is a part of their programming."

"But why? Why would you do something so drastic?"

Godric grinned. "Because I made a few modifications to the Harte engine." He turned to Sam. "Hey, so I'll meet you tomorrow for our weekly chess match?"

"Oh, not tomorrow, my friend. Wife's birthday tomorrow."

"Oh! Wish Jazia for me, will you?"

"Of course! And Godric – about your little project with the Egyptians…"

"The Pyramids? What about them?"

"Maybe you should ask them to stop. They're already on a third!"

Godric cursed. "A small programming glitch, I suppose. I'll straighten it out. See you, then. Thanks a lot!"

"No problem, my friend. I'll see you around."

"Computer, end program." The hills promptly faded melted away into the walls of the Praetor's office. "You see what he did there? He decided to cancel a plan with me because of a busy schedule. The Harte engine, Praetor, has been programmed with a sense of free will. Thus making any part of the program as realistic as life, itself. In this case, even artificial wives make you sleep on the couch if you forget their birthday!"

The Praetor managed a weak smile. His brain still trying to catch up with what he had just witnessed. "But if they are self-aware…"

"They are also hard-wired to believe that theres no way for them to cross into our world."

Godric sat down. "The opportunities to use my program for new games are limitless."

The Praetor took a few specs to gather his thoughts.

"Okay, Godric. I'm interested. I'm putting you in charge of the next game release.

The Havalan programmer beamed. "Thank you, engard!"

EPILOGUE:

"Computer, pause simulation."

Godric and the Praetor froze in mid-handshake. The whole world stopped, in fact.

Celeste materialized from the wall. "Reduce North wall opacity to zero." The office wall faded away to reveal the audience sitting in the Maxima, watching the simulation.

"As hypothesized, this program works exactly as we meant it to. The characters in the game are as close to alive as they're going to be." Celeste stopped for a second, looked around at her people in the audience, and then back at Godric's frozen smile.

I hope you knew what you were doing.

"I have been trying to solve the Bartholomew equation, though. Taking the program out of the realm of the virtual, and bringing it closer to what we call reality. And I believe I've found the answer. Actually, my program found the answer for me. Computer – run program patch Godric-one-gamma-pie." There was a pregnant pause, followed by a beep, indicating end of program.

"As of now, each and every character in my program knows that we exist."

A soft murmur rippled through the crowd. People shifted in their seats, and some even stood up to take a closer look at the stage. Celeste turned back to the Havalans.

"Computer, continue simulation."

Havala resumed its motion. Godric and the Praetor turned around to face Celeste. Both of them looked at her, and knew who she was. What she was. Godric had a look of confusion interlaced with awe. In all the time they had known each other, this was the first time she had seen him looking so lost. And yet, those eyes had more than just dumbstruck surprise, fear and cold recognition. There was something warm in there. Admiration. Affection. Mixed with the excited incertitude that their unique situation brought.

Celeste cleared her throat. "Hello, Godric." d

Interstellar Imagination:
Spacecraft designed with Infinity in Mind

What kind of exotic ships will let us truly reach for the stars?

Samir Alam
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"Ship like this, be with you till the day you die."
**- Captain Mal, Firefly
(Tim Minear/Joss Whedon)**

On 24 August 2013, the Voyager I space probe became the first man made object to journey beyond the heliopause - the ecosystem boundary of our Sun. The epic journey took 35 years 11 months and 21 days, and finally introduced humanity to the interstellar Universe - a part of the cosmos beyond all human experience, only ever known through telescopes and radio spectroscopy. We had finally crossed the threshold into the undiscovered country.

And if we as a species are capable of going from Robert Goddard's 1912 test flight of the first liquid-fuel propelled rockets to discovering an Earth like planet such as Kepler 186f in 2013, then the next 100 years can only take us farther. Soon it will be time once again to venture forth boldly, with no data to support our ambition nor clear view of where we are heading, the only undeniable truth will be that we should begin - now.

Designing Perfection - From the Imagination to the Cosmos
Long before the idea of the airplane or journey's beyond the planet could be envisioned by science, we had writers and artists prophesying its possibility. It was
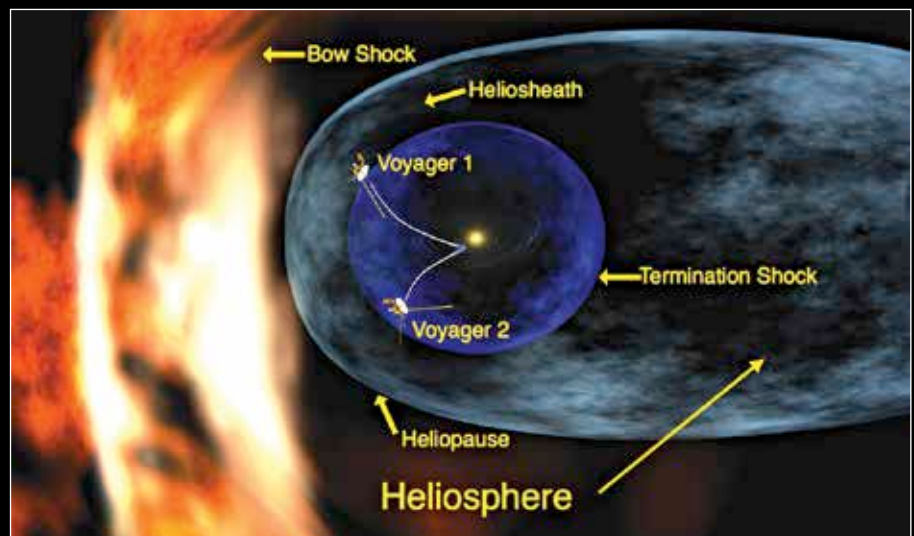
Over 11000 human work-years were dedicated to just get Voyager to Neptune.

the musings of Jules Verne in his 1865 novel "From the Earth to the Moon" that gave Konstantin Tsiolkovsky - the founding father of rocketry and astronautics - the inspiration to develop rocket propulsion. And in that spirit, the work being done by groups such as the 100 Year Starship programme holds true promise. The program was initiated by the United States Defense Advanced Research Projects Agency (DARPA) and the National Aeronautics and Space Administration (NASA) in 2012 with a simple purpose - to foster the quest to achieve interstellar space travel in the next 100 years.

This quest is fuelled by the vision already realised in our collective imagination through stories. In a case of reality imitating art, the imaginary inventions of science fiction writers have given us a peak into the future. The designs and technologies, imagined in the great stories of our contemporary history are a treasure trove of scientific possibilities playing them-

selves out. In some cases the realities constructed are pure fantasy but in others they come very close to science.

One such contemporary example of a scientifically accurate starship is the fictional ISV Venture Star from James Cameron's movie Avatar. The interstellar spacecraft follows all the factual standards of science needed for deep space travel with none of the fictional stylisms like sleek aerodynamics or faster than light travel. The idea of the Venture Star was based on the designs of polymath Charles Pellegrino and physicist Jim Powell who conceived it originally as a craft called the Valkyrie Antimatter Starship in their 1993 novel "Flying to Valhalla". The ISV Venture Star in Avatar may represent the absurdly evil Earth based corporations of the future but its technological foundation is rock solid in today's science.

This scientific authenticity of the Venture Star's design lies in the fact that its propulsion engines are placed on the nose

of the ship facing the direction of travel with the rest being towed behind it. This design concept is traced back to Robert Goddard's early designs for a rocket and is surprisingly effective for interstellar travel. The ship is designed to be launched from space powered by orbital lasers which is a more fuel efficient means of propulsion than using stored fuel banks for thrust.

The lasers power the photon sails of the craft and avoid damaging the ship thanks to a mirror shield on the ships rear. Based on the movie's design, the 1.5 kilometer long ship has photon sails with a diameter of 16 kilometers, capable of accelerating the ship at 1.5 g for nearly half a year and then being retracted into the craft. This push allows the ship to achieve a velocity of 210,000 kilometers per second or 70 percent the speed of light until it reaches its destination. As it arrives at its destination the yet to be invented hybrid fusion and matter-antimatter engines in front of the vessel burn for nearly half a year to decelerate the ship to zero velocity.

It is an elegant design where the bulk of the ship's structure is dedicated to propulsion with a relatively smaller volume devoted to cargo, habitation and crew areas. The Venture Star is essentially a small space station attached to a massively powerful engine capable of interstellar flight. It is an efficient, cost effective and reusable design that allows for maximum returns on investment. But not so much in terms of adventure - realism has its cost.

"born" in space rather than created would offer a host of benefits – an internal ecosystem designed to produce usable resources like water and food, the ability to respond at the speed of quantum-bionics and adaptable genomic traits that could support the needs of the crew.

The Leviathan helmed by the heros of Farscape is called Moya and was a more than a ship – it was a being in its own right that worked in symbiosis with its crew on their journey through space. Although the field of biomechanics and biocomputers is in its infancy there is no reason that in a 100 years, if not sentience, we would have a spacecraft designed with all the biological elements from the show if not more.

Already using nano-bionics plants are being hot-wired to create more energy. Extrapolate this and you could power a biomechanical spacecraft infinitely, as long as it was sufficiently exposed to photons in space. Such a spacecraft would embody the idea of life in space far more than any other we can imagine today.

And yet the biggest problem of interstellar space travel remains propulsion - the ability to generate the massive amounts of energy needed to get us to velocities that wouldn't make the universe seem so large. But that too is a changing reality.

Not Warp Drive - Alcubierre Drive!

If ever an astronomer in the future was to look across the galaxy at Alpha Centauri
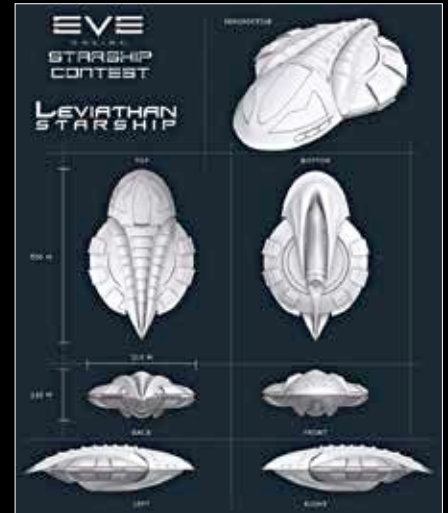
SPOILERS! Moya, the Leviathan from Farscape gave birth to a son - Talyn.

and it is real - sort of. The theory proposed by Alcubierre allows for the contracting of space in front of a spacecraft and the expanding of space behind it - to literally alter the spacetime continuum to achieve faster than light velocities.

Miguel Alcubierre, who proved this possibility using Einstein's field equations in 1994, arrived at a solution where instead of a spacecraft moving at light speed, it was space that curved around it. The idea of the Alcubierre drive works within Einstein's theory of general relativity which normally doesn't allow for anything to move faster than the speed of light. Such a spacecraft would then be static within a "warp bubble" which would be riding along the spacetime curvature as the Alcubierre drive warped the space around it.

The design of such a ship was a centerpiece discussion at the 100 Year Starship program in 2012. Scientists predicted that such a drive could be possible at substantially less power requirements than previously thought and even laid out a basic design. The Alcubierre drive would require the spaceship to be shaped like a tapered oval in the form of a prolate spheroid attached to a large encircling donut like ring. The donut would be composed of exotic matter that would be controlled to cause space-time to curve around the starship as it was suspended in a warp bubble. This concept if implemented with enough exotic matter and technological innovation,

The Venture Star with its realistic propulsion system – engine hauling the rest of the ship

Other ship designs that push us closer to the exotic include the biomechanical starships from the TV show Farscape called the Leviathans. These epic class of interstellar spacecraft although thoroughly outside the realm of reality (for now) do offer useful insights. A spacecraft that is

and see signs of human intelligence shining back at Earth it would most likely be thanks to spacecrafts powered by an Alcubierre drive. This form of theoretical propulsion allows a spacecraft to travel faster than the speed of light by playing around with the very fabric of spacetime -
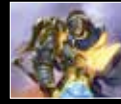
would allow the spacecraft to travel at nearly 10 times the speed of light - making the journey to the Moon in one twelfth of a second, to Pluto in 33 minutes and to Alpha Centauri in 159 days.

Of course this technology would require the harnessing of specific exotic particles and have a host of side-effects, from complete lack of steering control to a sonic boom shockwave that would destroy anything in front of the spacecraft at its destination. But despite the potential impossibility of a technological device making the Alcubierre drive a reality, it is clear that the universe as we understand it allows its existence. And that is sufficient for us to figure out the rest.

Interstellar Ark For the Future

Another major "to-do" item for mankind is to plan for another home planet. This "single-point failure" is within the very nature of humanity and the risks are plenty – natural resource exhaustion, climate change and the next Extinction Level Event like an asteroid strike.

This reality was further felt when in December 2004 a near-Earth asteroid was discovered called "99942 Apophis" that had a frightening chance of striking the Earth in 2036. This asteroid was initially predicted to crash in the Pacific Ocean causing devastating tsunamis and floods.
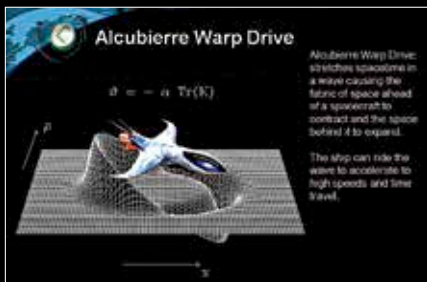
With enough exotic matter scientists already have an idea of how a Alcubierre Drive ship could be designed.
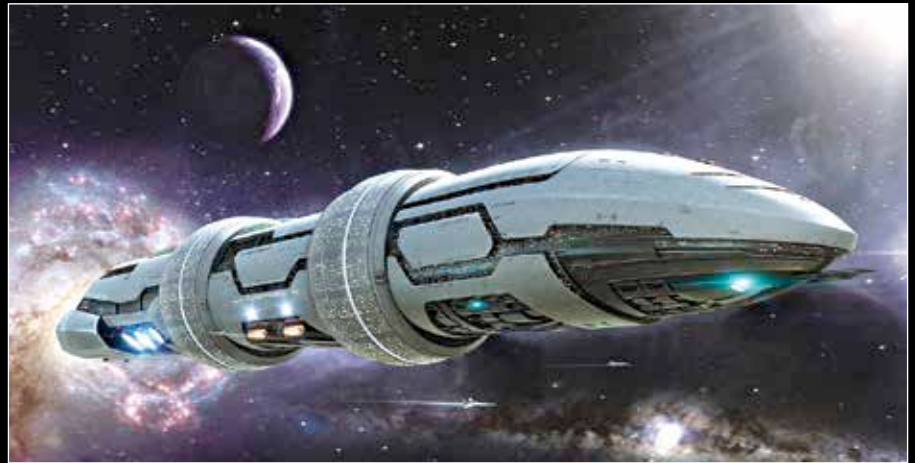
Imagine an interstellar ark as a cross between a cruise ship and a labour camp.

Fortunately, further research concluded that Apophis would miss the Earth completely but it did bring the problem to the forefront with Russia at one point preparing an Armageddon-like interception program.

The next level of interstellar spacecraft could very well be built with the intention of launching generational ships that travel across the galaxy to colonise Earth-like planets decades or centuries later. We have already begun to catalogue such planets and will spend the next few decades analysing them even further. It is perhaps only a matter of time that Kepler 186f will not be the only destination for us to aim towards. Spacecraft on such missions wouldn't be running interstellar errands to seek resources and materials, but in fact be like the sea faring ships of early settlers on Earth who walked across the land until they came to the sea - and then they crossed it, blind to what lay ahead of them.

A generational ship of such ambition would be a massive enterprise, built with the view of sustaining the long term survival of human beings. Such a ship will need to not only have the fastest propulsion possible but also be more efficient in managing its resources than human beings have ever been. The required technologies would need perfect harmony within the created ecosystem, a world capable of growing food from waste and processing waste to food to maximise energy efficiency. In such an interstellar ark the access to new resources would be near impossible as most of space is empty. The populations of such a craft would rely on

their biospheres for farming, enclosed ecosystems for sustenance and engineering systems that exist autonomously. They would need to co-operate, contributing to the survival of not only each other but the next generations of travellers as well. Their descendents would be educated and trained in the skills necessary to sustain such a ship and every crew member would serve an integral purpose to the journey. Machines like 3D printers would used to manufacture all that is required - to repair, build and upgrade technology as the years went on - innovation wouldn't be a consumerist pursuit, discovery would be a matter of basic survival.

Second Star to the Right

Most of what we hope for in the designs and technology of interstellar ships may be seen as frivolous but it is in these instances of whimsy that insight shines brightest; like Einstein dreaming of riding a beam of light we are driven by the joy of discovery and not the fear of ignorance - it is this fearless drive towards discovery that will pave the way towards the next large leap into the cosmos.

As a species we must recognise that technology is the instrument of our will and science the dogma of our faith. The way we imagine, experiment and design our dreams defines what we can expect our future to be like. In that journey, be it towards the heavens in search of new homes or into the microcosm of our own selves we shall never truly discover unless we imagine. **d**
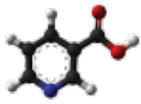
Could you turn the sun down a bit?

"The belief that we can manage the Earth and improve on Nature is probably the ultimate expression of human conceit..."
–Rene J. Dubos

Cyril Vatteli
readersletters@thinkdidgit.com

Humans will always find a way to mould things around us to suit us, and that is why we are awesome, and that is also probably why we are hated (by hyper intelligent animals who can understand such complex emotions). Glow in the dark rabbits? Poisonous cabbage? Tosh! We'll take you through some of the more interesting, and philosophical-question-raising ideas that scientists around the world have come up with to make our earth a better place.

Dial-a-lightning

In what would make a very good slow-motion video, all scientists at the University of Florida have to do is fire a rocket with a trailing grounded copper wire attached to it into a thundercloud, and after travelling around 600-900 feet --lightning strikes. The special wire inside the three foot long rocket distorts the electric field under the cloud, resulting in a lightning discharge hitting the rocker.

All of this occurs with the team behind it cosy in a metallic trailer that is completely grounded. The alternative, is to hope that lightning falls *exactly* where you want it to. The main scientist behind this, Dr. Rakov and his colleagues use this technique to test to what extent devices like electric lines, insulation on nuclear weapons, and airport runway lights can withstand such a hit.

I've always wanted a lightning-facing view

But this is when you want lightning to hit something. There are also ways to make lightning go somewhere else. While still in the test phase, the idea is of shooting a beam into the atmosphere that will leave a stream of ionized molecules in its wake, minus their electrons. This stream could be used to pull and channel lightning bolts.

The only problem was that till now all of the research just allowed for this beam to travel a few feet at best, useless we would imagine unless you want that lightning bolt to hit "just a few feet away." Now, courtesy University of Arizona and Florida, that beam can travel at least 165 feet, enough to avert a disaster.

The new beaming method will involve embedding the primary high intensity laser beam into a secondary lower intensity beam, called the dress beam, which will refuel the primary beam and allow it to travel larger distances.

Ack! You say this was pretty straightforward. Where are the philosophical-question-raising ideas you spoke about? Yes yes we are getting to it, gradually.

Hurricane Repel

When they are not being helpful by destroying Mongol fleets when they were en-route to invade Japan 1274, or preventing the England from being attacked by the Spanish Armada in 1588 by ramming right into the invaders, hurricanes cause billions of dollars of damage by destroying homes, levelling cities, and killing thousands. Yes there are methods now which ensure that hurricanes do not arrive unannounced, but there is only so much one can do in 48 hours, shifting an entire city not being one of the options. So what can we do?

Well between 1962 and 1983, a hurricane research program called Project *Stormfury* was implemented with a plan

to cut off the air supply feeding the eye wall, the location just outside of the eye of the hurricane where the most damaging winds and intense rainfall is found. This would result in the eye wall fading away. After this, a second, wider eye wall would emerge further from out from the storm's centre. It was expected that because this wall would be wider, the air whizzing into the clouds would be slower and thus less dangerous.

While the first two hurricanes it was tried on showed positive results, which may have caused some scientists' beer-glasses clinking, that high came off when the third hurricane showed only a insig-nificant impact, and the fourth hurricane no impact at all. It was later found out that the third hurricane would have acted the same way independent of the method used. So we were back to square one.

are now pondering another possible solu-tion- wind farms.

The idea, by Stanford engineer Mark Jacobson, is to place wind turbines along the coast of an area which regularly sees hurricanes. When the winds go through the turbine blades causing them to spin, some of this kinetic energy gets converted to electric energy, thus causing winds to slow down by even around 50%. Thus in theory this can save lives and power your television too.

The slow winds would even result in decreased flooding caused by hurricanes when it causes the waters along the coast to rise much higher than a normal tide, called storm surge, by up to 79%. One of the few issues which persist from Project *Stormfury* days are that it would still be difficult to understand the exact impact a wind-farm would have on a hurricane.

That is the same amount the US will spend on its military campaigns on Iraq and Afghanistan.

Geo-engineering

Ah, here comes the questions-raising part.

So Geo-engineering, fondly called 'mad science' by some sceptics or realists depending on what side you are on, is a purposeful large-scale manipulation of the Earth's climate with the aim of reducing global warming. With ideas of Geo-engineering being around since 1953, the debate rages on what the implications of such an activity would be. Why the controversy? Well lets look at some of the methods which have sprung up to counter the menace of melting glaciers.

Dark Skies

The idea here is to throw sulphate par-ticles into the stratosphere, which will reflect sunlight and reduce the tempera-ture of the earth. This notion, which first arose in 1977, was given further weight when the eruption of Mount Pinatubo in the Philippines in 1991 threw up 20 million tonnes of sulphur dioxide into the stratosphere after which the entire planet cooled by 0.4 to 0.5°C.

Possible repercussions? The sulphates may deplete some of the ozone layer, influ-ence ecosystems by reducing the capacity of plants to undergo photosynthesis due to the reduced sunlight, result in the skies ceasing to be blue, and of course could be a 'small' contributor to acid rain throughout the world. A big responsibility.

But that didn't stop Russian scientist Yuri A. Israel from carrying out field tests of this theory in 2009.

The scientists set up detectors on the ground to measure meters like solar radia-tion, wind speed, pressure, temperature, and humidity. At 10:50 am, the Soviet Mikoyan-8 helicopter flew up 650 feet and went back and forth over a 3 mile long distance in the sky, perpendicular to the wind direction, releasing smoke.

While the general cloudy condi-tions made it a bit of a pain to figure out whether any effect was natural or due to the foreign particles, the scientists soon realized that the smoke which they had released into the air had scattered up to

Hurricane Earl is glad turbines are not used yet

Now after considering placing a substance on the ocean surface which would prevent evaporation thus limiting intensity of the hurricane, dragging ice-bergs to the water surface to cool it since hurricanes' energy feeds on warm ocean water, and even nuking the centre of the hurricane because we want to see what Fallout will look like in real life, scientists

While Mark stated that a 100,000-turbine wind farm from New York to Washington would have reduced Hurricane Sandy's winds by up to 140 kmph and reduced the storm surge we spoke about earlier by 34%. According to estimates, a 5-turbine farm would cost around $300 mil. So the Washington-New York wind farm would cost a whopping $6 trillion.

10% of the Sun's rays at different points during the experiment.

David Keath, famous for his talks on the subject, argues that while geo-engineering looks like an extreme step, the need for it will only increase as we continue to be unable to reduce carbon dioxide emissions. One of the reasons why geo-engineering is still not talked about in the open so much is because it promotes the notion that we don't need to reduce our carbon emissions since we can just, you know, throw some sulphate into the air and we'll be fine.

Another argument against releasing sulphates into the stratosphere is that it addresses only one issue of warming – which may also be just a symptom – without addressing the other pertinent issue of levels of carbon dioxide in the atmosphere. But we have a solution to that too.

Iron-seas

Mt. Pinatubo returns to help pro-climate manipulation scientists! When the volcano interrupted it also deposited around 40,000 tons of iron dust into the oceans. An environmental scientist studied the event and saw that it substantially brought down atmospheric carbon

Mt. Pinatubo, caught in a rare moment of non-eruption

dioxide. So the next method of reducing carbon dioxide in the atmosphere is by dumping iron into the sea.

The reason? See Phytoplankton are these single celled organisms found in the sea. They absorb carbon dioxide from the atmosphere, convert it to energy,

and when they die they take the hapless carbon dioxide to the bottom of the ocean, never to be heard of again. Iron promotes the growth of phytoplankton. Thus in theory more phytoplankton results in more carbon dioxide being sucked out from the atmosphere.

Phytoplankton are also suspected of being the reason the ice age lasted for so long. Researchers from Princeton University and Swiss Federal Institute of Technology in Zurich proved that dust borne by the wind carried iron to the region of the globe north of Antarctica, driving the growth of phytoplankton, leading to the removal of carbon dioxide from the atmosphere, thus amplifying the ice ages and making them much colder. Some even say there would have been no ice age on the planet at all if it wasn't for this sucking out of carbon dioxide from the atmosphere.

So on October 23, 1993, a crew of scientists dumped almost 1,000 pounds of iron into the sea, mixed with a colourless chemical that would help the crew track the patch which was 'fertilized'. Sure enough, the next day the scientists swore they could even smell the phytoplankton growing. They had succeed in increasing the growth of the helpful-plankton, but unfortunately all they were able to record was a three-fold increase in chlorophyll levels, not nearly enough to be practical.

In June 1995, researchers once again dumped iron into the ocean, except this time they ensured that the iron stayed near the surface and received sunlight. After this the researchers saw 30-fold increase in chlorophyll levels. This consumed an estimated 367 tonnes of carbon dioxide.

So Iron fertilization might actually work after all. But hold on though, there were still quite a few hang-ups to address before we actually took to making the oceans look a little less blue:

There are still concerns that this method could actually *increase* the

Phytoplankton will take care of that pesky CO_2

amount of carbon dioxide in the air. The iron could also cause Diatom blooms, a type of algae which has entered a – for lack of a better word – 'blooming' lifestyle, may actually take over the phytoplankton, thus destroying exactly what we are trying to promote. The result – whatever carbon dioxide is being absorbed now disappears as well.

Should we be doing this at all then?

See lightning kills around 53 people a year in the US alone. Hurricane Katrina killed 1,833 people. And the effects of global warming will cause entire cities to disappear under-water. While the idea of bending nature seems heavy handed, the point remains that there has come a point when man must put up a fight against nature to protect himself.

The ideas are far from perfect, as we somewhat rightly guessed, but there is a strong need for them to be talked about, to be debated, because only then will we be able to figure out a solution to them if any.

Because, well, we respect nature and the earth and all that that entails, but when it comes down to the subject of life we would rather be on the side of the table which gives the orders.

The (digital) dance of democracy

Jayesh Shinde
Manager - Test Centre
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> "While technology has invaded almost all facets of our online and offline existence, the Election Commission of India hasn't kept pace with some of the merits of the digital age"

Last month, just before we closed this issue, all of us from Digit who're eligible to vote exercised our right to franchise in and around Mumbai. We were happy that we made our voice heard where it matters the most (so to speak), but none walked away satisfactorily from the experience. All of us faced trouble (in varying degrees, of course), from getting registered, to the day of polling and finally pressing that big, bold button on EVMs. Some of our family members' names were missing (despite having voted in the past and having valid election IDs), others had to hop across centres to find their names. No one checked my ID at my designated polling station, which was shocking to say the least. Clearly, while technology has invaded almost all facets of our online and offline existence, the Election Commission of India hasn't kept pace with some of the merits of the digital age.

Amidst all this chaos, the city's voting percentage increased by double digits. I'd like to think that this swell in numbers was contributed to largely by first-time voters afflicted with the romance of casting their inaugural vote, as over 100 million new young voters were added to the electorate this year. The youth have largely kept pace with the "Great Indian Election Tamasha" digitally, particularly bombarded with information through social media. Our political parties and leaders have taken to social media with great vigour, which is a good sign and a great way of engaging the allegedly disenchanted strata of voters into the current political discourse. From political satire (memes, jokes, parodies) to alleged exposés, live Hangouts to Facebook and Twitter debates, the web has been deployed to good effect before and during this Lok Sabha elections.

This embracing of social media and big data analysis will only increase in the future, not just for national elections but even local ones. Opinion polls, which are easy to rig, will be a thing of the past.

A joint report by the Internet and Mobile Association of India (IAMAI) and the Mumbai-based Iris Knowledge Foundation predicts that Facebook users will "wield a tremendous influence" over the results of the polls in 160 of the total 543 constituencies. Even a team of researchers at the Ohio Centre of Excellence in Knowledge-enabled Computing at Wright State University have been tracking the Indian political sentiment on the web since July 2013. Don't treat it as the holy grail, obviously, but some of the data revealed here is quite fascinating. Take a look: http://dgit.in/2014insights

However, most of our country's electorate (over 70 per cent of the 814 million) still live in villages and haven't even heard of Facebook, Twitter or Google+, let alone use any of these social platforms. For them, smartphones enable access to election-related information (and propaganda) unlike any other – after all there are more mobile phone users in India than toilets, remember? Parties have reached out to them ingeniously. One tool developed by BJP, called Voxta, allows voters to listen in on political speeches in real-time on their phones from anywhere in the country. AAP has signed up thousands of members by only asking people to give them a missed call. All parties have flooded WhatsApp (with 48 million Indian users) to overcome the hurdle of last-mile-connectivity to directly get their message across to eligible voters.

I remain hopeful that all this enabled tech-savvy voters to form a better opinion of their local leaders, political parties, and their national agenda, before making an informed decision and casting their votes. No one has any excuse to not vote anymore, especially with the introduction of the NOTA button to at least "waste" your vote by accounting it to yourself (read more: http://dgit.in/1igbR7u). All of us here at Digit would be disappointed if anyone of our readers who was eligible to vote didn't carry out his or her civic duty.

As for my opening rant against the Election Commission, we know it's ill-equipped to conduct these elections against overwhelming odds with over 930,000 polling booths, 1.7 million voting machines, and 11 million personnel helping them conduct this democratic exercise. Technology holds the key to alleviating their burden as much as ours (as voters).

Until the next general elections in 2019 then, and the ability to vote remotely or in advance, as per our convenience. Wouldn't that be a sight for sore eyes, yes?

Bazaar

THE LATEST PRODUCTS REVIEWED FOR YOU

The Digit Test Centre receives hundreds of products every month. Each of these products is put through a series of tests and is finally given a score. The final score is arrived at after considering a number of factors and evaluating them in terms of features, performance, value for money, build quality, and, in the case of software, even ease of use.

For better understanding of our ratings, here's a quick guide to our overall score

10 to **30**
Extremely poor product.
Keep away!

31 to **50**
Strictly OK.
Not recommended

51 to **70**
Decent product.
Go for it, but there may be better products out there.

71 to **90**
Very good product.
Highly recommended.

91 to **100**
Ground-breaking product.
We've never seen anything like it before.
A definite must buy!

JBL Pulse Bluetooth speaker

Buy this, for the light show!

Price ₹14,990

The Pulse has a similar design to JBL's highly rated Flip 2 and the Charge Bluetooth speakers. The cylindrical shape is 3-inches by 7-inches, and despite the generous use of metal, doesn't weigh much.

There are some lighting preset modes to choose from, but you can also create a custom light theme and control the brightness. For the times when you may not be in the mood for the visual extravaganza, you can turn off the LEDs altogether.

As with speakers of this size, some tracks will sound really good, while some may not have the same brilliance as the others. This is mostly due to size limitation, which has a direct impact on bass response and how far you can push the volume. Critically, vocals are handled very well, and while most other affordable portable bluetooth speakers cannot do it, the JBL Pulse handles mid detail very well. That gives the sound a much richer aura, and feels more natural. Bass is just about adequate for most tracks, but you will end up with a slightly harsh sounding bass on rock and trance tracks.

The battery life offered by the JBL Pulse depends on how judiciously you use the light show. With the lights completely off, and used as a conventional bluetooth speaker, the Pulse lasts about 9 hours, with music playback at 50% volume. With the lights on throughout, that drops to just around 6 hours.

Meant for personal listening, perhaps one or two people, small room, and music that isn't bass heavy.

Vishal Mathur

79
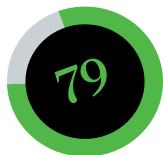
Features	90
Performance	70
Build	85
Value	70

Specifications
Bluetooth Speaker; Polymer Lithium-ion Rechargeable Battery; 2.402 GHz - 2.480 GHz Bluetooth Frequency Range; NFC Support; 3.5 mm Jack; 105 to 20000 Hz Frequency Range; 80 dB Signal-to-Noise Ratio

Contact
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Moto X
The elder brother

Price ₹23,999

Like the Moto G, X is mostly made out of plastic which does not necessarily mean that it is of low quality. It does come with changeable back panels, but sadly it isn't user removable so one has to get it factory-fitted. There is also a special wood-finish back panel which you can buy in two variants (walnut and teak) by paying ₹2,000 more.

The display is a 4.7 inch AMOLED 720p touchscreen panel with Gorilla Glass protection. Yes, the pixel density is lesser than the Moto G, but the Moto X has smaller bezels than its younger sibling. When compared side by side, both the handsets are similar in size although the Moto X is slimmer and lighter in weight.

The smartphone runs on stock Android 4.4.2 with a splash of Motorola wallpapers. Moto X does feature two very useful features. First is the Active display which is a lockscreen feature where the display gives you notifications in a small circle, even when the display is locked. You can just swipe the notification circle to directly open the app related to the notification. The other neat feature is the Touchless control. Motorola has integrated basic control functions of the handset with Google Now. You can make calls, send texts, open apps and a lot more by just speaking to the phone.

Running on a dual-core processor, Moto X sounds like an underpowered device, but it is no slow-poke. The Snapdragon processor is clocked at 1.7 GHz with 2GB of RAM and an Adreno 320 GPU. Quite frankly the SoC provides great performance power. We tested the smartphone's performance by running some benchmark apps and power hungry games. The results were very promising and, overall, the Moto X is impressive.

Kunal Khullar

79

Features	80
Performance	80
Value	75
Design	80

Specifications
Display: 4.7 inches AMOLED panel with 1280x720 resolution (312ppi); **Battery:** 2200mAh; **Storage:** 16GB; **Camera:** 10MP rear with LED flash, 2MP front; **SoC:** Qualcomm MSM8960Pro Snapdragon; **CPU:** 1.7GHz dual-core; **GPU:** Adreno 320; **RAM:** 2GB; **Operating system:** Android 4.4.2; **Connectivity:** 3G, W-Fi, Bluetooth

Contact
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Email: NA
Website: in.motorola.com

Samsung Galaxy Note Pro 12.2
A massive tablet with a huge price tag

At 1.7 pounds (0.7 kg), the Samsung Galaxy Note Pro does not feel heavy at all, and that is something you will be fairly amazed by. Considering the display size, this tablet has kept its weight and thickness well in check, and Samsung deserves a pat on the back.

The Galaxy Note Pro is powered by the same Exynos 5420 processor clocking at 1.9GHz, as inside the Galaxy Note 10.1 2014 Edition and features an identical 3GB of RAM.

Before we get down to the performance aspects of the device in question, it is important to take a look at the ever evolving TouchWiz UI. With each iteration, Samsung has made subtle tweaks to how the interface looks. Sometimes it didn't work well and sometimes it did, but in the case of the Galaxy Note Pro, it most certainly does. Widgets look a lot better and don't look like plastered boxes, and fill the screen a lot finer than earlier. The Magazine UX is perhaps the biggest evolution in terms of additional functionality and a refreshed look. By default, there are two such screens, apart from the standard widgets and icon home screen. One offers all Business centric apps - email, calendar and the Hancom office apps. The second offers lighter stuff - News, sports scores etc. You can pretty much change all this around and select between a bunch of widgets and social networks to show up information here. Unlike traditional widgets, these boxes of information fill up the screen end to end, and Samsung has incorporated multiple customization options, including layout and widget sizes. You need to have at least one Magazine UX page as a part of the TouchWiz UI.

The Galaxy Note Pro's 12.2-inch screen has the same 2,560x1,600-pixel resolution as the Galaxy Note 10.1 (2014 Edition). Despite the slightly bigger screen, the brilliance is retained as is. The display is bright, text is crisp and the ability to tweak colour richness among three presets makes a lot of difference when reading an ebook or watching a movie. For a screen size as big as 12.2-inches, this is aimed at the business user who might pair this with a Bluetooth keyboard and use this as a laptop replacement. Equally, this screen is brilliant for watching movies on. The only issue is the reflective nature reduces viewing angles considerably.

In terms of system performance, the Galaxy Note Pro 12.2 has the same hardware and the specifications that catapulted the Galaxy Note 10.1

Price ₹65,575

(2014 Edition) to the top of the Android tablets scoresheet. Needless to say, you really only need to figure out if this tablet fits your usage scenario, because the performance will be absolutely fantastic. No slowdowns, no sluggishness and the UI has been streamlined along the way that it doesn't get in your way - either in terms of performance or in utility. For gaming, this may be a tad too big to be moved around as you power-slide your way through a corner at the Laguna Seca Raceway in Real Racing 3. But, game load times are quick and the gaming performance is very good.

Battery life is a tad lesser than its 10.1-inch sibling. In the video battery drain test, with the same HD video used on both devices via VLC with screen brightness at 100% and volume at 50%, the Note 10.1's battery dropped to 86% in an hour. The Note Pro's battery level was at 81% after the same duration. The bigger display has a slight negative impact on the battery, but it's not overmuch.

The Galaxy Note Pro 12.2 is labeled as a "business" tablet. It may or may not, but this tablet does come closer to replacing your laptop for quite a few tasks. The display is very good and in typical Samsung style, there are the gamut of features including the complete S-Pen ecosystem of apps. A bunch of preloaded business centric apps give this a little more productive capabilities than most tablets.

Vishal Mathur

80
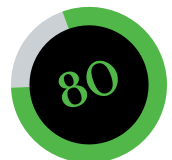
Features	90
Performance	90
Build	85
Value	55

Specifications
Processor: Exynos 5420 Octa-Core (1.9GHz + 1.3GHz); **RAM:** 3GB; **Display:** 12.2-inch S-LCD (2,560x1,600-pixel); **Storage:** 64GB + microSD slot; **OS:** Android Kit Kat

Contact
Samsung India
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Website: samsung.com/in

Sony Xperia Z1 Compact

The best 'mini' Android smartphone

It is right to say that the Z1 Compact is the only mini version of a flagship smartphone that doesn't compromise on performance and hardware. Yes, it does come in a smaller package with a 4.3 inch display, but on the inside the Z1 Compact runs on the same Snapdragon 800 chipset that was seen on the Xperia Z1. The smartphone even offers the same 20.7MP camera with Sony's Exmor RS mobile technology to get those brilliant shots. In terms of design, the Z1 Compact has front and back glass panels fitted onto a nice metal frame which acts like chassis for the smartphone. While it looks exactly like the Z1, the only difference here is

Price ₹34,000

that the Compact is about 1mm thicker than its elder brother.

The only minor issues that one might face is the glass finish on the back, which is sadly not scratch proof and the volume of the loudspeaker is a bit too low due to the waterproof sealing.

The Z1 Compact is a beast when it comes to performance. The smartphone manages to beat the scores of the Nexus 5 and even the Z1 making it one of the most powerful Android devices available in the country. Even the camera on the Z1 Compact is brilliant and makes the Lumia 1020 a thing of the past. Colours and contrast are very punchy, the autofocus smooth, fast.

If you don't fancy 5-inch smartphones, then the Z1 Compact is THE smartphone to buy.

Kunal Khullar

85
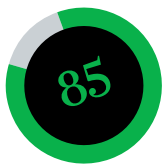
Features 90
Performance 90
Build 90
Value 70

Specifications
Processor: Qualcomm Snapdragon 800, 2.2GHz quad-core; **RAM:** 2GB; **Display:** 4.3 inch IPS LCD with 1280x720 resolution; **Storage:** 16GB, expandable via mircoSD card; **OS:** Android 4.4.2 Kit Kat; **Battery:** 2300mAH; Waterproof and dustproof certification

Contact
Sony India Pvt Ltd
Phone: 1800-3000-2800
Website: www.sonymobile.com/in

Galaxy GTX 780 Ti HOF+

Hold on! Here's another one that goes past the competition

Price ₹57,000

The Galaxy GTX 780 Ti HOF card is clocked at 1006MHz while this card is clocked at 1020MHz. The 14MHz increment might not seem to be much and quite frankly, it isn't. However, in the extremely competitive environment that enthusiasts

thrive in this increment does matter.

Physically there is absolutely no difference between the HOF and the HOF+ cards, except probably the HOF+ cards could have a better binned GPU.

In 3DMark Firestrike we saw an increment in the score across all parameters. The graphics score went up by 303 points while the physics which is more dependant on the CPU showed a 126 point increment. This aspect is slightly surprising since we normally don't see a fluctuation of such a wide margin. The overall score went up by 269 points.

Under load conditions we did notice a drop of 4 degrees. This could be attributed to the BIOS of the card being different. Since the HOF+ has a higher clock speed it can be expected to heat up more than the HOF even if the difference is miniscule.

This card sits at the peak of what we've tested so far. With a reduced price of ₹57,000+taxes this card is a much more favourable option than anything else in market.

Mithun Mohandas

76
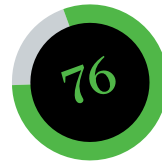
Performance 90
Value 75
Build 64

Specifications
Chipset: GK110; **Base clock:** 1020MHz; **Memory clock:** 1750MHz; **Stream processors:** 2880; **Texture Units:** 240; **ROPs:** 48; **Manufacturing process:** 28nm, PCIe 3.0, 2560 x 1600 digital resolution support, 3GB Memory; **DirectX support:** 11; **OpenGL support:** 4.3; **Power Connectors:** 8Pin + 8Pin; **TDP:** 250W; **Dimensions (LxWxD):** 290mm x 132mm x 53mm; **Warranty:** 3 years warranty

Contact
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Website: www.technologyandgadgets.com

AMD Kaveri A8-7600

Three generations down AMD is making some progress albeit slowly

Bulldozer was a massive disappointment with all the hype around it, then came Piledriver with a few of the kinks sorted out and now it's up to Steamroller to take things forward. Bulldozer, Piledriver and Steamroller are all terms used to label each of AMD's processor microarchitecture. Another thing we'd like to remind you is about the new core-thread structure that they introduced with bulldozer wherein they re-defined the word core for their processors. Each module now shares the floating point pipeline and can handle two threads, so the A8-7600 has two modules and four threads.

The introduction of this sharing concept was quite surprising back then and everyone went after AMD for trying to cover up the processor's drawbacks by coining new terminology but it seems they had other long term plans which have come to fruition in Steamroller. Enter HSA (Heterogenous Systems Architecture) which allows both the CPU and GPU part of the APU to access the same memory. Whenever data has to be shared between the CPU and the GPU, it first has to moved from, let's say, the CPU's memory to the GPU's memory where certain operations are performed after which the data is brought back into the CPU's memory. This procedure takes up precious time which can be avoided if the CPU and GPU of the APU were to be able to access the same memory space. HSA makes this possible and they are calling it hUMA (heterogenous Unified Memory Access). However, don't expect to instantly get a massive boost in performance with this new addition. Applications have to be programmed to make use of HSA. Then arises the question as to whether programmers will take to the new approach?

A new chipset and a new socket have been introduced with Steamroller, the A88X and the FM2+ socket, respectively. The FM2+ socket makes use of two extra pins, this means that the new Kaveri processors will need new motherboards and older processors will still be compatible with the new motherboards as long as the BIOS supports the use of the same.

The TDP of the processors are configurable, so if you motherboard allows modifying the TDP of your Kaveri processor then you can reduce power usage by sacrificing the processor's base clock a little. The A8-7600 allows for the TDP to be dropped from 65W to 45W dropping the base clock from 3300 MHz to 3100 MHz. The feature wasn't polished in the initial Kaveri launches but with the A8-7600 is works much better. If the TDP were to be dropped by 5W then one can expect a performance reduction of about 6% in processor intensive benchmarks, otherwise in casual games and software that don't need much processing power, the difference is hardly felt.

When it boils down to performance, Kaveri does better than Intel processors when it comes to graphics though not to the extent that you'd be gaming effortlessly on 1080p at maximum configuration. The A8-7600 comes with an R7 GPU on the die, which has 384 cores clocked at 720 MHz. With this the APU is capable of running current generation games like Bioshock Infinite and Tomb Raider at low settings comfortably with some stuttering in certain scenarios. But reducing the resolution does improve performance to ensure a playable experience. So compared to AMD processors, this one sits somewhere between the A10-6800K and the A10-5800K while in comparison to Intel processors it performs better than HD 4600.

There are very few applications that can make use of the Heterogenous Systems Architecture that the new Kaveri processors have. LibreOffice is one such software and then there is VLC which uses OpenCL to optimise certain processes. Overall, this processor isn't something that you'd go for if CPU processing is what you need, most i5 processors are competitively priced but their graphical prowess isn't that good. Wait till we test the higher SKUs of Kaveri for more insight into the matter.

Mithun Mohandas

Price ₹12,990

68

Performance................ **66**
Value **70**

Specifications
Core Name: Kaveri;
Architecture: Steamroller;
Socket: FM2+; **L2 Cache:** 2x2 MB; **Graphics:** R7; **GPU Cores:** 384; **GPU Clock:** 720 MHz; **Max DDR3 clock speed:** 2133; **Warranty:** 3 years

Contact
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Phone: 124 469 6000
Email: Chandrahas.Panigrahi@amd.com

ASUS GTX 780 Ti Matrix Platinum Edition

Made for the enthusiasts of LN2 cooling

Price ₹60,000 (excluding taxes)

We never expected the onslaught of customised graphics cards to stop and they haven't. The ASUS GTX 780 Ti Matrix Platinum edition is one such card from ASUS's ROG brand, meant for elite gamers.

The last Matrix we had seen was the HD 7970 and that needed three expansion slots but with the new series that has changed and from now on we'll be seeing dual slot cards only. This is a welcome change since it allows for more cards to be used in SLI without opting for specialised motherboards. To start off, one of the fans on the card happens to be a CoolTech unit with high static pressure and the heat pipes along with the fins are all painted black. There have been a few modifications for those who deal with liquid nitrogen, this card comes with a switch that readies the card for LN2 by overriding some of the heat and current threshold limits.

This GPU has a new memory defroster to prevent silicon chips from cooling down overmuch. Performance wise this card is actually way better, the stock frequency of 1006MHz is the same that we've seen on the Galaxy HOF+ and the ZOTAC AMP! editions of the 780 Ti. So all of these cards perform in the same league. For a full review do check out the online article.
Mithun Mohandas

79

Performance............................90
Value 75
Build 72

Specifications
Chipset: GK110; **Base clock:** 1006MHz; **Memory clock:** 1750MHz; **Stream processors:** 2880; **Texture Units:** 240; **ROPs:** 48; **Manufacturing process:** 28nm, PCIe 3.0, 4096 x 2160 digital resolution support, 3GB Memory; **DirectX support:** 11; **OpenGL support:** 4.4; **Power Connectors:** 8Pin + 8Pin; **TDP:** 375W; **Dimensions (LxWxD):** 308mm x 177mm x 41mm; **Warranty:** 3 years extended warranty

Contact
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Email: reachus@asus.com
Website: www.asus.in

HP Deskjet Ink Advantage 4515

A great colour printer

Price ₹10,085

Most printers do little to set themselves apart from the rest of the crowd. This device however, sets itself apart by offering stellar print quality for photos, as tested on HP's own photo paper, and great connectivity options. If you really want to nit-pick you will see a slight lack of detail in very fine textures (in photo prints), but nothing you'll otherwise notice. There is a noticeable amount of bleed in text prints though, but that's the only real downside to this device. If you primarily want a photo printer, the HP Deskjet4515 will not disappoint.

67

Features 80
Performance 82
Cost of Ownership................38

Specifications
Connectivity: USB, Wi-Fi, e-Print; **RAM:** 128MB; **Print resolution:** 4800x1200; **Scan Resolution:** 1200x600; **Cartridges:** 1xRGB + 1xBlack; **Cartridge Cost:** ₹475 each; **Input Tray Capacity:** 100; **Warranty:** 1 year

Contact
HP India Sales Pvt. Ltd
Phone: 1800 425 4999
Website: www8.hp.com

AOC A2258PWH

Meh

Price ₹18,990

Would you spend 20k on a device that doubles as a monitor and an Android PC? You might. But what if we told you that the screen has the worst contrast ratio we've seen in a long time, and that the Android PC in question is running on ICS, is powered by a measly 1GHz CPU (dual-core) and 1GB RAM, or that the performance is abyssmal and that you don't have a touch-screen? What if we were to also tell you that the device, by itself can't play even 720p video clips, let alone 1080p? Would you spend 20k on such a device now? Of course not; it's a wonder that AOC expects otherwise for this product.

45
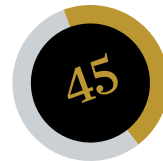
Features 80
Performance............................20
Build 60
Value 20

Specifications
Panel Size: 21.5"; **Response Time:** 2ms; **Brightness (measured):** 162cd/m2; **RAM:** 1GB; **OS:** Android 4.0.4; **I/O:** D-Sub, HDMI, Line-in, Earphone-out, RJ45, USB 2.0 x4; **Speakers:** 2Wx2; **Warranty:** 1 years

Contact
AOC India
Phone: 124-2806116/17
Website: http://www.aocindia.com/

HP 15-d008TU

An affordable laptop with excellent battery life

83
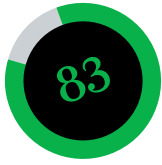
Features 85
Performance................ 75
Build 80
Value 90

Specifications
Processor: Intel Pentium Quad Core N3510 @ 2GHz; **RAM:** 2GB; **Display:** 15.6-inch (1366 x 768 pixel); **Graphics:** Intel HD; **Storage:** 500GB HDD; **OS:** Windows 8.1 (64-bit)

Contact
HP India Sales Pvt. Ltd
Phone: 1800 425 4999
Website: www8.hp.com

It is good to see that a laptop priced at less than ₹30k comes with the kind of build quality that does not betray any "affordable" roots. Materials used are of good quality on this HP laptop, and apart from the odd flex on its underside, it's built well.

The HP 15-d008TU is powered by the Intel Pentium N3510 processor, clocking at 2GHz. This is the Pentium chip from the Bay Trail family, with the 22nm architecture, and 7.5W TDP, which is perhaps the biggest indicator that this chip is meant for power efficiency. In terms of what we experienced in the real world usage, the performance is consistent. There is the bottleneck posed by just 2GB of RAM, but within that, you can still open multiple apps simultaneously before a slowdown is witnessed. Multitasking with a handful of apps is good, but nothing more.

Price ₹28,900

The 15-inch display is slightly reflective, but the good native brightness. Text readability is excellent throughout, and the colours look much better than what most rivals' have been able to come up with. The keyboard is pretty close to being perfect. The response is consistent, and the sharp feel of each keypress is very helpful while typing. In our very stressful battery tests, the HP 15's battery lasted 4 hours and 20 minutes on a single charge. On a conservative battery plan, you can squeeze over 6+ hours of battery backup, we reckon.

The HP 15 is a fairly competent laptop, at a very competitive price tag. Meant for basic use, though.

Vishal Mathur

Cubetek Ezcast HDMI air streamer

Small and well-designed

This device turned out to be well thought out from a design and a user experience perspective. The wonderful thing about this device is that even if you skip out on the manual then you don't have to worry about the setup since the very first thing that you encounter once you connect the device is an informative screen which lists the device's SSID, password and links to all the applications that can be download for every platform out there except Windows Phone (QR codes included). The android app did take its own sweet time to load at first but then onwards the operation was smooth and set up was even better. The app can pull content from your phone's memory (audio, video, pdf, etc.), connect to your cloud storage

service app (dropbox, onedrive), surf the web and make use of your device's camera to stream the video feed directly.

There is the option to mirror your device's screen as well. With the ability to upgrade the device firmware over-the-air there isn't anything more an average user could ask for. If it does matter, then you can connect to Chromecast using the app as well. The implementation of the keyboard in the app is better compared to XBMC remote which is more popular. There are certain irksome facets which include the fact that you can't select the quality of the Youtube stream and you have to settle with whatever Youtube goes with.

Mithun Mohandas

Price ₹3,100

75

Features 80
Performance................ 70
Build 75

Specifications
Model: CB-AS-01; **CPU:** AM8251; **RAM:** DDR3 128MB; **Memory:** 128MB; **Supported protocols:** DLNA, Airplay, EZcast, Miracast; **Wi-Fi:** 802.11n; **Dimensions:** 87 x 32 x 12mm; **Supported OS:** Android 4+, iOS6+, Mac 10.7, Win XP/7/8; **Warranty:** 6 months

Contact
MELODY ELECTRONICS
Phone: 080 41224606
Email: amitdugar@hotmail.com
Website: www.melodymedia.in

MSI GTX 750 Ti TF

It performs moderately well while remaining really cool

Price ₹12,900 (excluding taxes)

MSI has two SKUs of 750 Ti out and this one is the Twin Frozr edition. Compared to the vanilla card this one comes with three profiles as any other card from MSI's gaming series. The top profile takes the clock frequency to 1085 MHz which does put the card ahead of most of its competitors. Buildwise this card isn't as impressive as other offerings from MSI, especially the Hawk R9-270X which is a mid-range card compared to the 750 Ti which can be said to be an entry level card.

As with most GTX 750 Ti cards, even this one does not require external power supply since it only needs about 60W which the motherboard can provide. And it runs two fans off the same power source. And at the default clock frequency it performs slightly better than the reference GTX 750 Ti and the ZOTAC GTX 750 Ti which we tested two months back. Temperatures under load conditions were stable at around 46 degrees celsius which is way better than the 61 degrees that the stock card can manage. This can be attributed to the two heatpipes and the two fans which is signature of the Twin Frozr series. The Gaming App which allows you to select between the different profiles has some issues with Windows 8.1 so for now we recommend using Afterburner.

Mithun Mohandas

62

Performance............................66
Value 60
Build 60

Specifications

Chipset: GM107; **Base clock:** 1059MHz; **Memory clock:** 1350MHz; **Stream processors:** 640; **Texture Units:** 40; **ROPs:** 16; **Manufacturing process:** 28nm, PCIe 3.0, 2560 x 1600 digital resolution support, 3GB Memory; **DirectX support:** 11.2; **OpenGL support:** 4.4; **Power Connectors:** None; **TDP:** 60W; **Dimensions (LxWxD):** 250 x 128 x 37 mm. **Warranty:** 3 years extended warranty

Contact

Acro Engineering Company
Phone: 11-40525645
Email: http://www.acrotechindia.com
Website: saini@amigointernational.biz

JBL Bassline

The name sort of gives it away

Price ₹6,990

Somehow the last couple of JBL headphones we've got from JBL have all been heavy on the the low end. Both the J22i in-ears and the chunky J55i over-the-ear set were tuned for bass performance and the JBL Bassline is no different. Perhaps they're catering to a growing penchant for bass among Indian audiences but clearly "thump" is all the rage in these here lands. The Bassline set has a few things going for it. For starters it's collapsible – very much like the M50 or 280 Pro if you're familiar with how those designs work. It can be folded up into a nice little package that slips easily into the bundled carry case. The cable is detachable, has an in-line mic with remote, and the quality is fairly decent, so is the construction of the driver housing and headband. In terms of comfort, headband clamping pressure is not overpowering but the ear cups do tend to get a little warm with extended use. We had the black one but it's available in three other colours – white, red and blue. The anodized aluminum accents and chrome plating make the headphone look nice for sure. Now the big question – performance. You cannot really expect extreme high fidelity at this price point and the Bassline doesn't surprise anyone there. Bass frequencies are obviously exaggerated and the curve sort of dips off towards the highs. You won't get ear piercingly shrill guitar wails or high cymbals. Some of our bass tracks, particularly Angel by Massive Attack and Hatesong by Porcupine Tree had us reaching for the first two knobs of the equalizer – the bass was that overpowering. In a nutshell – a good option if you're looking for a slightly premium, portable bass friendly headset, but nothing to write home about.

Siddharth Parwatay

64

Performance............................58
Features 70
Value 58
Build 68

Specifications

Driver size: 40mm; **Input Impedance:** NA; **Frequency Response:** 10Hz – 22kHz; **SPL:** 117dB @ 30mW; **Rated power input:** 20mW

Contact

Harman International India Pvt. Ltd.
Phone: 1800 108 1234
Email: info@harman.com
Website: www.harman.in

Nokia X
Nokia's access to Android

67.5

Features 60
Performance................. 50
Value 80
Design 80

Specifications
Display: 4 inches IPS LCD panel with 800x480 resolution (233ppi); **Battery:** 1500mAh; **Storage:** 4GB, expandable via microSD card; **Camera:** 3.15MP rear; **SoC:** Snapdragon S4; **CPU:** 1GHz dual-core; **GPU:** Adreno 203; **RAM:** 512MB; **Operating system:** Android 4.1.2; **Connectivity:** 3G, W-Fi, Bluetooth, Dual-SIM

Contact
Nokia India Pvt Ltd
Phone: 1800-425-3388
Website: nokia.com/in-en

The Nokia X is like an overgrown Asha handset. The handset has a 4 inch display and just a single touch-sensitive key at the bottom of the display to go back or close applications. The back panel is made out of soft plastic which has a matte finish and and can be popped out and installed easily. Under the panel we have the 1500mAh battery, two microSIM card slots and a microSD card slot. The handset has a very simple and clean design approach. The phone fits in one hand well and looks quite attractive.

Coming to the platform, Nokia has crammed in a highly customized version of Android thanks to AOSP (Android Open Source Project) which looks like blend of Windows Phone

Price ₹7,300

and Asha platform. The UI consists of the familiar Fastlane menu, which shows all your notifications as well as recently opened apps and settings.

The UI seems a bit claustrophobic and lags a bit, but we expect Nokia to fix that soon. Another thing's that the OS doesn't offer proper multitasking. The major issue with the OS is that there is no Google framework, which means no Google apps and services, and Google Play store. You are stuck with the Nokia Store or can install third-party app stores.

To be frank, we expected something better from Nokia, but what we got was something that seems more like an experiment. Hopefully, it will improve.

Kunal Khullar

ZOTAC ZBOX EI730 Plus
Sort out a few kinks and it gets better

62

Performance................ 60
Value 60
Build 66

Specifications
CPU: Intel Core i5 4570R; **RAM:** 8 GB 1600MHz; **Graphics:** Intel Iris Pro 5200; **HDD:** 2.5-inch 5400 RPM 1TB; **Ethernet:** 2x Gigabit; **Wi-Fi:** 802.11ac; Bluetooth 4.0; **Card reader:** SD/MMC; Realtek 8-channel audio; 2x Display Port/1 DVI; 4x USB 3.0 ports; **Dimensions (LxWxD):** 188 x 188 x 51 mm; **Warranty:** 4 years warranty

Contact
Vardhaman Technology
Phone: 022-25007002
Website: http://www. vardhamantechnology.com

ZOTAC's ZBOX PCs have been quite handy devices, if you've ever mounted one of these devices on your monitor's VESA mount then it makes it an AIO of sorts. They're nifty and easy to tuck and also a good building block for a very tiny PC.

The EI730 is ZOTAC's EPIC gaming series but in order for such a product to appeal to gamers, some of the default hardware needs to be looked at. For starters, the RAM on this unit is a single 8GB DIMM with another slot available. Single channel RAM performs roughly 10-15% slower than dual channel configuration. Then the hard drive happens to be a 5400 RPM drive which is again slower than any desktop drive.

Both of these combine to slow the computer

Price ₹52,999 (excluding taxes)

down and for gamers, this matters since load times will increase significantly. They've included an mSATA port as well, so if we were to populate that with an SSD then the speed issue can be remedied. Lastly, Intel's IRIS Pro performs akin to NVIDIA's GT 640 which means even games like Metro: Last Night and Biochock Infinite will draw about 20 FPS on high quality @ 1600x900 resolution. Any game newer than these two and you'll have to bring the settings down to even make is playable.

Overall, the device's default configuration is lacking but it does give you the option of making good on all those aspects. So if you are willing to spend 53K and then a further 20K then this device should match up to its desktop counterparts.

Mithun Mohandas

Plucky
Panels

Finding a monitor in this day and age is not that hard, there's one for every budget and dozens in every price bracket. But which one's right for you? We'll help you find out.

Anirudh Regidi
anirudh.regidi@thinkdigit.com

Computer monitors are not to be taken lightly, if the CPU is the beating heart of your system, the monitor is your window to the delights of the digital world. Your window can be as marvellous (or as egregious) as your budget affords you. That said, advanced display technology is much cheaper now and it's actually possible to get an excellent display at an extremely low price– if you know what to look for that is– and we're here to help you to accomplish just that.

PC screens have come a long way since the days of the first, passive-matrix LCDs (see jargon buster) to the current crop of almost universally LED-backlit, active-matrix LCD screens. Where earlier all you could do was walk into a shop and just pick up the monitor that fit your budget, you now have quite a range to choose from and a variety of panels to satisfy your every need.

The monitors this time around were quite impressive, there were a few exceptions of course, but the race for the title of best buy was such a close one that it's actually, in a way, heartening. We received

about 15 monitors for this test ranging in size from 22-inch to 27-inch and we feel they're a very healthy representation of the variety of monitors available in the market today. Also, if we've missed out a few manufacturers it's not because

we're partial, it's just that some of them declined to have any of their monitors participate in the test.

We've broken down the monitors into two categories and without any further ado, let's begin with the test.

22-INCH TO 24-INCH MONITORS

This is by far the most popular category as far as monitors are concerned and the bulk of the monitors that we received fell into this category. Interestingly, all the monitors here

boasted of a native resolution of 1080p. Most were TN panels, but there were a few VA and IPS panels thrown in as well. Moreover, they are priced between ₹9,000 to ₹22,000 which is a somewhat a sweet spot.

HOW WE TESTED

Testing monitors is quite a finicky process. All the monitors need to be calibrated to some sort of baseline (for reference) and the tools used need to be up to the task. Here's an overview of our test process.

TEST RIG:
The monitors were evaluated on a rig with the following configuration:
- **CPU:** Intel Core i7 3960X
- **MoBo:** ASRock X79 Extreme 6/GB
- **RAM:** Kingston 8GB @ 1600 MHz
- **HDD: WD** Velociraptor 600GB @ 10,000 rpm
- **GPU:** Nvidia GeForce GTX 770 (reference graphics card)
- **PSU:** Corsair HX620
- **Mouse:** Razer Ouroboros
- **Keyboard:** Corsair K95
- **Sensor:** DATACOLOR Spyder3Elite

INITIAL SETUP:
The setup process was as follows:
- The monitor was first setup on the test rig and then restored to factory default settings
- Monitors were then placed in sRGB mode if available, otherwise they were set to "Standard" or "Normal" mode depending on nomenclature.
- The test environment was maintained at a standard level of lighting for the duration of the test.
- All monitors were calibrated using the Spyder3Elite sensor using the sRGB target profile. Preference was given to black levels during setup, therefore the calibrated brightness levels will be lower than the maximum brightness of the display.

TEST PROCESS:
All tests were performed under controlled lighting conditions and all results were logged in an excel sheet for number crunching at a later stage.

- After calibration, the Spyder3Elite was used to measure the contrast ratio and calibrated brightness of the panel.
- Lagom.nl was used for measuring black levels, white levels and sharpness using the recommended test process (as specified by lagom.nl).
- PixPerAn was used to measure pixel persistence and refresh rate. This is a somewhat subjective test and was thus given a lower weightage than others.

The following tests were conducted to evaluate real-world performance:
- **Counter-Strike:** Global Offensive: This is a fast-paced game and was used to evaluate the refresh rate of the monitor.

- **ARMA II: OA:** A military simulation, ARMA II's "Death from Above" scenario was used to evaluate the monitor's contrast ratio.

- **Avatar:** The movie features some amazing lighting and colour effects, not to mention the fast-paced action sequences. Avatar was used to evaluate the overall movie watching experience on the monitor.

- The strength of the stand was evaluated by tapping the monitor at certain points along the bezel. The duration of the wobble was recorded and averaged over five taps.
- Ratings were also given for the ease of use of the OSD. Monitors with backlit OSD buttons and more ergonomically placed buttons received higher ratings.

FEATURES SCORE:
Every monitor was given a features score based on the various features that the monitor possessed. These include bundled cables, connectivity options, refresh rates, USB hub, etc. Each feature was given a weight based on a pre-determined scale.

FINAL SCORE:
The final score was obtained by taking the sum of features score (40 percent weightage) and the performance score (60 percent weightage).

DISCLAIMER: Owing to space constraints, the entire log-sheet with testing records couldn't be printed in this issue, but the elements necessary to make an informed decision are present in the tables. Feel free to write in to us at editor@think-digit.com with any questions and/or suggestions regarding our test processes.

BUYING GUIDE

"Should I go for a TN or a VA panel? Should I stretch my budget and grab that elusive IPS? What about refresh rates? Is 60 enough? Oh! That 120Hz monitor looks tempting." If these are the kind of thoughts that race through your head when browsing for a monitor, fear not! Digit is here to help you out.

TN vs. VA: As you can see from the jargon buster, both are completely disparate display technologies and what they offer is also as disparate. VA panels offer great viewing angles and a very high contrast ratio, giving you images that are sharp and colours that are punchy at the same time. But they have a high response time, leading to some amount of blurring in fast-paced scenes. TN panels on the other hand offer poorer contrast and viewing angles, but can offer much better refresh rates.

That said, picking between the two is no easy feat. Most TN and VA panels sport similar refresh rates, which gives the edge to VA panels since they otherwise perform better. However, good quality TN panels, especially gaming panels, offer high refresh rates (120Hz+) and are definitely the right choice for movies and gaming. In the same vein, poor quality VA panels offer terrible contrast ratios and horrible refresh rates, negating the advantages of a VA panel.

Recommendations: If you want an ideal, all-purpose monitor at a reasonable price and size, go for the BenQ GL2460HM.

IPS: IPS panels are nice only if you want excellent colour reproduction and nothing else. The monitors are expensive, sport a lower contrast ratio when compared to most VA panels and offer the lowest refresh rates. However, if you're a designer or photographer type person, someone who needs accurate colours, then you have no other choice but IPS.

Recommendation: The ASUS PA238Q if you're on a budget, otherwise just grab the ASUS PB278Q or NEC EA273WM-BK depending on the resolution you prefer. The NEC is a TN panel but it's well-calibrated and offers competitive colour reproduction.

Screen resolution: This is more of a personal choice. A higher screen resolution is usually better but as a rule of thumb, 1920x1080 is more than adequate for screens up to 24-inch in size. Monitors that are 27-inch and larger could do with a higher resolution (2560x1440) but the quality of the NEC EA273WM-BK proves that it's not a prerequisite. Do bear in mind that if you're a gamer, you might be better off sticking to a 1080p screen simply because a higher resolution will tax your system that much more – unless you've got a really powerful rig of course.

Refresh Rate: A high refresh rate is ideal for gaming and movies but that also means that you'll be restricted to TN panels. Most monitors in our test came with some sort of booster mode to boost refresh rates. However, from our tests we came to the conclusion that those modes don't really amount to much. A monitor that natively supports 120 Hz is preferable to one that "boosts" your refresh rate. As such, don't get swayed by the jargon. 60 Hz is acceptable, 120 Hz is better, but more expensive at the same time.

Recommendation: BenQ XL2411Z for its high refresh rate and excellent overall performance.

got with this monitor is exactly what one would expect from any high-quality IPS panel– great image quality, excellent colour reproduction, one of only two monitors to pass our sharpness test and a horrible refresh rate and low contrast ratio. This was also one of the more feature-rich monitors in the test and supports everything from DisplayPort (DP) to a USB hub. The monitor also lets you orient it any way you want with its flexible stand.

While the image quality is very good, it's important to note that there was a noticeable reddish tinge in the corners, especially when rendering dark scenes. This is a minor drawback though and a small price to pay for image quality. If you're in the market for a professional monitor that will give you great colour reproduction, look no further than this one.

ASUS VS238H

This uses a 24-inch TN panel and as impressive as the PA238Q was, this is as disappointing. The monitor is just about average in every department except the price, where it's among the more expensive options available. It's also light on features and connectivity options, but what's most disappointing is the refresh rate, which seemed to be quite bad in our real-world tests. One could argue that the monitor is more suited for office work, but even then there are better monitors available.

BenQ GL2250HM

This is a bare-bones monitor and the cheapest one in our test, but it's also one of the most disappointing and the price is no excuse for the abysmal performance. The brightness,

Viewsonic VX2452mh
The only offering from Viewsonic was mildly disappointing. It's a TN panel that boasts of a reasonably impressive contrast ratio, however, white levels are absolutely awful and so was the refresh rate. The monitor does give you the option of boosting refresh rate and while it does help to some extent, it doesn't do anything to mitigate the mildly washed out nature of the panel. Calibration with our sensor did help sort out the display quality somewhat, but we doubt that most of you will have access to such a sensor in the first place, meaning you'll end up stuck with what you get out of the box. Considering its price and all the competitors in the segment, you can safely give this one a pass.

Acer S240HL
Another TN panel, the S24OHL is a very light-weight panel with, unfortunately, the flimsiest stand in the test. You have the bare essential connectivity options and even though the monitor supports HDMI, there's no audio I/O to be seen. The monitor's performance was just a smidgen ahead of the Viewsonic VX2452mh, mostly because of slightly better black levels and colour reproduction.

ASUS PA238Q
Easily the best 24-inch monitor in the test when you consider just the image quality, the PA238Q is also quite an expensive panel. It's an IPS panel that's been built for professionals who really care about their image quality. What we

BenQ GW2255HM

after calibration, was way lesser than the average brightness measured in the category, and while colour reproduction was pretty decent overall, the refresh rate was terrible. Regardless, why would you want this when BenQ's own stellar GW2255HM is available for just ₹250 more?

BenQ RL2455HM
An impressive enough monitor, the RL2455 is claimed to be designed with "RTS Gamers" in mind. We do feel that the moniker is just marketing mumbo-jumbo and we won't harp on it since the website will tell you all you think you need to know (you don't); but it doesn't change the fact that this is a very nice monitor overall. The response time is excellent and black levels are pretty good too. Strangely enough, the good response time did not translate that well in our movie test, we don't know why that is but it's a minor hitch in an otherwise excellent product.

BenQ XL2411Z
This one's slightly on the more expensive side but for a gamer, it's well worth it. The only monitor that offers support for Nvidia's 3DVision 2 technology, the monitor boasts of an excellent 120Hz refresh rate that is supposed to ensure flicker-free gaming and our tests bear that out. We will say that the display is a bit washed out, especially in the BenQ recommended FPS1 and 2 modes but the modes did work as advertised and afforded enough contrast to ensure that the in-game environments were clear and had a satisfactory contrast ratio in Counter-Strike Source (FPS2's been configured for that mode it seems).

You're compromising a bit on colour fidelity and black levels but if you think that an excellent refresh-rate is worth the compromise, then this is the monitor for you, If you can afford it. The RL2455HM is a viable alternative to the XL2411Z, if you don't need 120Hz that is.

BenQ EW2440L
Another monitor to avoid, the EW2440L offers quite a bit on paper, including an MSL connection for transmitting video from your mobile phone, but it falls flat when it comes to image quality. The contrast ratio of 270:1 is well below average and worse than that found on the screens of even budget laptops. The reason for the terrible contrast ratio is not the actual brightness, which is quite decent, but the backlight bleeding, which was about 5 times worse than the best in our test.

The monitor performed quite well otherwise, notably in terms of its refresh rate, but with such a terrible contrast ratio that is way lesser than the average in the entire test, there is no way that we can recommend this monitor to anyone.

BEST BUY
BenQ GW2255HM
If you're in the market for a monitor below ₹10,000, this is hands-down the best monitor you can buy. It boasts of the best contrast ratio in the entire test (close to 1100:1) and the stellar black levels are easily matched by the very decent colour reproduction and viewing angles. The refresh rate does take a beating, considering that this is a VA panel, but that's a small price to pay for the image quality. For those of you who haven't experienced a 120Hz panel, the refresh rate on offer is more than adequate.

EDITOR's PICK
BenQ GL2460HM
This is by far our favourite monitor in the 24-inch category.

BenQ GL2460HM

LCD MONITOR TEST 2104	22-24-INCH MONITORS						
Brand	BenQ	BenQ	Viewsonic	Acer	BenQ	BenQ	BenQ
Model No.	GW2255HM	GL2250HM	VX2452mh	S240HL	RL2455HM	EW2440L	GL2460HM
Price	9,750	9,500	13,500	11,500	14,500	16,000	12,750
Features (so 40)	8.93	10	15.2	8.56	12.4	8.2	10
Performance (so 60)	45.71	42.47	41.53	41.72	45.27	42.34	45.86
Total (so 100)	54.64	52.47	56.73	50.28	57.67	50.54	55.86
Features							
Screen size (in inches)	22	22	24	24	24	24	24
Panel Type	VA	TN	TN	TN	TN	VA	TN
USB Hub (USB2.0/USB3.0)	N/N	N/N	N/N	N/N	N/N	N/N	N/N
Speaker	Y	Y	Y	N	Y	Y	Y
Audio i/o	Y	Y	Y	N	Y	Y	Y
VESA (100x100)	Y	Y	Y	N	Y	N	Y
Tilt / Swivell / Height / Rotate	Y/N/N/N	Y/N/N/N	Y/N/N/N	Y/N/N/N	Y/N/N/N	Y/N/N/N	Y/N/N/N
Control Pod	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Rated Response Time (GtG in ms)	6	2	2	5	1	4	2
Rated viewing angles (H/V)	178/178	170/160	170/160	170/160	170/160	178/178	170/160
Backlit buttons	N	N	N	N	N	N	N
Connectivity							
HDMI / DVI / D-Sub / DP	Y/Y/Y/N	Y/Y/Y/N	Y/Y/Y/N	Y/Y/Y/N	Y/Y/Y/N	Y/N/Y/N	Y/Y/Y/N
3D Support	N	N	N	N	N	N	N
Bundled cables							
DVI / D-Sub / HDMI / DP	N/Y/N/N	N/Y/N/N	Y/Y/Y/N	Y/Y/N/N	Y/Y/N/N	N/Y/Y/N	N/Y/N/N
Power / Audio / USB	Y/N/N	Y/N/N	Y/Y/N	Y/N/N	Y/N/N	Y/N/N	Y/N/N
Port layout (Horizontal / Vertical)	H	V	V	H	V	H	V
Power adapter	Y	N	N	Y	N	Y	N
Performance Test							
OSD (Ease of use)	7	7.5	7	5	7.5	7.5	6
Gaming tests							
CS:GO (Response time) (so 10)	6	8	8	7	8	7	8
ARMA II (Black level) (so 10)	8	7.5	6.5	7	9	8	9
Movie Test							
Avatar (SO 10)	7	6	6.5	7	7.5	7.5	8
Spyder 3							
Contrast ratio (X:1)	1081.54	390.32	717.78	613.78	613.4	273.77	570
Brightness (cd/m^2)	241	124.4	221	233	204	244	235
Lagom.nl							
Contrast (SO 224)	223	222	219	221	224	220	222
Black-level (SO 20)	17	19	15	17	16	18	17.5
White-level (SO 12)	11.5	9.5	9	9	9.5	5.5	9.5
Sharpness (SO 10)	0	0		0	0	5	0
Gradient (SO 10)	8	6.5	7	8	8	7.5	7
Pixperan (lower the better)	9	7	8	8	9	10	8
Wobble duration (seconds)	2.5	2.5	4	4.5	3	3	1.5

Trend Micro 'droided
Trend Micro takes charge of 'droid security by safeguarding the Android platform for Mobiles and Tablets **http://dgit.in/trendmican**

ACK App
Amar Chitra Katha Pvt announced the worldwide premiere of the 'ACK Comics' app, Amar Chitra Katha's official comic store app on iOS and Android.

LED Monitors

27-INCH MONITORS

BenQ	ASUS	ASUS	BenQ	BenQ	ASUS	ASUS	NEC	ASUS
XL2411Z	PA238Q	VS238H	EW2740L	GL2760H	PB278Q	MX279H	EA273WM-BK	VK278Q
21,000	21,250	15,250	21,000	18,000	45,000	25,250	45,000	26,350
16.8	23.33	11.2	10.2	11.2	21.36	10.16	25.36	14.8
45.1	47.2	42.92	39.59	41.41	42.14	41.97	48.08	43.34
61.9	70.53	54.12	49.79	52.61	63.5	52.13	73.44	58.14
24	24	24	27	27	27	27	27	27
TN	IPS	TN	VA	TN	PLS-IPS	IPS	TN	TN
N/N	Y/N	N/N	N/N	N/N	N/N	N/N	Y/N	N/N
N	N	N	Y	N	Y	Y	N	Y
Y	Y	Y	Y	Y	Y	Y	Y	Y
N	Y	Y	N	Y	Y	N	Y	Y
Y/Y/Y/Y	Y/Y/Y/Y	Y/N/N/N	Y/N/N/N	Y/N/N/N	Y/N/Y/Y	Y/N/N/N	Y/Y/Y/Y	Y/N/N/N
N	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
1	6	2	4	2	5	5	5	2
170/160	178/178	170/160	178/178	170/160	178/178	178/178	178/178	170/160
N	N	N	N	N	N	N	N	N
Y/Y/Y/N	Y/Y/Y/Y	Y/Y/Y/N	x2/N/Y/N	Y/Y/Y/N	Y/Y/Y/Y	x2/N/Y/N	Y/Y/Y/Y	Y/Y/Y/Y
Y	N	N	N	N	N	N	N	N
Y/Y/N/N	Y/Y/N/N	Y/Y/N/N	N/Y/Y/N	Y/Y/N/N	Y/Y/Y/Y	N/Y/Y/N	Y/Y/Y/N	Y/Y/N/N
Y/N/N	Y/Y/Y	Y/N/N	Y/Y/N	Y/N/N	Y/Y/N	Y/Y/N	Y/Y/Y	Y/Y/N
V	V	V	H	V	V	H	V	V
N	N	N	Y	N	N	Y	N	N
7	8.5	7	8	6	7	6	7	7.5
8	7.5	6.5	7	7	7	8	8.5	8.5
7	6.5	7.5	6.5	8	6	5	9	7
8.5	8.5	7	5	6	7.5	6.5	9	9
724.61	322.06	493.33	141.04	669.47	340.91	143.2	553.02	506.56
323	113	127	254	305	128	197	82	166
221	224	223	223	222	222	224	222	224
18	19.5	17	17	15.5	17	19	20	13
8	11.5	11	8.5	8.5	10.5	11.5	9.5	9.5
0	5	0	0	0	0	0	0	0
8	8	7	8	6	8	8	7	5
10	8	9	9	8	8	8	8	9
2.5	1	4	3.5	3	2	3	1	2.5

The price is decent, the performance is very good and the colours are excellent. We did note that the measured contrast ratio is a little below average and there is a noticeable amount of backlight bleed visible in dark scenes, but at this price, we couldn't ask for anything better. If you're looking for a great monitor at a decent price, this is the one for you. If it wasn't for the GW2255HM, this would have one our Best Buy crown.

27-INCH MONITORS

Honestly, this was the category where we had the most fun, or rather, the category in which we really took our time testing. Why anyone would not want to use a 27-inch monitor for everything is just beyond us (price, space constraints, price, did we mention the price?). The good 27-inch monitors are glorious to behold and even though most of them had low refresh rates, image quality was so good that we didn't care.

For the test we received six monitors in this category that ranged in price from ₹18,000 to ₹45,000.

BenQ EW2740L

This is without a doubt, the very worst monitor in our tests. The contrast ratio is abysmal and just to put things in perspective, the backlight bleed is more than twice as bad as the other E-series monitor from BenQ, the EW2440L. If you're in the market for a monitor, actively avoid this one.

ASUS MX279H

This is, again, another one of the terrible monitors, though it's not as bad as the E-series monitors from BenQ. The contrast ratio is an abysmal 143:1, and the calibrated brightness well below average, but the monitor does redeem itself by offering excellent colour reproduction and a decent refresh rate. If you need a "cheap" 27-inch monitor then this is probably the one you should get but we'd still

BenQ GL2760H

recommend that you get a nice 24-inch monitor instead. The difference in image quality will easily make up for the loss in screen size.

ASUS VK278Q

It's hard to put your finger on exactly what's wrong and what's right with this monitor. The contrast ratio is decent, but brightness is low and then again, the backlight bleed is minimal. Refresh rate is very decent for a 27-inch panel but then the colour reproduction is just slightly worse than average. Even in the real world tests we weren't too sure about the monitor. Avatar looked pretty good overall, the contrast ratio and refresh rate definitely made a difference but strangely enough, ARMA II was a bit too dark and pumping up the brightness increased the backlight bleed. We're in two minds about this monitor and unfortunately,

we can't decide for you. You'll need to see it for yourself to decide if it suits your taste.

ASUS PB278Q

We've tested this monitor before, in fact, this was our Zero1 award winner for 2013 and we've included it in this test more for reference than anything else. As such, this monitor was impressive in 2013 and is still as impressive even today. It's one of the few monitors that sports a resolution of 2560x1440 while most panels in the 27-inch segment only have 1920x1080 as the maximum supported resolution. Also it offers stellar colours (our Spyder3Elite actually seemed to slightly ruin the image quality). The refresh rate is still below what a true gamer would want and there is some bleeding at the corners, but the image quality is excellent and adequate compensation for everyone else. If the NEC

NEC EA273WM-BK

JARGON BUSTER

TN: Twisted Nematic (TN) panels are among the cheapest type of panels available. Without going into too much detail, these panels generally offer high refresh rates, an average contrast ratio and decent viewing angles with average colour reproduction.

VA: In these panels, the liquid crystals are perpendicular to the glass substrate and tilt to allow light to pass through. These panels generally offer great contrast, deep blacks and excellent colour reproduction. The refresh rate is usually low however, and colour reproduction is not as good as on IPS panels.

IPS: In-Plane-Switching, in this type of display technology, the liquid crystals are aligned parallel to the glass substrate and are re-oriented in the same plane to allow light to pass through. However, don't fret if this doesn't make sense. All you need to know is that IPS generally offers excellent viewing angles and possibly the best colour reproduction among LCD monitors. IPS panels do suffer from low refresh-rates and they tend to be large, expensive and generate a considerable amount of heat. That said, there are many variants of IPS displays, including e-IPS, s-IPS, PLS and many more. Each offers some sort of advantage and compromise over the other.

Passive-Matrix LCD: This is a now defunct (thankfully) technology that was used in the early days of the LCD. Basically, a grid-pattern circuit would be responsible for the switching of the liquid crystals. A comparatively rudimentary process that was slow and was responsible for low refresh rates. It was cheap though.

Active-Matrix LCD: All modern LCD panels available today use this technology. In essence, each pixel is a transistor that can be turned on or off individually, vastly improving image quality and refresh rates because of the finer control.

Contrast Ratio: This is a measure of how much brighter a white scene is compared to a black one. Good monitors will have a high contrast ratio, but a high contrast ratio isn't everything. A contrast ratio of above 500:1 is perfectly adequate for most users.

Refresh Rate / Response Time: Refresh Rate is a measure of the frequency at which a monitor can "refresh" an entire image on its screen and is measured in Hz. Response Time is exactly the same thing, but it's measured in ms. As a general rule of thumb, a higher refresh rate or lower response time is what you're looking for. Any monitor that says AMA or Flicker Free usually boasts of either a high refresh rate or a boost mode to pump up the refresh rate if required.

Backlight bleed: All LCD monitors incorporate a source of light, usually in the form of an LED array. The orientation of the liquid crystals on the monitor, controlled via some circuitry, limits the amount of light that escapes, generating lighter and darker shades. Backlight bleed is visible when the crystals do not adequately block the light emanating from the backlight. All monitors suffer from some degree of backlight bleed. How much is acceptable is a matter of personal preference.

Low Blue Light: Many of the BenQ monitors in the test came with a setting that said "Low Blue Light". This mode is supposed to reduce the amount of blue light emitted by the backlight of a monitor, thereby reducing the stress on our eyes. Surprisingly, it actually worked and we found that for regular browsing and office work, the mode worked wonders. Give it a spin if you get the chance.

EA273WM-BK hadn't been around, this one would have walked away with the "Best Performer" crown yet again.

BEST PERFORMER
NEC EA273WM-BK

We definitely didn't expect a TN panel to win our best performer award and definitely not one with a 1080p screen resolution on a 27-inch panel. However, this panel, despite its abysmally low brightness of 87cd/m2 (once calibrated), sports the lowest levels of bleed we've seen yet. Backlight bleeding does increase once you pump up the brightness, but since we're only measuring calibrated levels, this monitor is unmatched and even at higher brightness levels the contrast ratio still holds. This ensures consistent performance under any circumstances.

Sporting a TN panel, this monitor does also boast of a lower response time than most other monitors in this category and that response time coupled with the low bleed means that movies and games look stunning. For still images you'd still want to use something like ASUS's PB278Q, but for everything else, this NEC panel is just better.

The monitor also features a sensor that dynamically adjusts brightness based on ambient light, but more interestingly, it can also check for the presence of a human in front of the screen and tones down the brightness considerably when one is absent. This feature is interesting, but was a bit irritating to use in practice since you have to be directly in front of the monitor for this to work. If you adopt the correct posture at your desk you will always be directly in front of your monitor anyway, so there's that to consider.

Do note that this is a very expensive monitor but if you do purchase it, you won't regret your decision.

BEST BUY
BenQ GL2760H

If it is value for money you want then the GL2760H is the monitor you'd want to buy. The monitor is strictly average in every regard, except the brightness value (300 cd/m2, which is very high), and performs reasonably well at everything. There is quite a bit of backlight bleed in dark scenes, but not much more than the other monitors in this category and it's definitely within an acceptable range. We can't find anything particularly good about this monitor, but then again there's nothing particularly bad about it. What tips the balance in its favour is the price and adequate performance. This is the best 27-inch monitor that the average user can buy today.

This test was definitely an interesting one and one that we learnt a lot from. Hopefully, the detailed tables and buying guide should help you reach an intelligent decision with regards to the best monitor for your needs. If not, we do have a buying guide on page 92 if you don't want to go through all the statistics. We're are always looking forward to hearing from you so do write in to us at: editor@thinkdigit.com

Troublesome video encoders, unsearchable docs, time-consuming context menus. And more...

We'll solve them all. It's Team Digit to the rescue!

🇶 Ultra slow running game

I have an HP N204TX laptop with:
- **Processor:** Intel Core i5 4200U
- **Graphics Card:** Nvidia GeForce 740M
- **RAM:** 8GB

Whenever I play *Crysis 3* on my laptop, the game gives very inconsistent FPS. I run the game at the lowest possible settings but to no avail. I have the same issue while playing *Call of Duty: Ghosts.* What could be the possible reason for this?

I used GPU-Z to take temperature readings of the GPU and it showed the GPU at 67°C on full load. So is this issue because of the temperature or something else? Please help.

–Aditya Gadgil

🇦 First, check whether you're using the latest graphics drivers for your GPU. If not, then download and install them. Often, game issues are addressed with new driver updates so you should always run the latest drivers. Your GPU temperature readings look normal and since you're already playing the game at the lowest settings, this might be an issue with the game itself. Are you having the same issue with games other than *Crysis 3* and *CoD: Ghosts*? Because, Crysis 3 is known to have performance issues with sudden drop in frame rates for the first version of the game's release. You should update the game's version to the latest release as well because this issue was resolved in one of the update patches released for the game. Write back to us how it works out for you.

🇶 Right-click lag

Hi, I have a decent mid-range PC with the following configuration:
- **CPU:** Intel Core i5-3450s
- **Motherboard:** Gigabyte GA-Z77M-D3H

- **RAM:** Corsair Vengeance 8GB
- **GPU:** ZOTAC GTX 560Ti
- **OS:** Windows 7 64-bit

My problem is that whenever I right-click on my desktop, the circular loading icon appears and it takes a much longer time than it's supposed to for the right-click menu to open up. At first, I thought that it might be a virus issue but I scanned my PC using an anti-virus program and couldn't find any. I tried everything I could, but the right-click menu loading time doesn't decrease. Please provide a solution.

-Amanpreet Singh

🇦 The long time taken to open up your context menu can be due to a number of

before this problem occurred. Alternatively, the problem can also be due to too many entries in your context menu. It so happens that every time you install a software, some of these software create an entry inside the right-click context menu and when there are a lot of these entries, the menu opening sequence slows down. Remove the entries that you don't require from the context menu. To do this, you can either make changes to the registry, if you know how to, or use a free program like 'ShellExView' and remove the unnecessary entries. If doing this still doesn't fix the issue, then another known possible and common reason for this to happen may lie within the Nvidia Display

Add and name the new key from here in the registry

reasons. If this issue cropped up after you installed a particular program, then try a system restore using a restore point from

Manager. To fix it, `Go to 'Start' menu> Search "regedit" in the search box> Press [Enter] >`
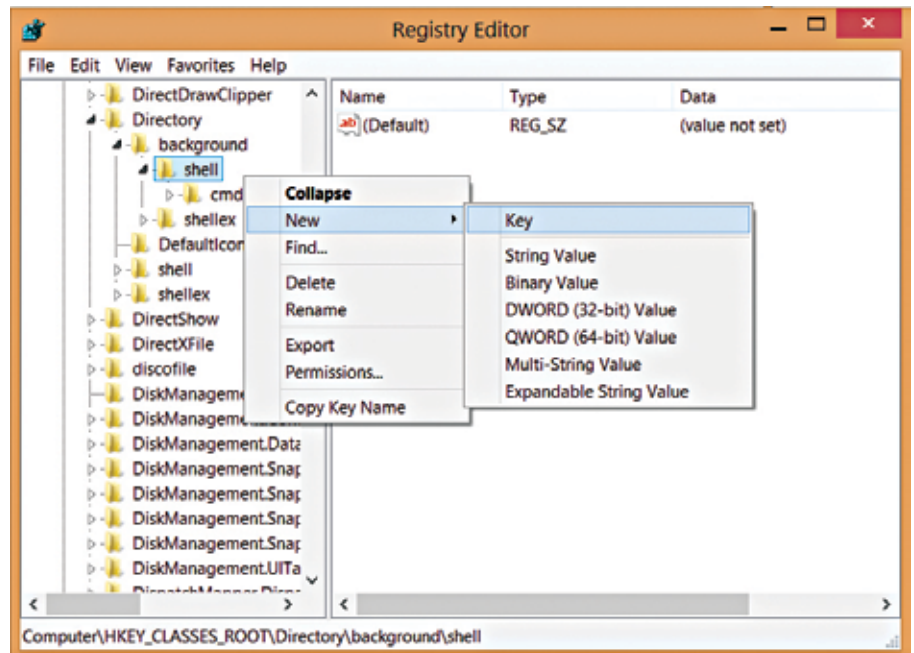
103 **Tips & Tricks**
Bit.ly has some neat tricks up it's sleeve and
Google+ has introduced some great features
for manipulating your photos

107 **Build your own app**
Building your own app is ridiculously easy,
specially if you happen to have experience
with HTML5 and Javascript

Q&A

```
Browse "HKEY_
CLASSES_ROOT\
Directory\Back-
ground\ContextMenu-
Handlers" > Next
locate 'NvCplDesk-
topContext'> Right-
click on 'NvC-
plDesktopContext' >
Click 'Delete'.
Next browse for
"HKEY_CLASSES_ROOT\
Directory\Back-
ground\shell" >
Right-click on
'Shell' > Add new key and name
the key "Nvidia Control Panel"
> Right-click on the key that
you just added and name it
"Command" > Double-click this
newly made "Command" key >
Enter inside the Default value
that you'll see which will be
this: 'C:\windows\system32\
nvcplui.exe'
```

Your right-click context menu opening time should now be back to normal.

Help rip it please. Pretty please?

I edit and rip videos often for which I've started using AnyDVD HD tool along with HandBrake in Windows XP. To back up my collection of videos, I use HandBrake but I'm having certain weird issues with it. HandBrake always provides an output file of exactly 4GB and no matter what I try, the output file is never playable. I tried to tweak the settings inside HandBrake and also used every recommended video player available to play the files, but nothing works. What could be the possible reason for this to happen? Please help me resolve this issue.

-Shrikant Rai

 Your first course of action here would be to update to the latest version of AnyDVD HD and HandBrake. You didn't mention your system specifications or even the file system that you're using or writing the files to. If you're using Windows XP on a hard disk drive that's formatted with FAT32, this would be the reason for the issue. Because FAT32 has a

Last activity view

maximum file size limit of just a little bit over 4GB and a typical HandBrake encoded output of a 1080p Bluray file exceeds that 4GB limit. So in your case, HandBrake may be hitting the file size limit of FAT32 and stopping the encoding process in the middle to provide you with an output video file that doesn't play because it's in fact an incomplete and corrupt file. To get rid of this, you'll need to write your encoded outputs on a hard disk drive that is formatted with another file system, say NTFS.

PC a public property?

I live in a hostel and have my own desktop that's kept in my dorm room. My roommates also access my PC and I've permitted them to do so with user accounts but the offshoot of this is that many times I find my files at the wrong places or newly installed programs that I don't have a clue about. Is there a way in which I can see what other users have done to my PC so that I'm well informed in case something is about to go wrong?

-Vinay Kanojia

 We understand how unnerving it can be to have changes made to a personal PC. It's always very useful to know what were the exact changes made by other users in case you want to trace the source of any problem that occurs subsequently because of the change. To do this, you just have to download and install a handy tool christened 'LastActivityView' from: http://dgit.in/LastActivityVieW. When installed, LastActivityView shows you the files that were opened, folders saved/edited, programs installed/uninstalled, network

connections made and other useful information about what went on with your system while it was being used including the PC start-up and shutdown times. Now you should be able to effectively view changes made and take measures depending on whether those changes are healthy for your system.

Can't search a thing

I have many of my work documents stored on my home PC (Windows 7 Ultimate 64-bit) since I work from home often. The problem is that the in-built search tool in Windows isn't able to find my documents. This makes my work very difficult as I have
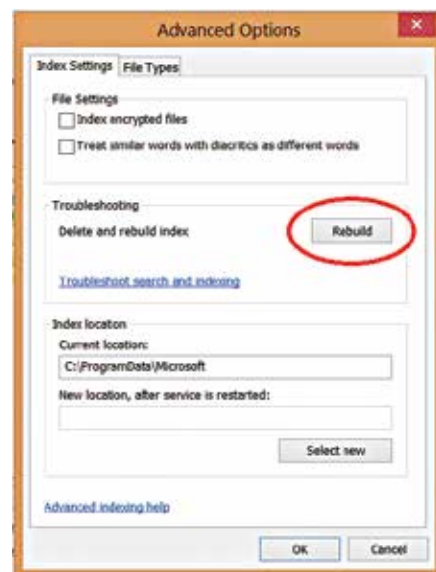
Rebuild your search index from advanced options

to manually search for the required documents every time I'm working on something. Help me fix this issue.

-Joseph Fernandes

 Your problem is because of an error in search indexing. To get rid of this, follow these steps: `Go to 'Start Menu' > Launch 'Control Panel' > Type "index" in the search box (Don't worry as this search box would still work)> Click 'Indexing Options' > Next click 'Advanced' > Click 'Rebuild' > Finally click 'OK'.` This will create a new search index and will let you search your documents without trouble.
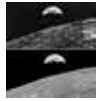
Killing the Radio Star

Learn how to scrobble like a veteran – anywhere, anyhow.

Prakrit Dhondiyal
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Why are we doing a workshop on scrobbling?

Yes, we are well aware that scrobbling has been around for the past decade. No, we aren't just reminiscing. Scrobbling has re-entered our radar with Last.fm's newest project – Buggles.

Named after the 70s new wave/electronica duo 'The Buggles', the new Last.fm feature takes the song 'Video Killed the Radio Star' to heart. While Last.fm has primarily been known for playing audio tracks from various artists, regional restrictions don't allow most music to be heard globally. Damn the music labels!

The Buggles feature has now found a workaround. Why not use the world's largest music database to play your

music? Yep, Buggles uses YouTube videos to play your library.

For those who came in late, Scrobbling was a term that originated with the UK-based music database Last.fm. Scrobbling involves taking songs played through your media player and filing away the required metadata to improve, and better tailor the songs that are played for you through Last.fm. Thus essentially catering to your own individual musical needs. For scrobbling your songs, the audioscrobbler plugin is available for over a hundred and fifty music players (both online and offline).

So here's a quick refresher course on how to scrobble easily from wherever you are.

Scrobbling online

You obviously need a Last.fm account. Visit http://www.last.fm/ and create your own Last.fm profile.

If you're the kind of person who relies on online players to stream their favourite music or to discover new music, then scrobbling is at your fingertips. Websites like Spotify and 8tracks have built-in plugin-ins for Last.fm.

In your Last.fm homepage, go into Settings and check the 'Applications' tab. This will give you a list of pre-supported applications that support the scrobbler plugin by defaut. Sign into your respected profiles on other websites and link them to your new Last.fm ID. Now everytime you play something on any of the linked websites, Last.fm will update your account with the data from said website. Scrobbling complete.
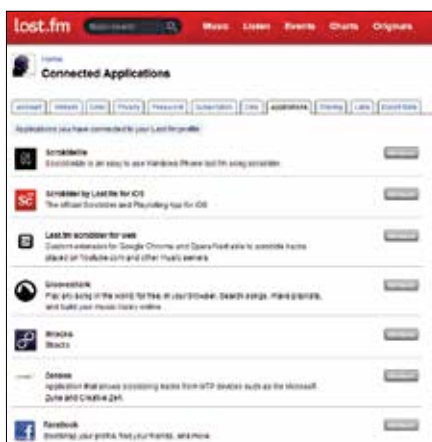
For websites like YouTube and Soundcloud, one would need to find alternative routes to scrobble. If you're a die-hard Chrome user, life is much easier. Simply go to http://dgit.in/lfmscrblr and download the 'Last.fm Scrobbler' plugin. Another lesser known plugin is Scroblr (http://dgit.in/chrscroblr). Install any of the plugins and let it scrobble for you from any of the supported websites in its list. Scroblr is also available for Safari users at http://scroblr.fm/. If you use Firefox try Foxy Scrobbler from http://dgit.in/foxyscr.

Web browser-based scrobblers are useful for people who don't rely on just one website to listen to music.

GrooveScrobbler Update

Grooveshark's premium scrobbling policy changed, recently. While at one point of time it was a part of their premium account, the Last.fm scrobbler is now built into the regular Grooveshark account. Something scrobblers will be really happy to know.

Scrobbling from your PC

For the offline users, Last.fm has an easily accessible plugin for almost all conventional (and some unconventional) media players. To find out if your favourite media player can scrobble, visit http://dgit.in/dzitscr for the complete list of Last.fm scrobblers. We can't speak for the

Widget up your Last.fm

Making your Last.fm profile look more like your own personal space is always a fun and interesting thing to do. Here are a few widgets that will help you get started.

Level Up!
Here's a great widget that gives you your own Last.fm level, based on usage and veteranship: http://dgit.in/lfmLuwid

Artist Cloud
This widget created a world cloud of your highest played artists and puts it up on your profile: http://dgit.in/artiscl

Artist Logos
A nice long collage of logos that your favourite bands sport. It looks great on a profile: http://dgit.in/lfmlogos

Installing these widgets is quite easy – as you generate each widget, you are provided with a few lines of BBCode that can be embedded in your profile in the 'About Me' section. Simply copy-paste the code to add the widget to your profile.

An extensive list of widgets is available here: http://dgit.in/ultlfmwid

out-of-the-way media players, but for the popular and functional standard players, however, the scrobbler plugin works like a charm. So if you use Winamp, Media Monkey, Windows Media Player, iTunes, Songbird or VLC, the scrobbler will scrobble it all for you.

If you're using a media player not supported by the Last.fm plugin, well, as the Last.fm saying goes – If it doesn't scrobble, it doesn't count!

Scrobbling from your phone

The phone has become the next generation of MP3 player of sorts. Suffice to say, if you're an avid scrobbler, scrobbling from your phone is a must. And Last.fm's tentacles reach deep into the world of smartphones. There is an official Last.fm app for every OS (except, maybe Windows Phones, but we'll get to that). The Android scrobbler syncs with most

music players of today, if not there's always the ScrobbleDroid app. The iOs scrobbler isn't as considerate. Due to reasons that probably have something to do with Apple's compatibility, the Last.fm app for iOS comes with its own music player. The player can detect music from your iTunes app, but scrobbling can only occur when the music is played off the Last.fm app. Playing music on the iTunes app does not scrobble for you automatically. At least, not yet. The Android app also has more personalization features. You can decide how long a song has to play to consider it scrobble-worthy and manually synchronize which players you want to scrobble from. At face value, the Android app is a lot more convenient and customizable. But at the end of the day, both apps scrobble well.

For Windows, the popular scrobbler was created by a techie in the US called Arnold Vink. The App is called 'ScrobbleMe'. It's simplistic, like everything in a Windows phone and the scrobbles almost glitchless. The only downside one could see on using the app is the fact that it doesn't scrobble too well instantly. It saves your play logs, but takes some time to update them with Last.fm. It's a lot faster if you tap the 'Scrobble' button on the app and manually scrobble your plays. It is, however, at the end of the day, a scrobbler, and is available on the Windows Phone Store at http://dgit.in/scrme.

Scrobbling from your MP3 player

This is a bit trickier than any of the previous options. Scrobbling from an MP3 player is not the easiest thing to do, but with some effort and a little patience, you can set up most MP3 players to scrobble. The easiest MP3 player to scrobble from at the moment is the iPod. iTunes updates your play count from both your iPod as well as the music you play on your PC itself. All you have to do is set up your Last.fm plugin on iTunes, and voila – instant scrobbler for your iPod.

Few players (specifically Sony ones) other than the iPod are supported by a third party scrobbler called Zenses. Zenses can be downloaded from http://dgit.in/zensesscr. Zenses links to your

Last.fm account, extracts metadata from your MP3 player and scrobbles it for you. But for some reason that probably have to do with firmware, Zenses has trouble

with some brands. Some MP3 players do not create the .scrobble.log file which is used by scrobblers. One way to get around this limitation but which isn't entirely without risk, is by using a third party firmware that's been around for a while. This firmware is called Rockbox and is easily available online. It has its share of supporters and is quite straightforward to install. Installation instructions for Rockbox can be found at http://dgit.in/rckbxinst

Why scrobble at all?

Well, it's a personal choice. Music lovers may be loyal to their favourites, but they are almost constantly in search for more music to keep the fire burning. Scrobbling is a great way to get access to more music. Last.fm started scrobbling as a road to discovery. Your own personal music taste is analysed by code which at the same time cross-references it with the behaviour of other music lovers of similar taste, and suggests music based completely on your history of listening

to music. As new artists enter the music scene, scrobbling is a great way to pick and choose what suits your taste. And with the advent of the Cloud Age, new music is literally at everyone's fingertips. All you need is curiosity and the right code to nudge you in the direction you need to go.

WORD!

Make your own Lyric Videos

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As the name suggests, lyric videos are those in which the words to the song are the main element of the video. The fundamental reason behind making lyric videos was to have a way to coordinate lyrics with the song and do it in a way that it doesn't take too long to stream. With the increase in hi-speed internet availability, the technique spun off into an outlet for creativity.

Prince and George Michaels were two of the first few artists to make lyric videos 'professional'; And in the age of Windows Movie Maker, every audiophile started making them for their favorite musicians. And with YouTube – well, 'nuff said.

In today's day and age, with the high-end software easily available to the common man, lyric videos have taken a whole different turn for the better. One such example of well-made lyric videos is Katy Perry's "Part of Me" (http://dgit.in/kplyric). Admittedly not the most imaginative lyrics, but the video's production quality is impressive. So if you're interested in making your own lyric video (and maybe do it with some class) read on:

Adobe is your friend

It may be a professional (meaning paid) suite for video editing, but it is one of the easiest to tinker with if you plan on making a lyric videos. Concentrate on Adobe Premiere Pro, Adobe After Effects and Adobe Photoshop. Audition comes in handy later, if you feel like tweaking the song, a bit.

Step One: Adobe Premiere's 'Add Title' option works well enough for someone to put all the text on the screen. The tweaking comes in the later stages.

Step Two: Once you have your lyrics on screen, add the audio track and synchronize the lyrics on the timeline.

Step Three: This deals with basic animation. The effects tab in Premiere gives a variety of options for effects and

Jolify

YouTube's built-in video editor.

transitions, so you can always make a basic lyric video look funky and eye-catching using these.

Once you get familiar with that, move on to some serious animation with Adobe After Effects. After Effects can help you animate text in 3D, make it dance around

on screen and give you more personalization control over the video.

If you want to make the extra effort, and superimpose text on a video, After Effects can also let you make text look like it was ingrained on a table or embossed on a wall.

There's also an available industry-standard particle system for After Effects called **Trapcode** (http://dgit.in/rgtrap) available for $399 which can be used to create basic particle-based VFX for your videos, adding a little pizazz to your work.

Since Adobe programs are not free, you can try out free alternatives to them which work similarly and create lyric videos. "Ezvid" is one such example but you can find more here: http://dgit.in/21frvided

Online Editors

There are several video editing software available online. Since text-based editing is common to all video players, most of these video editors would help you make lyric videos with ease. These video editors may not give you the range of options available on the professional software, but they perform the role of being a quick fix to lyrical video editing.

Jolify is an online editor meant specifically for lyric video creation. It's a step-by-step video editor that asks you to import your track and add frames of lyrics that can be easily synchronized with the audio file. To use, just create an account at http://dgit.in/lyrvid and keep your own personalized library of lyric videos as and when you create them.

YouTube's built-in Video Editor is as simplistic as it can get. Simply go to http://dgit.in/ytved, select the background and text colour, and get to it. Import your audio track off your PC onto the Youtube Editor's Timeline. Synchronize the text by clicking on the text button at the required points in the video. Recheck the video when done and publish directly on YouTube. Simple and uncomplicated Lyric Video editing.

If you intend to go beyond the norms and come up with some really creative stuff, check out this link for some ideas that you may be able to use to spark some creativity in you: http://dgit.in/ytlyrvid Remember the old saying: Imitation is the sincerest form of flattery.

BITLY

Sharing links on space-constrained sites like Twitter led to the rise of URL shorteners - tools that shorten links so they take up fewer characters. Probably the most well-known among these services is Bitly. (We here at Digit are huge fans of Bitly ourselves!) Apart from just shaving off a few characters off a link, Bitly has a plethora of features that allow you to use it as a link repository of sorts - use it as a cloud-based bookmarking system, an analytics tool or a social engagement monitor, all for no charge!

Use Custom Domain Names

You've probably noticed that the links in our magazine start wth dgit.in - this is Bitly's custom branding at work. What used to be a pro-only feature, custom-domains are now available to all users. Just create an account, head over to Settings > Advanced and configure your custom domain. Bear in mind though, that you need to be the owner/administrator of the custom domain that you're using, as you'll need to change the DNS/CNAME settings of your custom domain to point to bit.ly.

Customize Your Bitmarks

If setting up a custom domain seems like a lot of work, you can customize your Bitmarks (links saved with Bitly are called Bitmarks) by adding a meaningful word or phrase after bit.ly/ to make it easier to remember. What is usually just a random selection of letters and num-

Click on the pencil icon to customize a Bitmark

Tips & Tricks has its own page numbers, and does not follow the rest of the magazine's page numbers. This is done to ensure that you can cut out and save T&T in a separate folder for later reference.
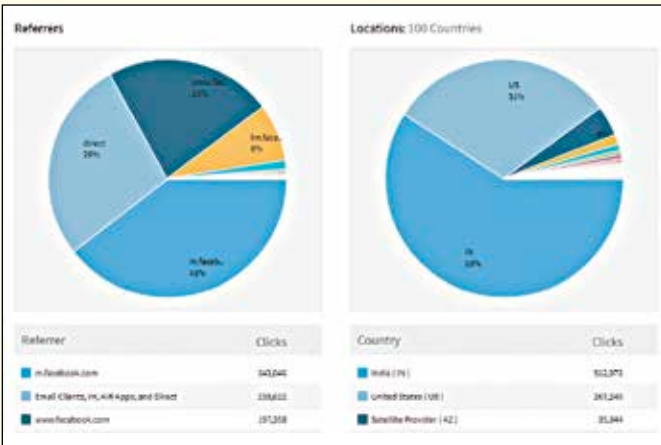
The Stats page gives you details about your links' reach.

bers can now be customized by clicking on the little pencil icon next to a saved link, and entering your custom phrase.

Use it as an analytics tool

Bitly's great feature is that it gives you detailed analytics on every link you save using Bitly. You can view the number of clicks on your Bitmarks over time, which websites are driving traffic to your link and the countries this traffic is originating from. This is great if you want to analyze your brand's

reach on social media platforms - just shorten your links using Bitly before sharing them. Head over to the Stats section in the panel on the left to view your links' performance.

Using Bitly Bundles

One killer and underused feature of Bitly is the Bundle. A bundle is just a collection of links that can be shared using a single URL. It's great for aggregating a bunch of links on a particular topic for research, especially given that Bitly has lightning-

fast search that you can use to sift through your Bitmarks at a later time. You can also use it to create playlists with songs or videos from different sources (e.g. combining songs from Soundcloud, Grooveshark and YouTube) or a shopping list/wishlist with items from different e-Commerce sites. Bundles can also be collaboratively created – you can choose up to 12 people who can add links to your Bundles, and it's a great way to for teams to curate and share links.

Get stats on any Bitly link

Bitly gives you statistics on any link that's shortened using Bitly, not just the ones you've saved yourself. Just add a '+' to any link that's been shortened with Bitly (e.g. http://dgit.in/wvPing+) and you'll get analytics for that link, including how many clicks to that page have been from your Bitmark and who has shared that page the most. It's useful if you want to check out the engagement on a competitor's website or see how a popular page has been performing.

Use the Chrome extension / iOS app

Bitly has a handy Chrome extension (http://dgit.in/BitlyChrome) that lets you save the current webpage to your account with one click. You can directly save the link to Facebook/Twitter, customize it or even add it to a bundle from

Bitly for iOS saves Bitmarks and shows you trending links.

within the extension. If one of your links gets a lot of hits, the extension will send you a notification. Similarly the iOS app will automatically add any URL that's on your Clipboard, and you can view analytics or discover popular 'trending' links from within the app itself.

Keyboard Shortcuts

Any power user worth his salt knows that mastering keyboard shortcuts is a great way to improve your productivity. Bitly has a tonne of them up its sleeve. 'a' will add a new Bitmark, 't' will edit the title and 'p' will change the privacy settings for a Bitmark. It also includes Vim-style keybindings - j/k to scroll through your list of bitmarks and '/' to focus on the search box.

Use A Tracking Domain

Setting up a Tracking Domain that you own (for example, the full address of your website or blog) gives you detailed analytics for all click traffic originating from a Bitly link. This includes Bitly links shared by any and all users. You need to have FTP access to your domain name, and you can set it from the Advanced section of the Settings page.

Do more with lab features (Sharing Map, Bitly Feelings)

Bitly has a few whimsical features up its sleeve in the experi-

A Complete List of Bitmarks that Bitly offers.

mental 'Labs' section of the site. What we found particularly interesting is a bookmarklet called Bilty for Feelings, that lets you choose from a list of customized domains to "express how you feel about the content you're sharing". For example, you could use upvot.es for a link that you like, oppos.es for a link you don't agree with or lolthis.me for a link that had you in splits!

GOOGLE+ PHOTOS

Google+ is full of amazing features and people have started using it more and more, but not many of them know how to make the most out of it, especially when it comes to the "Photos" section. You'd be surprised with the number of awesome things you can do with your photos using Google+. There are plenty of lesser known features that we'll be exploring here to enhance your imaging experience with Google+.

Add automatic effects and videos with Auto Awesome

Auto Awesome is one of the coolest features offered by Google+. Once turned on, it will automatically add fun special effects such as Snow, HDR, Motion, Eraser, Action, Smile, Pano and Mix to your photos and videos. It will also let you create interesting videos using a combination of your photos and videos. This feature only works if your photo matches the required criteria (discussed later). You don't have to worry about your original photos being deleted. It just creates a new version of them and your original photos can still be found among your other photos.

To enable Auto Awesome, `sign in to your Google+ account > Main menu`

`(top-left corner of the Google+ homescreen) > Settings > Photos and Videos > Auto Awesome > Check "Create awesome new photos and videos for you"`.

Note: For some users, Auto Awesome is turned on by default so make sure you don't uncheck 'Create awesome new photos and videos for you'.

Add snow effect to your photo

Enabling Auto Awesome will automatically add snowfall effect to your photos. The criteria here is your photo should have snow in it. So if you've uploaded a photo that contains snow, then Google+ will automatically add snow effect to that photo.

Remove moving objects from photos

Sometimes a moving object or person may spoil your captured moment. To overcome this, Google+ lets you remove any motion-blurred objects from your photo with the 'Eraser' effect. To do it, take more than four successive photos of the same scene with movement in the background, and Google+ will club the photos together making a single photo with the moving object removed.

Create an action photo

You can create a photo showing a full range of movements without having any Photoshop skills. Google+ offers this feature as one of its Auto Awesome effects. To create an action photo, take four or more photos of the same scene with the sub-

jeect moving and let Google+ do the rest.

Add HDR effect

With Auto Awesome, it's possible to add an 'HDR' effect to your photo even if it wasn't shot in the mode. To do this, take three or more photos

Pick any effect for your photos

of the same scene at different exposures while ensuring that the camera is completely still. Google+ will combine the best lighting from each photo and present you with an image that's as true to life as possible.

Create a short animation with photos

Earlier, creating a GIF out of your photo on Google+ required meeting some criteria. Overriding it, Google+ now lets you create a GIF-like short animation with your photos thanks to the 'Motion' effect. You can do this by taking more than five successive photos of a scene while holding your camera still.

Check this to enable Auto Awesome

Get the best group photo

Want the best group photo? Take more than two successive photos of a group with people smiling and Google+ will merge these photos to show everyone looking their best.

Create a Photo Booth style grid

It's possible to create a photo booth style grid with your photo using Auto Awesome. Take three or more successive photos of a person with the same background. Google+ will use its 'Mix' effect to put them together into a photo booth style picture.

Make an Auto Awesome movie from your photos

You can also make an Auto Awesome movie with your photos. However, it's only possible on selected Android devices such as Nexus 4, Nexus 5, Nexus 7 (2013), Nexus 10, HTC One, Samsung Galaxy Note 3, Moto X and Moto G running Android 4.3 and up.

To make the movie, download and install Google Photos app on your device. Open it > Tap the movie icon at the top right > Select the photos or videos you want to add > Tap 'Select' at the top right > Press 'Play' > Choose 'Share' or 'Save'.

Edit your auto awesome movie

You can also edit your Auto Awesome movie if you want some part of it to be changed. To do it, open the Google Photos app. Touch the photos main menu at the top left > Auto Awesome > Select the movie you want to edit > Tap the play icon to edit it.
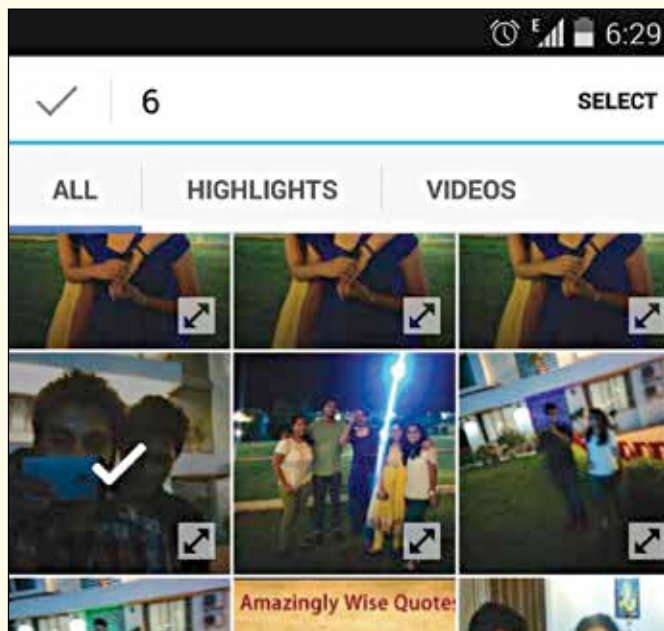
Select photos and videos that you want to use in the movie

To reorder scenes, tap the pencil icon at the top right. Touch, hold and drag the scene to change its order. Additionally, you can change the music by touching the musical note icon and change the length of the movie by touching the clock icon.

Create a photo slideshow for your profile

Whenever you click on your avatar photo on your profile page, unlike Facebook, Google+ opens up an entire album and not just the profile picture. You can use this album to display your photographs in the form of a slideshow. To do this, click on the left menu > Profile > Go to Photos menu > Scroll down to Profile Photos > Select 'Add Photos' from the dropdown menu.

Use GIF as a cover photo or profile picture

Very few people know this, but Google+ lets you use animated GIFs as your profile picture or cover photo. Twitter did let us use animated GIFs as profile pictures but it no longer allows

it. So Google+ is the only social network that currently lets you do this.

Auto-upload unlimited photos from mobile

As you may know, the Google+ mobile app automatically backs up your camera photos to your account, but did you know about its significance? With this feature, you can keep a backup of unlimited photos in your Google+ account as Google gives you unlimited storage for standard sized photos (up to 2048px). Uploading original (high-resolution) photos will take up your Google Drive space, so we recommend keeping the resolution

as standard. This gives you unlimited cloud storage for your photos without paying a single penny.

Search all Google-animated photos

Google+ will not only create Auto Awesome animated photos from the new pics you upload, but also from older photos that match the criteria. It's always a surprise to find your old photos made Auto Awesome. To find all the photos that Google animated for you and people in your circles, go to http://dgit.in/1gO31t3 or search for "motion" in the 'Photos' tab.

Rearrange all your photos easily

Google+ offers a very neat feature called 'Album Organizer' to organise and rearrange all the photos in your album. With it, you can sort photos by time, reorder your photos, move or copy them to another album and delete a bunch of photos at once. To use this feature, open the album that you want to organise > Click on 'Option' menu > Select 'Organize album' > Select the sorting option you want.

To sort photos by time, click on 'Order by date' and it will display the photos in a chronological order, from earliest to latest. To sort them from latest
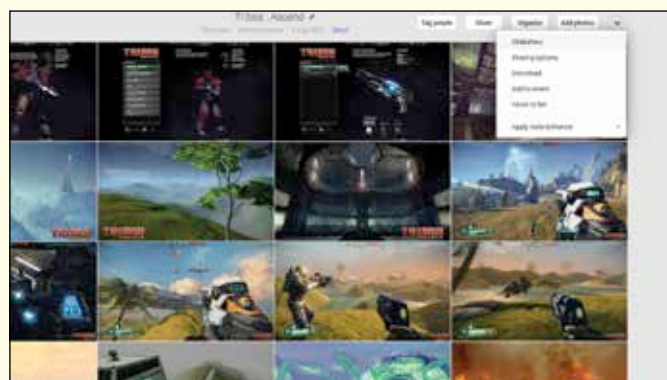
View your photos as a slideshow
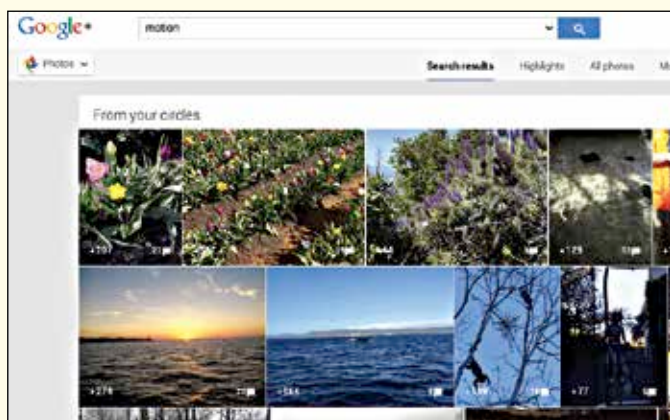
Search "motion" and you'll get all the GIFs from within your circles

to earliest, click this option again. To reorder your photos select the photos you want to reorder and drag them to the new position. To move or copy photos to another album, select the photos and click 'Move'.

Disable resharing of your photo album

Whenever you upload a photo or an album to Google+, those you've shared the album with can reshare your album. However, if you're not comfortable with this, you can disable resharing to prevent possible strangers from seeing your album.

To do it, `choose 'Photos' from the main menu > Click on the album for which you want to disable resharing > Click on 'More' dropdown menu > Disable reshares.`

Once you've done this, new name tags created by others will become text tags. No one will be able to +mention others in the comments, all the posts about that album will be locked and 'Share via link' won't work anymore.

Add Auto Awesome to your Google Drive photos

You can also add Auto Awesome effects to your Google Drive

photos. First, you'll need to import those photos to Google+ and then let it do the rest of the work. To import Google Drive photos to Google+ place your cursor in the top-left corner of the Google+ main menu. Then go to `Settings > check 'Show Drive photos and videos in your photo library'.`

Once your photos are in the album, Google+ will analyse whether they match the criteria and accordingly add Auto Awesome effects to each of them.

Transfer your Instagram photos to Google+

Instagram doesn't offer the ability to share on Google+. However, you can import all your Instagram photos to a Google+ album and then share

See your photos come to life with HDR

them. This can be done using a third-party web app called 'Instagrab', which does this for you within seconds. `Head over to instagrab.in > Connect to your Instagram account > Connect to your Google+ account > Provide your email address > Press 'Queue it up'.` And that's it. A new album consisting of Instagram pictures will be created in Google+.

Stop animated GIFs with an escape key

We all love animated GIFs, but sometime they can be too distracting. A GIF, once loaded, will play in an infinite continuous loop. To get rid of this annoying animation, you have no other option but to leave the page. Thankfully, to deal with this there's a Google Chrome extension called 'Gif Stopper', which will stop all the GIFs on a page after hitting the [Esc] key. Get it from http://dgit.in/1gTH1Av.

See large version of photo without opening it

You can now see the enlarged version of the picture in your Google+ stream without opening it. '+Photo Zoom' is a

simple Google Chrome extension that shows you an enlarged version of the photo just by hovering over the image in your stream. No more messing with new image tabs or new pages loading. Get +Photo Zoom from http://dgit.in/1jTd6sD.

Restore deleted photo(s)

Photos that you delete in Google+ are stored in Trash for a short while before they're permanently deleted. Because
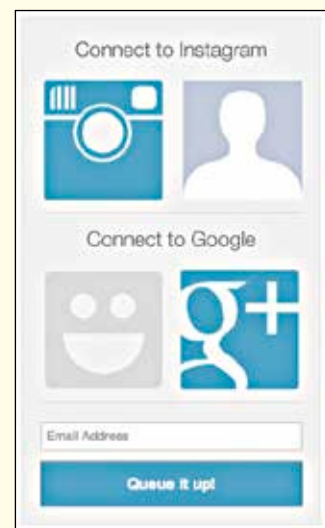
Click on the Instagram icon followed by Google+ to connect your accounts

of this, it's possible to restore a deleted photo. To do it, `select 'Photos' from the main menu at the top left > More > Trash > Select one or more photos that you want to restore > Choose 'Restore'.` These photos will reappear in the same album from where they were deleted.

Permanently delete photo(s) If you want to permanently delete photos, you need to delete them from Trash as well. This can be done by selecting 'Photos' from the main menu at the top left. Then go to `More > Trash > Select one or more photos that you want to delete > Choose 'Delete permanently'.`

Build your
Own App

With numerous approaches and even more development
tools available the developer has the freedom to pick and
choose. Here are your options.

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Having an App available for any service adds a tremendous value for the same and it isn't the domain of programmers anymore. However, without any programming knowledge whatsoever, you aren't going to be able to build apps as easy. In the early days we had to work on individual SDKs if an app was to be developed, but as the years went by more and more tools were released that could be used to develop apps on multiple platforms at the same time. In the following pages we are going to highlight three different approaches towards building apps and the amount of know-how needed to follow that particular approach will be highlighted as well. There are umpteen number of tools available with each have some advantage over the others, we've picked some of the most popular ones for you.

Before we start pulling out the hair on our heads (If you get into programming it's bound to happen) we need to know the different approaches we can undertake towards building apps and the advantages/ drawbacks of each approach. There are three approaches to going about building apps, the first is to go native which gives you the most flexibility since all the API features of a particular platform are made available to you. The major drawback is that you can only program the app on one platform. There are multiple reasons for

Getting your app on every app store has never been this easy

the same but the most obvious one is that the language used on each platform is different – Android uses Java, iOS uses Objective C and Windows Phone uses the .NET framework. Further on, certain functionalities like access to the phone's camera, push notifications and other hardware are only available if you develop on the native platform or at least use a wrapper. Security is one aspect which can be best implemented on natively built apps compared to the other approaches.

The second approach is to build a webapp which is basically a HTML5

website that is accessed via webview. This approach is more favourable if you already can develop HTML5 websites and all you need to do is create a CSS for your website that is broad enough to cater to as many resolutions as possible. One major advantage to HTML5 apps is that the interface will seem the same from whichever device you open the app. Also, if there are any errors in the content then you can fix it without having all your users download the app all over again from the app store. While initially these webapps didn't have access to most of the native features of your

Cat Simulator? Meow!
If Goat Simulator wasn't enough, a new Kickstarter campaign aims to raise $20K to build a cat simulator game. **http://dgit.in/MeOw**

Image text editor
Project Naptha, a new browser extension for Chrome lets users edit text directly from and on an image itself. **http://dgit.in/ImgNaptha**

	Native	HTML5	Hybrid
App Features			
Graphics	Native APIs	HTML, Canvas, SVG	HTML, Canvas, SVG
Performance	Fast	Slow	Slow
Native look and feel	Native	Emulated	Emulated
Distribution	Appstore	Web	Appstore
Device Access			
Camera	Yes	No	Yes
Notifications	Yes	No	Yes
Contacts, calendar	Yes	No	Yes
Offline storage	Secure file storage	Shared SQL	Secure file system, shared SQL
Geolocation	Yes	Yes	Yes
Gestures			
Swipe	Yes	Yes	Yes
Pinch, spread	Yes	No	Yes
Connectivity	Online and offline	Mostly online	Online and offline
Development skills	ObjectiveC, Java, .NET	HTML5, CSS, Javascript, .NET	HTML5, CSS, Javascript, .NET

phone, there are workarounds for some of these native features now like iScroll which enables pinch-to-zoom and other gestures. JQuery Mobile is another framework which enables more features on HTML5 pages which look and feel like a native app.

The third approach is a hybrid between the above two approaches. There now exist frameworks which have a native codebase which interacts with the phone while the front end is made out of HTML5. These apps give you access to native features of each platform while exercising the flexibility of HTML5. The HTML5 webpages can be saved onto your phone (local storage) or hosted on a remote server (remote storage) with a few local pages just in case the internet connectivity is lost while the app is in use. The table below compares these three approaches:

Before you start!
You should prep for programming by getting hold of all the software needed for each approach. We'll be listing these at the beginning of each section. But before you can compile these projects you will need your developer certificate or signing key from each store. Certain tools will allow you to compile without a certificate but not for all platforms, Apple's system is a little too stringent and most tools won't create the package for iOS till you upload or provide the developer certificate. Android apps can be packaged and sideloaded onto your device to test without the certificate on most tools. Now there is no need for getting

a Mac if you wish to obtain an Apple developer certificate as is stated in the documentation. Check this link out for a way to do the same without a Mac. http://dgit.in/iOSKey For iOS, Android and Windows phone you need to register for a developer account and pay a certain registration fee to obtain your developer certificates.

Also, each individual app store has a certain review process and do restrict certain parameters. All of these things need to be adhered to if you wish to have your app approved. These guidelines can be obtained at http://dgit.in/iOSRevi and http://dgit.in/AndGuide.

Test, test and test!
While a simulator can run your apps effortlessly it is always advisable to have a device to test out your apps. If you include more native features then a proper feedback is only obtained if using a physical device. But if you simply wish to test your HTML5 website then you can use the emulator in Chrome to view your pages as you

work on them. Since Chrome uses Blink as the engine you will get a more similar look as obtained in Android devices. Blink is a fork of Webkit which powers iOS' UIWebView so the webpage will be rendered the same as on iOS.

Hybrid Approach
For this method you'll have to pick a framework to go with. There are a few frameworks but the popular ones are listed below.
• Corona
• PhoneGap
• Appcelerator

We'll build a simple HTML5 app using PhoneGap as a wrapper to provide access to native features of each platform.

Step 1 - Pick the resolution
A primary thing you need to keep in mind while building using HTML5 is that the very same layout will need to be rendered in the exact same way across all screen resolutions that exist. Refer the image below to figure out the most popular resolutions.

Keep in mind that the CSS for your website has to incorporate all these resolutions otherwise your app will look different on different devices. There are way too many resolutions listed here so pick the ones that are most popular. The following link shows the different resolutions of active android devices along with statistics highlighting how popular they are. http://dgit.in/AndDash

Step 2 - Code your website
You can use any tool to create your website, be it dreamweaver or kompozer or any of the numerous alternatives. However, if there are many includes in the web page then the app load time will increase. We tried our hand at creating a design using

	Low density (120), ldpi	Medium density (160), mdpi	High density (240), hdpi	Extra high density (320), xhdpi
Small screen	QVGA (240x320)		480x640	
Normal screen	WQVGA400 (240x400) WQVGA432 (240x432)	HVGA (320x480)	WVGA800 (480x800) WVGA854 (480x854) 600x1024	640x960
Large screen	WVGA800** (480x800) WVGA854** (480x854)	WVGA800* (480x800) WVGA854* (480x854) 600x1024		
Extra Large screen	1024x600	WXGA (1280x800)† 1024x768 1280x768	1536x1152 1920x1152 1920x1200	2048x1536 2560x1536 2560x1600

Ensure that your app scales well according to the device resolution

Did you know?
204 million Emails are sent by internet users worldwide per minute. Now that's something to ponder upon

3D printed food
With the 3D printer now being used almost everywhere, and now for food, Cloudy with a chance of 3D printed food is quite a possibility. **http://dgit.in/3DFood**

Workshop

Adobe Muse and then compiled it using PhoneGap. The application load time was around 8 seconds on a Nexus 4. If you wish to make use of any of the native features then use the appropriate function call. The example for geolocation is given below.

```
        <script type="text/
javascript" charset="utf-8"
src="cordova-2.2.0.js"></script>
        <script type="text/javas-
cript" charset="utf-8">
        document.
addEventListener("deviceready",
onDeviceReady, false);
        function onDeviceReady() {
            navigator.geolocation.
getCurrentPosition(onSuccess,
onError);      }
            function
onSuccess(position) {
            var ele-
ment = document.
getElementById('geolocation');
            element.innerHTML
= 'Latitude: '           +
position.coords.latitude
+ '<br />' +

'Longitude: '           +
position.coords.longitude
+ '<br />' +

'Altitude: '           +
position.coords.altitude
+ '<br />' +

'Accuracy: '           +
position.coords.accuracy
+ '<br />' +

'Altitude Accuracy: '  + posi-
tion.coords.altitudeAccuracy
+ '<br />' +

'Heading: '           +
position.coords.heading
+ '<br />' +

'Speed: '           +
position.coords.speed
+ '<br />' +

'Timestamp: '           +
position.timestamp          +
'<br />';      }
```

```
        function onError(error) {
        alert('code: '     +
error.code     + '\n' +
                'message: ' +
error.message + '\n');      }
        </script>   </head>
        <body>
        <p
id="geolocation">Finding geolo-
cation...</p>
        </body>
```

This code returns the following as the output.

There are numerous examples like these for making use of each native functionality using PhoneGap's API. Most of them can be found here. http://dgit.in/PGapPlugin

There are a few things you need to

Access native functions in PhoneGap

keep in mind while coding your website, starting off with the amount of external libraries. Use as few external libraries as possible to make the application smooth. Using libraries are convenient but there are a lot more functions present in each library than you need, so unless you intend to use one or two libraries efficiently your application will be cumbersome to use. You might have to sacrifice on looks since they will be rendered differently on different platforms. This is absolutely fine. Use CSS as much as possible to load media since they get rendered only when the media needs to be displayed. This way you save on memory usage. Instead try to make use of the memory you will save to pre-load pages that are more likely to be clicked on. The example code for jQuery Mobile is given below.

```
    <a href="foo/bar/baz" data-
prefetch>link text</a>
```

The entire page gets loaded and you don't have to experience the 250-300 millisecond delay that is inherently present in Webkit. PhoneGap apps appear slow because of this delay and "lazy-loading" is one of the ways of getting around this issue. Avoid long lists as much as possible and avoid gradients in CSS since these are calculated my the GPU of the device and will take up quite the processing power but that doesn't mean that you can't use gradients anywhere, optimise its usage.

Step 3 - Generate assets
While coding you will come up with various elements and in order to get the work done as quickly as possible most programmers insert a simple blank image of the proper dimensions. Once you've finished coding you need to start creating all those images. Do keep in mind the image densities while doing so, otherwise you are likely to create an app that is compatible with very few devices. Or if you create just a few assets then your app will look wonderful on a few devices while it renders absolutely worse on everything else. This is why you need to generate multiple images/icons/splash screens for screens of different densities. This way you app seems the same no matter which device you are viewing it on. You can find all the different icon sizes that PhoneGap need from this link http://dgit.in/PGapIcon and for the splash screens from this link http://dgit.in/PGapSplash. Or you could simply generate all of them by uploading a few images using the following tool. http://dgit.in/IconGen

Step 4 - Arrange the file structure
Once you have all the files ready, you need to arrange them in a certain order depending upon what all you are going to use. Take your existing project folder with the HTML files and all the included libraries and put them all together in a folder labelled "www". If you've made use of any plugins that we mentioned earlier or any at all then those plugins need to be kept in a folder labelled "plugins" which sits at the same level as "www". There are

two more folders but you only need to use them if you have coded your application in such a manner that breaks down your code as platform specific and platform independant. In this case all platform specific files are stored in the "platforms" folder with each platform having their own folder at the same level (ios, android, bada, etc.).

Step 5 - Create the manifest

In the root directory of your app you'll need to provide a config.xml file with all the parameters about your app. This includes the name of the app, the different permissions that you'll need on each platform, core plugins, third-party plugins, icons and splash screens for each platform. If you've included third-party plugins which require an authentication key of any sort then you'll get a example code which you'll have to include in the xml code. Don't worry though, if you don't make the xml file on your own then the build service will do it for you but all the plugins won't work and all the icons will be replaced with the standard PhoneGap icons.

Step 6 - Zip it up!

Finally, you just have have to compress your folder using zip compression and no encryption. The config.xml file ensures that all the necessary permissions are included with your application when it is compiled. This is the package you'll need
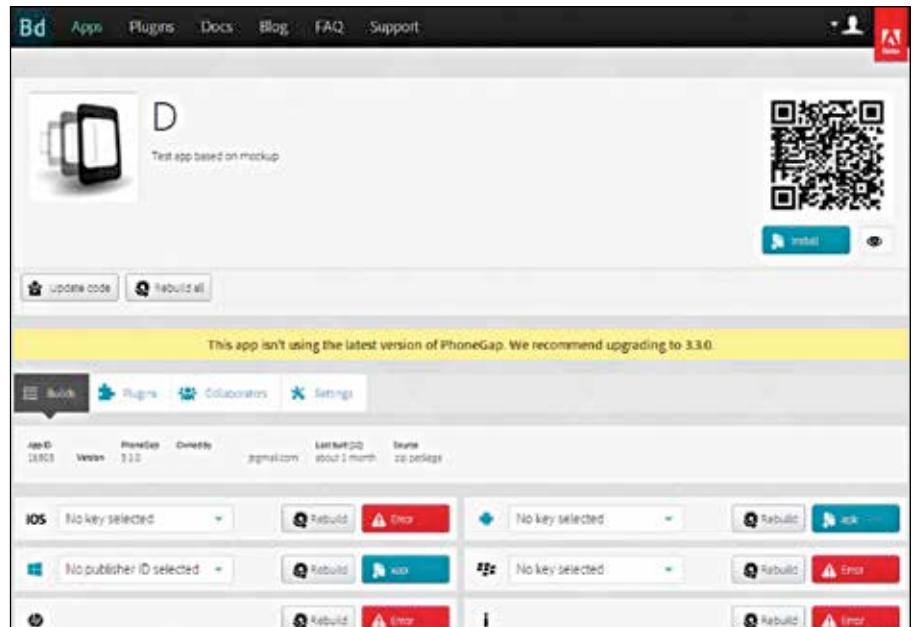
The errors indicate that no signing key have been provided for those stores

to upload to the PhoneGap build web site or you can commit the files via github.

Step 7 - Upload

Visit https://build.phonegap.com/ and sign up for an account. If you use Github for your signin then you can upload your project folder to Github and have new builds generated as soon as you modify any file. This process is not automated since this Build service is provided free of cost. If you were wondering about the signing keys for

each platform them you need to add them to your https://build.phonegap.com/ account. Otherwise your application package will not be generated for that particular platform. Even if it is generated you still won't be able to upload these files to the appropriate app store. In the image below you can see that only two packages are generated, the rest aren't either because a signing key was not provided or the PhoneGap version selected for the build is incompatible with the said platform.

Step 8 - Test your app

If you have a developer account then you can test your app out on your iOS device, for android devices you need not worry about having an developer account. Simply enable application installation from "Unknown Sources" in your Android device's security settings and you can install your app by transferring the apk file to your device and then tapping on the file using any file browser.

Step 9 - Upload to the store

Once you have tested all the apps and are satisfied with it you may proceed towards uploading it to each store. If you are submitting an app for the first time then the review process will take about 24-48 hours after which you can find your app on the respective app store.

The config.xml lists all the plugins, icons, splash screens, app name, etc.

digit KILLER RIGS

Everything you'll ever need to build your own PC. Whatever your budget.

🟩 Basic rig = ₹25,778 🟦 HTPC = ₹29,308 🟦 Entry-level gaming = ₹42,396 🟥 Mid-range gaming = ₹65,945 🟧 Ultra high-end = ₹3,25,121 🟥 Optional Accessories= ₹41,825

BASIC RIG

Processor	Intel Pentium G2020	3,450
Motherboard	Gigabyte GA-H61M-D2H	3,200
RAM	Corsair 2GB DDR3 1333MHz	1,600
HDD	Toshiba 500GB	3,150
Monitor	AOC E2043FSK	6,570
Graphics Card	None	0
Cabinet	NZXT Gamma	2,490
PSU	Corsair VS450	2,268
Speaker	Creative SBS A120 (2.1)	1,550
Optical Drive	Samsung SH-224DB/IDDS	1,050
Mouse	Amkette Ash Black (Bundle)	450
Keyboard	Amkette Ash Black (Bundle)	0
Sound Card	None	0
Total		₹25,778

HTPC

Processor	AMD A8-5600K	6,950
Motherboard	MSI FM2-A75MA-P33	4,450
RAM	Kingston HyperX Blu DDR3 4 GB	3,250
HDD	Western Digital WD20EZRX 2TB	6,045
Monitor	None (your TV)	0
Graphics Card	None (HD7560D onboard)	0
Cabinet	Cooler Master Elite 120 Advanced	2,977
PSU	Cooler Master Thunder 450W	2,696
Speaker	None	0
Optical Drive	Samsung SH-224DB/IDDS	1,050
Mouse	Microsoft Desktop 2000 wireless combo	1,890
Keyboard	Bundled	0
Sound Card	None	0
Total		₹29,308

ENTRY-LEVEL GAMING

Processor	AMD A10-6800K	9,900
Motherboard	ASUS F2A85-M-LE	6,200
RAM	G-skill F3-10600CL9S-4GBNT	2,800
HDD	Seagate Barracuda 1TB	4,000
Monitor	AOC I2251FWE IPS	8,350
Graphics Card	None	0
Cabinet	NZXT Gamma	2,490
PSU	Cooler Master Thunder 450W	2,656
Speaker	F&D F680	4,500
Optical Drive	Samsung SH-224DB/IDDS	1,050
Mouse	Amkette Ash Black (Bundle)	0
Keyboard	Amkette Ash Black (Bundle)	450
Sound Card	None	0
Total		₹42,396

MID-RANGE GAMING

Processor	Intel Core i5-3470	13,600
Motherboard	Gigabyte GA-B75M-D3H	4,365
RAM	Kingston HyperX 8GB (KHX1600C10D3B1/8G)	5,100
HDD	Toshiba 1TB DT01ACA100	4,000
Monitor	Benq GL2255HM	10,000
Graphics Card	ZOTAC GTX 750 Ti (2GB)	11,220
Cabinet	Antec One - S3	3,260
PSU	Seasonic S12II 620 Watts	5,750
Speaker	F&D F680	4,500
Optical Drive	Samsung SH-224DB/IDDS	1,050
Mouse	CM Storm Devastator (Bundle)	3,100
Keyboard	CM Storm Devastator (Bundle)	0
Sound Card	None	0
Total		₹65,945

ULTRA HIGH-END GAMING

Processor	Intel Core i7-4960X	73,899
Motherboard	ASUS Rampage IV Black Edition	35,750
RAM	ADATA XPG 2 x 4GB (2 Kits)	16,650
HDD	WD WD30EZRX 3TB + Samsung 840 Pro 256 GB	23,000
Monitor	BenQ XL2720T	33,415
Graphics Card	ZOTAC GTX 780 Ti	55,700
Cabinet	NZXT Phantom 820	16,836
PSU	Cooler Master V1000	14,811
Speaker	Logitech Z906 5.1	24,200
Optical Drive	LG Blu-ray WH16NS40 RW	6,500
Mouse	Roccat Kone XTD	5,400
Keyboard	Corsair Vengeance K70	8,460
Sound Card	ASUS Xonar Phoebus	10,500
Total		₹3,25,121

OPTIONAL ACCESSORIES

Surge Protecter	Belkin 8 Socket Surge Protector	1,044
Controller	Xbox 360 Controller (Wired)	2,100
UPS	APC 1000VA - BR1000G-IN	8,330
Webcam	Logitech HD Pro C920	6,800
Headphones	Sennheiser PX 100-II	3,570
Mousepad	Roccat Taito	650
Wireless Router	TP-LINK TD-W8968	2,211
Sound Card	ASUS Xonar Essence STX	9,500
External DVD-Writer	Lite-On eUAU108	1,670
Thermal Paste	Arctic Silver 5 (3.5 grams)	600
CPU Cooler	Cooler Master Hyper 212X	2,850
Fan Controller	Deepcool Rock Master V3	1,650
Case Fan	Corsair AF120	850
Total		₹41,825

Street smart

Price watch
We cover gaming mice, MFDs, tablets and Wi-Fi routers in this month's Price Watch

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Jabra Boost
Jabra boosts efficiency for office professionals across Asia. Read their press release to find out more: **http://dgit.in/jabraprel**

Dreams on a budget

Agent 001 shares some gyaan on the art of buying a laptop

Agent 001
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How does one go about purchasing a laptop? It's a question I've been asked many times and apparently, it's a question that still sends most people into a tizzy and much as I enjoy helping people out, maybe it's time you learnt a thing or two about fending for yourself in this tech world. You know the thing they say about teaching a man to fish right?

Ideally I supposed we'd want our tech needs to be fulfilled in a more satisfactory fashion, where we just waltz into a store and walk away with the gadget of our dreams. Why should we sit and worry about CPUs and RAM when all we want is a device to do our bidding? Well, your dreams aren't that far away from realisation, actually. Now I've been testing laptops (among other gadgets) for many a year and finally, after this much time, I think we're finally at a turning point when it comes to laptop power.

Both Intel and AMD have worked really hard on their CPUs and though they've taken a divergent path when it comes to implementation, almost all their CPUs now deliver enough power to ensure that at least your basic computing experience is intact. And by basic we mean that Windows 8 (Windows 7 too, if you prefer it) will run with all its bells and whistles and that your browsing and document editing will function smoothly.

Of course, a bare-bones laptop is not what everyone is looking for, so here are a set of general guidelines that should help you decide on your own and stand you in good stead for some time yet.

CPU

AMD or Intel is an age old question that for is still a matter of serious debate among enthusiasts the world over. While things may not be plain and simple in the PC world, in the laptop world the advantages and disadvantages are clear as day.

Before we sort that out though, bear in mind that this is the single most important component in your laptop. Laptops are not traditionally meant to be power-houses, but a good CPU goes a long way in ensuring a more comfortable computing experience, as well as towards future-proofing your device.

Intel: For a bare-bones laptop, anything above Intel's Celeron 1000 series of CPUs (i.e., any CPU launched since 2013) should be enough. From whatever tests I've conducted, one thing's been blindingly obvious, if you're going for a laptop, get one that's powered by Intel's Haswell CPUs (basically the Intel CPUs with a model no. that goes 4xxx). The improvements in battery-life over every other competing CPU is staggering and if you want a portable device, you wouldn't want any other CPU in your laptop. An i7 is simply an indulgence. It's definitely nice to have one, but you'll rarely need anything more than an i5 for most of your needs. Also remember that when it comes to gaming, an i5 + GPU combo is way better than just an i7 CPU.

If you have a tight budget, get a Celeron powered device. If you need

something a bit more powerful, get one that's powered by an i3 CPU. If you need a good all-rounder, get a device with an i5 and an Nvidia GPU. Obviously, if your budget permits it, get yourself an i7 and a more powerful Nvidia GPU and you should be all set for at least two years of computing pleasure.

AMD: If you're willing to sacrifice some amount of CPU power and battery power for better graphics performance, then AMD's APUs are made for you. You'll identify these CPUs by the "A" before their model no. (like theAMD A6).

For those not in the know, an APU is essentially an AMD GPU that's been mated to an AMD CPU. In effect what you get is a hybrid CPU-GPU combo that offers you something less than the best of both worlds. Take the case of the A10 APU, when pitted against an i5 (in the same price bracket) it offers you the computational power of a Celeron M and GPU power that's about 30% below what you'd get from an Nvidia 640M. That said, the combination works quite well, especially in GPU intensive applications, but there are very few other scenarios where you'd appreciate the APU.

Another main drawback of the APU is the tremendous loss in battery life, which is about half of what you'd get with an i5, and easily 7 times lower than what you'd get from a Celeron. AMD's E1, which is their low-end APU, is a bad choice for budget laptops though and even though the graphics option (on paper) is better than that on the competing Celeron, know that no amount of graphical power can compensate for loss in processing power.

RAM
The easiest decision you'll ever make, just remember that the more RAM you have the better your PC will perform. Don't take any laptop that sports anything lower than 2GB of RAM and 4GB is what I'd recommend as a starting point. While Windows can function on 1GB of RAM, you will be hard-pressed to get the rest of your apps working optimally. In fact, with even 2GB of RAM, a browser such as Google Chrome will be unbearably slow with even 10 tabs open.

Monitor
Don't scrimp on this. Your laptop will be with you for the duration of its working life (probably) and the monitor will be what you'll be staring at during that time. Get a good monitor, spend a little extra if you must but do not compromise on this. You'll regret your decision later.

The screen size is entirely your decision. Just remember that a larger screen size means lower battery life and a heavier laptop.

Storage
If you want battery life and performance, then an SSD in your laptop is a must. For anything else, just go with a storage capacity that you're comfortable with. Don't spend too much on an upgraded HDD though, usually the cost-

per-GB is very high for a manufacturer upgrade and you'll find that it's more economical to just purchase a portable HDD separately.

Keyboard and Touchpad
As with the monitor, this is something you'll spend interacting with the most. There's no right or wrong choice really in terms of layout, just go with the one that suits you best. However, a comfortable

keyboard is much more important than a convenient layout. Layouts you can get used to. But sticky keys? Never.

I've found that most laptops do offer decent keyboards these days, but I do tend to recommend Lenovo Thinkpads to anyone who wants a device primarily for typing on. It's not that HP or Sony or any other company are bad, but personally, Lenovo's island keys just seem more comfortable.

Essentials
Other essentials on any laptop that you must look out for are USB3.0 ports, HDMI output, an SD card reader and a webcam. These are usually present by default but the number of available USB ports might matter to a lot of people, so do count them.

It's hard to give a straight-up recommendation when it comes good audio from a laptop, but I've noticed that Sony laptops do tend to have the best audio quality around. The speakers on HP laptops are usually not that bad.

To conclude
If you'll notice, I've refrained from giving you any sort of recommendation with regards to laptop models and budgets. The reasoning for this is simple, laptops are constantly upgraded so what is relevant today may not be as relevant 30 days from now and also, this guide is meant to arm you with the knowledge necessary to find your dream laptop. I shall keep you updated with the ebb and flow of the tide of technology. Hopefully, though, I've finally taught you how to fish, for laptops at the very least.

Do drop me a mail at agent001@thinkdigit.com if you need some more advice or assistance.

SPEND SMART

Seems like a great time to buy new gadgets. Here are some of the products that we've picked for you to choose from

GAMING MICE

Brand	Model	Price (in ₹)	Diode Type	DPI	Base Weight (gm)	Buttons	Custom profiles	Cable Length (cm)	Adjustable Weights
Tt eSports	Level 10 M	6,888	Laser	8200	185	11	5	180	N
Logitech	G100s	1,399	Optical	2500	82.5	4	NA	200	Y
Cooler Master	Spawn	3,000	Optical	3500	142	7	NA	200	N
Razer	Naga Hex	5,649	Laser	5600	134	11	Unlimited	210	N
Steelseries	Sensei	7,299	Laser	5700	102	8	Unlimited	200	N
Mad Catz	Cyborg R.A.T. 3	3,747	Optical	3200	98	5	NA	NA	N
Roccat	Kone XTD	5,750	Laser	8200	123	8	5	180	Y
Tt eSports	Black Element	4,050	Laser	6500	NA	9	5	180	Y
Logitech	G500s	5,666	Laser	8200	121	10	NA	200	Y
Cooler Master	Recon	4,050	Optical	4000	139	9	5	180	N
Cooler Master	Mizar	4,499	Laser	8200	121	7	4	200	N
Razer	Ouroboros Elite	12,000	Laser	8200	115	11	Unlimited	Detachable	N
Steelseries	Kana	4,850	Optical	3600	72	6	Unlimited	200	N
Mad Catz	Cyborg R.A.T. 7	7,649	Laser	6400	150	6	NA	NA	Y
Roccat	Pyra	1,850	Optical	1600	90	5	5	150	N
Genius	Maurus	1,900	Optical	3500	NA	5	NA	180	Y
TAG	Gaming 007	790	Optical	2400	NA	6	NA	160	N

PRINTERS

Brand	Model	Price (in ₹)	Laser/Inkjet	First print time	Wi-Fi	Ethernet	Max print resolution	Cartridge cost (Colour + B/W)
Canon	MG7170	16,990	Inkjet	NA	802.11n	Y	9600 x 2400	695 + 840
HP	OJ8600	16,990	Inkjet	14 sec	802.11n	Y	4800 x 1200	1687 x3 + 2301
Samsung	SCX 3401	8,349	Laser	8.5 sec	N	N	1200 x 1200	3271
Ricoh	SP 200N	8,160	Laser	NA	N	Y	1200 x 600	689
Epson	M200	13,490	Inkjet	NA	N	Y	1440 x 720	687
Epson	L350	12,100	Inkjet	NA	N	N	5760 x 1440	420 x3 + 441
Epson	L210	11,000	Inkjet	NA	N	N	5760 x 1440	420 x3 + 441
HP	M1136	10,300	Laser	NA	N	N	600 x 600	3260
Canon	MG6470	11,200	Inkjet	NA	Y	N	4800 x 1200	1687 x3 + 2301
HP	4515	8,990	Inkjet	24 sec	802.11n	N	4800 x 1200	451 + 451
Canon	MG3570	5,349	Inkjet	NA	802.11n	N	4800 x 1200	1365 + 865
Canon	E510	4,849	Inkjet	NA	N	N	4800 x 1200	899 + 725
HP	1515	4,690	Inkjet	24 sec	N	N	4800 x 1200	451 + 451
Brother	HL-1111	3,985	Laser	NA	N	N	600 x 600	1500
Brother	DCP-J140W	7,592	Inkjet	NA	802.11n	N	1200 x 600	494 x3 + 730
Brother	DCP-7055	8,965	Laser	NA	N	N	2400 x 600	1500

ROUTERS

Brand	Model	Price (in ₹)	802.11 protocol	Bandwidth	External antenna	Dual band	USB Ports	Gigabit Ethernet	WPS
ASUS	RT-AC68U	18,790	ac	1900 Mbps	3	Y	2	Y	Y
Belkin	F9K1009zb	1,601	n	150 Mbps	1	N	0	N	Y
Buffalo	WCR-GN-AP	1,890	n	150 Mbps	1	N	0	N	Y
Cisco	EA4500	12,895	n	900 Mbps	0	Y	1	Y	Y
Digisol	DG-BR4015N	2,356	n	150 Mbps	1	N	1	N	Y
D-Link	DIR-810L	7,900	ac	750 Mbps	0	Y	0	N	Y
Edimax	BR-6228ns	1,190	n	150 Mbps	1	N	0	N	Y
Netgear	WNDR4720-100PES	20,160	n	900 Mbps	0	Y	2	Y	Y
TP-Link	TL-WDR4300	6,365	n	750 Mbps	3	Y	2	Y	Y
TRENDnet	TEW-752DRU	4,200	n	600 Mbps	0	Y	1	Y	Y
ASUS	RT-N10 EZ	1,070	n	150 Mbps	1	N	0	N	Y
Belkin	N750 DB	6,400	n	750 Mbps	0	Y	2	Y	Y
Buffalo	WCR-HP-G300	4,700	n	300 Mbps	2	N	0	N	Y
Cisco	E900	2,499	n	300 Mbps	0	N	0	N	Y
D-Link	DIR-600M	966	n	150 Mbps	1	N	0	N	Y
Edimax	BR-6428ns	1,850	n	300 Mbps	2	N	0	N	Y
Netgear	WNR612	907	n	150 Mbps	1	N	0	N	Y
TRENDnet	TEW-712BR	1,150	n	150 Mbps	1	N	0	N	Y
TP-Link	TL-WR740N	905	n	150 Mbps	1	N	0	N	Y

TABLETS 10 INCH

Brand	Model	Price (in ₹)	CPU	GPU	RAM	Resolution	Primary Camera	OS	Memory
Karbonn	Cosmic ST10	8,680	1.5 GHz Cortex A9 Dual Core	Mali 400	1 GB	1024 x 768	2 MP	Android 4.1.1	1.5 GB
iBall	Slide 3G 9728	16,949	1 GHz Cortex A9 Dual Core	NA	1 GB	1024 x 768	5 MP	Android 4.1	16 GB
Notion Ink	Adam II NI5534G9	17,999	1.5 GHz Cortex A9 Dual Core	NA	1 GB	1280 x 800	3.15 MP	Android 4.2.2	8 GB
Lenovo	Idea Tab S6000	19,499	1.2 GHz Cortex A7 Quad Core	SGX544MP2	1 GB	1280 x 800	5 MP	Android 4.2	16 GB
Milagrow	M8 Pro 3G	25,990	1.6 GHz Cortex A9 Quad Core	Mali 400	2 GB	1280 x 800	5 MP	Android 4.2.2	16 GB
HP	Omni 10	27,490	Intel Atom Z3770 Quad Core	Intel HD	2 GB	1920 x 1200	8 MP	Windows 8.1	32 GB
ASUS	Transformer TF3000TG	37,490	1.2 GHz Cortex A9 Dual Core	Tegra 3	1 GB	1280 x 800	8 MP	Android 4.0	32 GB
Sony	Xperia Z	39,990	1.5 GHz Snapdragon S4	Adreno 320	2 GB	1920 x 1200	8.1 MP	Android 4.1	16 GB
Samsung	Note 10.1	46,900	1.9 GHz Cortex A15 Quad Core	NA	3 GB	2560 x 1600	8 MP	Android 4.3	32 GB
Acer	W510	53,999	Intel Atom Z2760	GMA 3650	2 GB	1366 x 768	8 MP	Windows 8	64 GB
Apple	iPad Air Wi-Fi & 3G	60,000	A7	G6430	1 GB	2048 x 1536	5 MP	iOS 7	128 GB
iBall	Q9703	14,599	1.2 GHz Cortex A7 Quad Core	SGX543MP2	2 GB	2048 x 1536	5 MP	Android 4.1	16 GB
ASUS	TF101	19,990	1 GHz Cortex A9 Dual Core	ULP GeForce	1 GB	1280 x 800	5 MP	Android 3.2	16 GB
Google	Nexus 7 2012	10,999	1.2 GHz Cortex A9 Quad Core	ULP GeForce	1 GB	1280 x 800	5 MP	Android 4.2	32 GB
Apple	iPad Mini	58,900	A7	G6430	1 GB	2048 x 1536	5 MP	iOS 7	128 GB
Dell	Venue 8 Pro	39,999	Intel Atom Z3740D Quad Core	Intel HD	2 GB	1280 x 800	5 MP	Windows 8.1	64 GB
Google	Nexus 7 2013	24,749	1.5 GHz Krait Quad Core	Adreno 320	2 GB	1920 x 1200	5 MP	Android 4.3	32 GB
Acer	Iconia W4-820	23,799	1.33 GHz Intel Atom Z3740	Intel HD	2 GB	1280 x 800	5 MP	Windows 8.1	64 GB
Lenovo	Yoga 8	16,790	1.2 GHz MT 8125 Quad Core	SGX544MP2	1 GB	1280 x 800	5 MP	Android 4.2	16 GB
BlackBerry	Playbook	17,299	1 GHz Cortex A9	SGX540	1 GB	1920 x 1080	5 MP	BlackBerry Tablet OS	64 GB

Mass Movement

Advancements in transport have made the world a much smaller place, but for super-massive objects, transport is still no easy task. Here are some of the most capable heavy-lift machines ever made.

Mighty Marlin

Blue Marlin and Black Marlin are two of the largest transport ships in the world. Weighing in at 74,000tonnes, fully loaded, these ships can carry everything from other ships to full-fledged oil-derricks between themselves. A 17,600BHP engine is required to get each of these monsters moving, and even then, they can only hit 14knots.

Crawler-Transporter

Transporting the Saturn V rocket to its launch pad, not to mention the massive Space Shuttles and their launch towers is no easy feat. The platform that carries these behemoths is possibly the largest tracked vehicle in the world and has a carrying capacity of 5500 tonnes. The platform itself weighs over 2000 tonnes and each track's shoe alone weighs 900kg.

Seawise Giant

Take a wild guess, what do you think the largest self-propelled man-made object weighs? 100,000 tonnes? 200,000? Nope. 650,000 tonnes. That's the weight of the Seawise Giant, also considered to be the largest ship ever built. This ocean-going monster was sunk in the Iran-Iraq war, but was later salvaged and pushed back into service.

Antonov An-225 "Mriya"

The American's and the French might claim to build the best aircraft, but this side of the Iron Curtain, they stand no chance against the Russians. The Antonov An-225 holds the record for transporting the largest payload ever loaded into an aircraft (at 200+ tonnes). This aircraft is so large that it makes the Boeing 747 look like a Cessna.

Caterpillar 797

If you thought that pesky container truck that almost ran you over on the highway was large, you've seen nothing yet. The Caterpillar 797 is so massive that the wheel costs more than a Hyundai Jazz and the driver has to climb 15m to get to the driving compartment. If that wasn't enough, this 400 tonne metal monster can travel at 42kph!

Thialf (Greyjoy?)

Lost an oil-derrick? The Thialf will fish it out for you. This semi-submerged crane has a lifting capacity of 14,500 tonnes, more than enough for those derricks you keep losing. The vessel itself is held in position by six 5,500KW motors and 12 anchors that weigh 22.5 tonnes each. Random fact, it's got double the lifting capacity of its nearest competitor.

DeBIT cards
BitCoin might finally get a debit card of its own. Here's how you can get yours
http://dgit.in/1nvMxgG

Mining Madness
This is what you get when you've got all the time in the world, a Minecraft rendition of Denmark
http://dgit.in/1hAVopo

Unwind

How we unwind

Builder's dilemma
The one thing we value the most at Digit is reliability, but we also have an insatiable desire to twiddle with things and generally muck about. This does affect our "productivity" somewhat since we're always more excited when a PC dies on us than when it's purring away nicely. With three rigs dying on us this month, Christmas came early!

Ant-Man Returns
Ant's departure from the test-centre had left us with a hollow spot in our hearts, a void that's yet to be filled. We long to hear his dulcet whining as he tries to defend his sanity under our relentless onslaughts. But wait! What's that? The Ant's returned! Oh joy of joys! The test centre is whole again.

Let the Games begin
George R.R. Martin's epic saga has had us hooked from day one (of the TV series) and while some us have read the books (you can guess who they are by their smug, all-knowing smiles), others just watch the show. Either way, hardly a day passes without some sort of discussion on the happenings of Westeros.

digit DIARY

Ladies and Gentlemen, we have a titan in our midst. A gift from the Gods, a distant relative of Hercules himself (or maybe Koalemos). Ant we call him, the Chosen (minus) One, our Lord and Saviour, Monowarrior, Mathamystician, Star Child and His Whining Glory, the King of Interns. This divine creature walks the Earth with His head in the clouds (he's quite tall you know) and judges mortals from his lofty perch. He's also blessed with superhuman strength, or so he claims. His Holiness had left us a while ago to pursue higher studies and His return to the hallowed halls of our test centre (for a secret project) was awaited with bated breath and champing jaws in anticipation of the weeks of joyous persecution that we would inflict on this God among men (we're a heinous bunch aren't we?); and he did not disappoint.

He tried to lend credence to His claims of superhuman strength by further claiming to have lifted a Yamaha FZ with his bare hands, on a whim.

Divine He might be, but in mortal form He's subject to the same laws of gravity that we are and we were skeptical. For how could a mere lad (his human avatar) of 23 (with a build that's in the same vein as Dr.Seuss's Cat in the Hat) lift a bike that weighs 135kgs with his bare hands? We wanted more than claims, we wanted evidence, we wanted to see this superhuman feat accomplished with our very own eyes.

We grabbed the divine being and shoved him down to our parking lot where we scouted in vain for an FZ. Not finding one, we first settled on a Splendor. The lad placed his hands on the bike, called upon the powers of his progentors and lifted. Or attempted to at least, judging by the beads of perspiration trickling down his forehead, for the bike didn't budge.

Disheartened, we looked for a lesser object, one that would be more in line with our Lord's capabilities. As we moved from bike to bike our disappointment only grew and so did His desperation, but at long last we finally found IT; a two-wheeler that our Lord could get off the ground with his own two hands. It was a bicycle. We've lost some faith in our Lord now, but who's to question the being that claims that stars reflect the light of the Sun? Our Star Child has, after all, descended from the Heavens.

Speaking of interns, our Pony is blossoming into a real man. He no longer cavorts around like that happy little Pony he was when he first set foot in our office. Months of playing Smite has transformed him into a raging beast that curses like a drunken sailor in the face of in-game noobishness (discounting the fact that he's not that great himself). Still, he does serve as a substitute for the Ant (a poor one we might add), but given enough time, we're pretty sure he'll fill the void.

In the midst of these fallen Gods, maturing Ponies and the madness of issue closing came news that raised the spirits of the entire team and brought a smile to even the hardiest of souls working at Digit. Big Daddy, the gentle giant himself, a man who can crush another's head as easily as he would a tomato is now an actual daddy. You read that right, Jayesh is now the father of a very lovely baby girl. In his own words, "I'm shaking with joy. Can't describe the feeling."

Our heartiest best wishes go out to the enraptured father and his family. It's times like these that allow us to take a breather from the nebulous joys of gadgets and tech and exult in the joys of life.
P.S. You can send in your well-wishes to editor@thinkdigit.com

Digit Squad

C#

Top 10 C# mistakes
It's quite likely that you are one of the millions of programmers who commit these simple mistakes
http://dgit.in/10csharpmis

SpaceX sues US Gov.
SpaceX sues the Government over not letting it launch military satellites
http://dgit.in/SpaceSue

digitSQUAD

This month we highlight some aspiring tech writers and their spirited attempt to get published in the magazine. Let's have more!

Create your own TOR url and start off with HTML5 game development

Creating your own .onion URL with your computer as the server

Praneet Sah

Sometimes when you need a website which isn't public and you wish to share it with a select few. At such times you can easily get an URL with a .onion TLD. With your computer as the server you are assured that your files hosted on the site are safe on your own computer and are being shared with the right people.

First of all, you will need to install the TOR(The Onion Router) browser. This is a special browser that focuses on anonymity of the user. All the sites you visit using it are routed via a proxy server, thus, it doesn't let the site know your real identity. Websites using .onion as TLD are only accessible via the TOR browser or through certain websites like tor2web.org In case you want your site to be accessible via normal browsers then you need to append '.to' at the end of an .onion URL. This isn't recommended because there is a chance that your site may fail to load. Now we are going to install a Web Server on our computer. You can use XAMPP and other popular web server packages but you risk disclosing your actual IP, hence, it is advised to use 'Savant'.

Setting up the server

Start Savant and click on the 'Configuration' tab and a pop-up should appear. In the 'Server DNS Entry' option, type 'localhost' and in 'Port # To Server From' type '8080'. If this doesn't work then try port 80 or any other open port for your system. After clicking 'apply' open any browser and visit 'localhost:port', replace port with '8080' or with whichever you went with. If the page loads then you've got it right, if

not then re-check all the steps. The page that just loaded was from your own PC only and that too from "C:\Savant\Root" directory. As a general rule 'index.html' will be acting as your default/first-loading page. Note: Savant is very unstable so you can use 'uniformserver' as well.

Obtaining your URL

Now almost everything is done, we just need to tell TOR about our server and then it will provide us our URL. Before we begin you need to create a folder on your desktop which will be used by TOR to provide you the URL of your site. Close your TOR browser if it is open and then go to your TOR installation directory, look for a folder labelled 'Data', in it open the 'Tor' folder and look for a file named 'torrc'. Open it in any text editor program and enter the following lines in it.

```
HiddenServiceDir C:\Users\
YOUR_USERNAME\Desktop\NAME_
OF_FOLDER
HiddenServicePort 80
127.0.0.1:YOUR_PORT
```

In the above two lines make sure to edit 'your_username' with your computer's username and 'name_of_folder' with the name of empty folder that you just created on your desktop. Also make sure to replace the word 'your_port', with the port that you entered in Savant. Now you need to save this file and then open TOR browser, so that TOR can generate a URL and Private Key for your website. Wait for 5-6 seconds and then close TOR browser. Now navigate to the folder that you'd created on your desktop and you will find two files in it – Hostname and private_key. You don't have to do anything with private_key, it's there for identification purposes. Open the file Hostname with any text editor and you'll find the

.onion sites are hidden from most engines

URL of your website with .onion as TLD. For me the URL was "utfd24oh7n43kzj2.onion" and to visit the website you need to append '/index.html' after .onion so the URL becomes http://utfd24oh7n43kzj2.onion/index.html

Don't delete the folder that you've created on your desktop. Running an anonymous site is not an easy task and it's possible that the authorities may crack down on you if you engage in any illegal activity.

HTML5 Game Dev – Getting started with PandaJs

Dileep Mohanan

HTML5 is the next big thing with new and interesting APIs to experiment with. Among them, Canvas has been making the some waves (Check some demos here http://www.canvasdemos.com/). Canvas is a container to draw graphics on the go. From text and images to 3D, you can draw and manipulate them in a web page. This along with Js gave rise to a lot of game frameworks. Panda.Js is only a few months old but has some powerful features – Physics engine, particle engine, WebGL and more.

In this article, we will learn how to setup a game scene, to add or remove assets and finally about making the assets interactive.

Microsoft Mobile Oy
Microsoft's aquisition of Nokia is complete
and it has been rebranded
http://dgit.in/MicroOy

Google+ chief quits
Vic Gundotra is to leaving Google casting a
shadow over the future of Google+
http://dgit.in/ByeVic

Digit Squad

The Engine

Go to www.pandajs.net and download the latest engine. After extracting the zip, you will find two folders *src* (engine and game main file) and *media* (assets – images, audio etc.). Inside the *src* folder you will find two files – *config.js* (path configurations) and *main.js* (your game code). You can find the source codes inside the engine folder or make your own and add it there.

Setting up the scene

Open *main.js* using a text editor. You would see the following:

```
game.module('game.main')
.body(function() {
    game.addAsset('logo.png');
    SceneGame = game.Scene.extend({
        backgroundColor: 0xb9bec7,
        init: function() {
            var logo = new game.Sprite('logo.png');
            logo.anchor.set(0.5, 0.5);
            logo.position.set(game.system.width / 2, game.system.height
/ 2);
            this.stage.addChild(logo);   }});
        game.start();});
```

- **game.module** – Configures which all modules the game needs.
- **game.addAsset()** – Assets (images, audio etc.) should be added before its referenced inside a scene. The above line adds the image logo.png from the media folder (path configured in config.js) to its assets set.
- To create a scene, we create a class which extends the *game.Scene* class. Several methods and properties are available for the *game.Scene* class. The *backgroundColor* property lets you paint the background a solid color.
- **init()** - is called to initialize the scene. Here we create a sprite of the PandaJs logo which we added to our assets set earlier.
- **anchor.set(x,y)** – Sets the registration point of the sprite. You can find a demo of what's an anchor point here http://jawsjs.com/jawsjs/examples/example5.html
- **position.set(x,y)** – Sets the x and y coordinates to display the sprite.
- **stage.addChild()** – Adds the sprite to the scene.
- **game.start()** – To start the game. You can specify which scene to start first, the dimension of the scene and the *CanvasId*. The parameters are in the order – *game.start(Scene,width,height,loaderClass,CanvasId)*.

Making the sprite interactive

To make the sprite interactive, we must include the *core.js* and set the sprite's interactive property to true. Below the game.module add the following –

```
.require("
        engine.core")
```

And inside the init() function, after creating the sprite class add -

```
logo.interactive = true;
```

Interactions are possible through keyboard and mouse. For mouse several methods like click, mouseup, mousedown, mousemove are supported. To make it do some function on click, we implement the click method as follows –

```
logo.click = function () {//your code to do something}
```

Removing the sprite

To remove a sprite from the screen, call the removeChild() method from the scene or just remove() from the object itself. Like –

```
logo.click = function () {this.remove();}
Or
this.stage.removeChild(logo);
```

More?

That is pretty much the basics. You can find more about PandaJs on its official website. If you want to know more about HTML5 Game engines, head onto http://html5gameengine.com/ and find which is right for you. There are plenty of frameworks to choose from and most of then are as easy as this one to work with. Happy coding!

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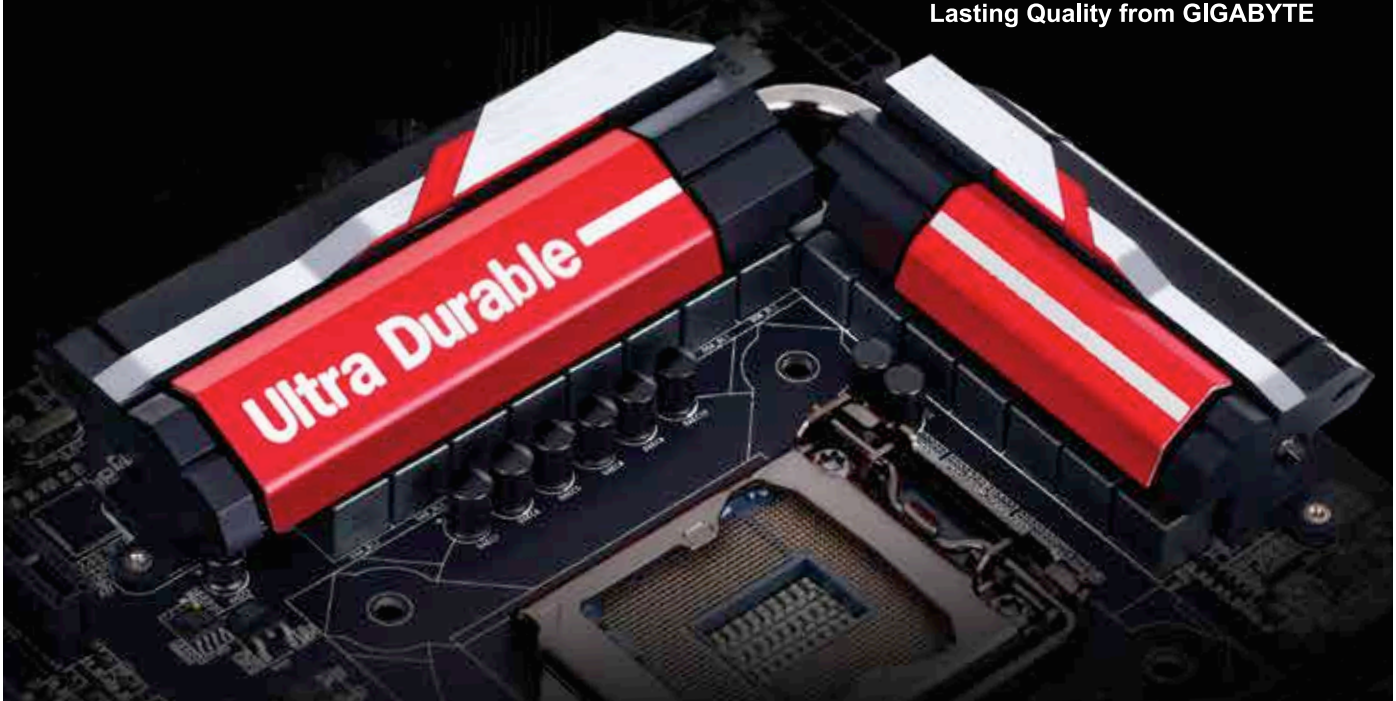*conditions apply

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