mvdit tech book
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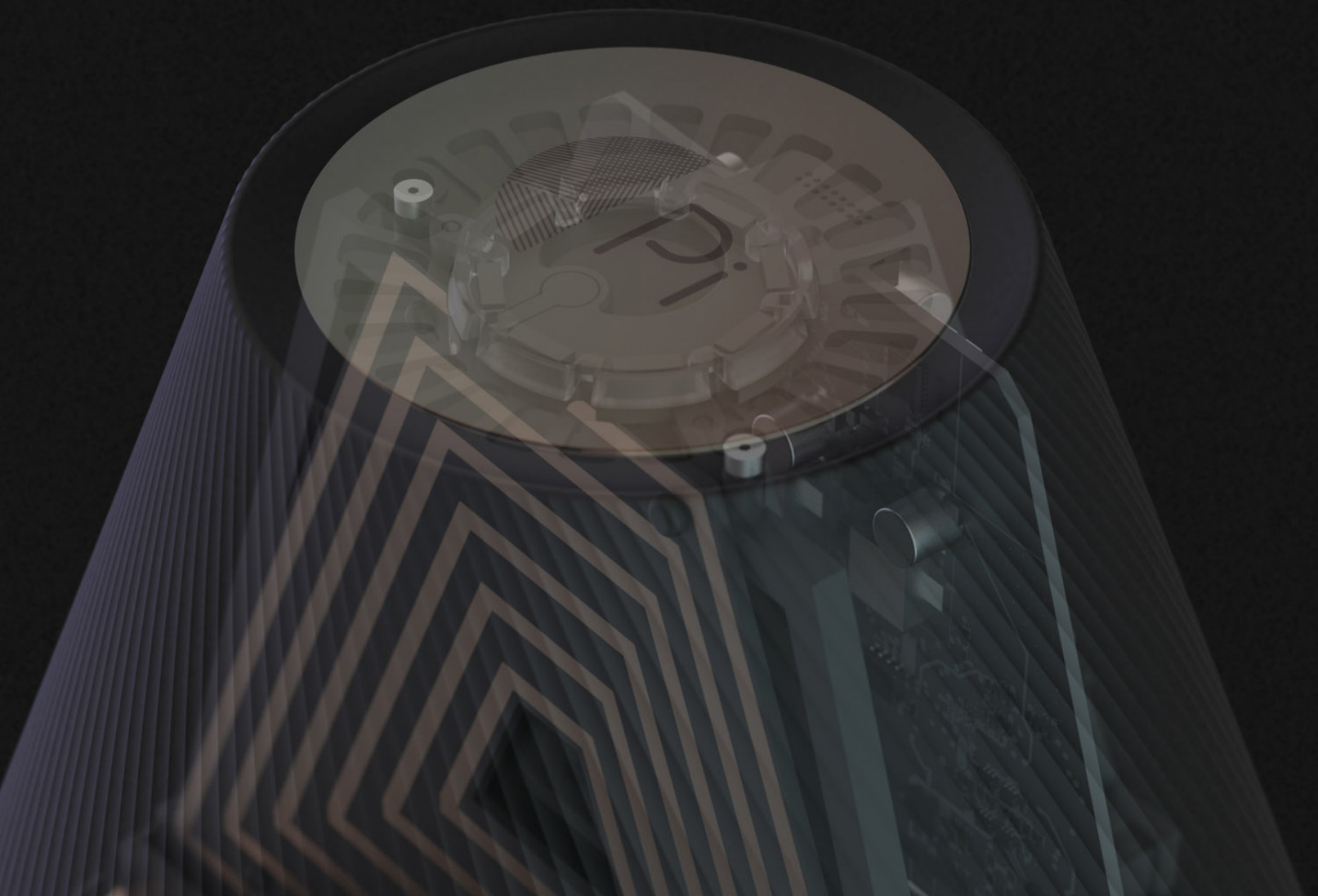
WHAT IS OVER THE AIR CHARGING



"If you do something and it turns out pretty good, then you should go do something else wonderful, not dwell on it for too long. Just figure out what's next."

- Steve Jobs

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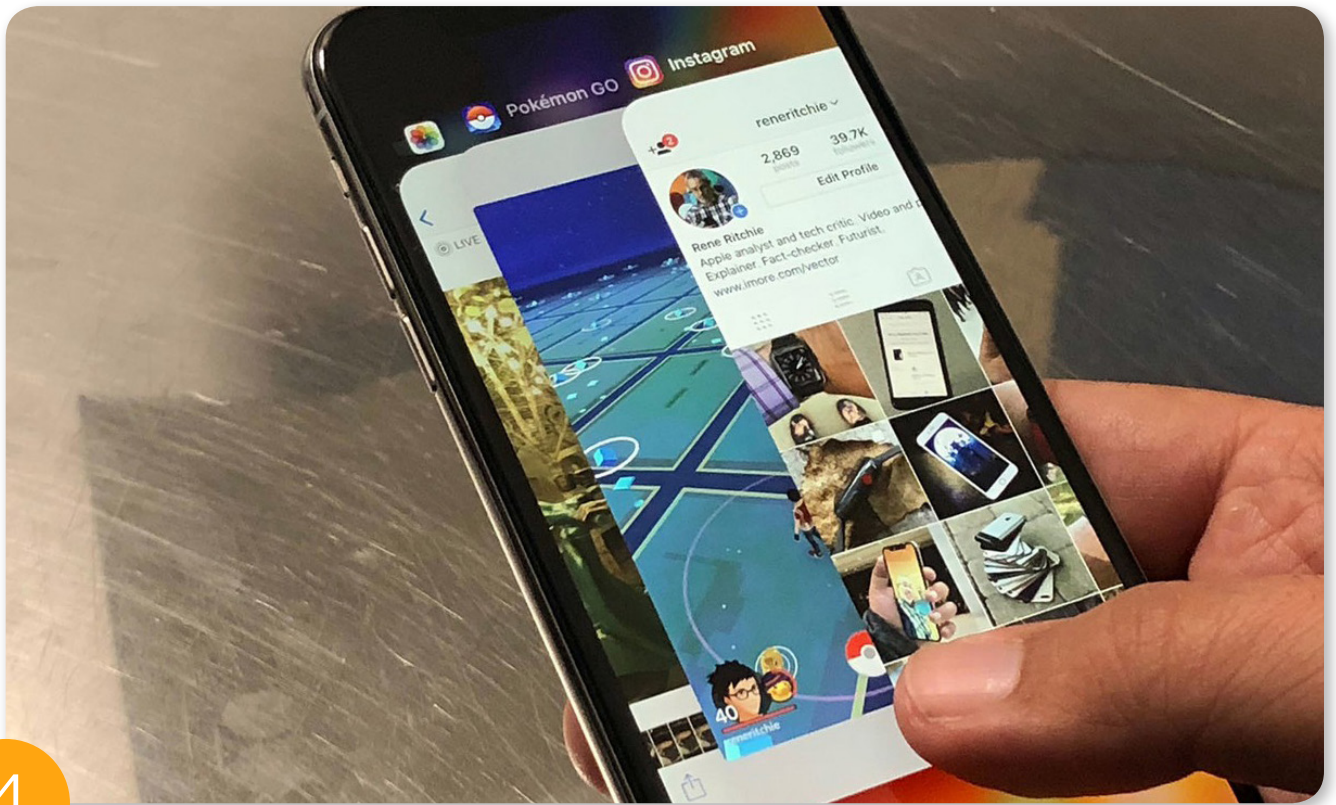


4 New Interactions with the iPhone X

HOW DOES OVER THE AIR CHARGING WORK

Vidit Bhargava

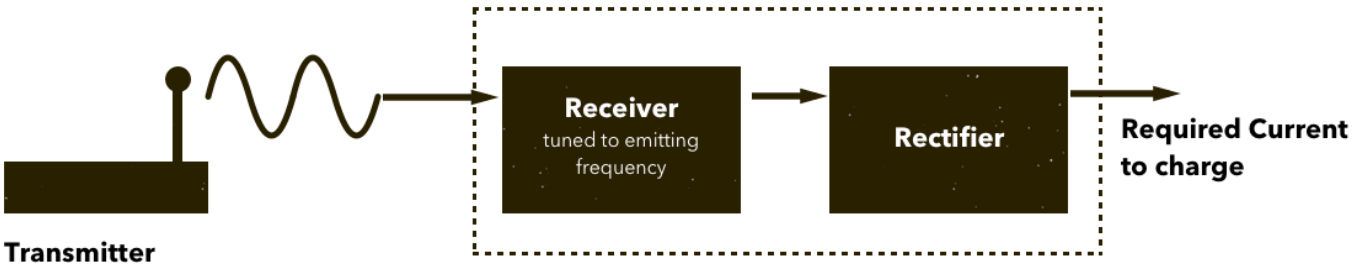
With the number of smart gadgets increasing by the day, Charging them has become a hassle. You need to charge your phones, your computers, watches, et all. at regular time intervals. And the number of wires can be staggering. One solution to this problem is Wireless Charging. Well, not exactly wireless charging but more like Induction + Resonance based Pad Charging. You place your device on a Pad and the device starts charging. These charging pads can be placed into furniture and you basically have a spot in your table where if you were to place your phone, your phone would charge.

But this isn't truly wireless. To begin with, you need contact with a special part of the surface to charge your devices, and secondly, that pad needs to be connected to a power source too, and generally supports a single device. So what you're doing with this kind of wireless charging is just replacing the charging cable with a pad.

What if, you didn't need all the charging paraphernalia? What if charging happened over the air? You plug in a charger. And all your devices in the room start charging, without the need of any cables. Sounds like Science Fiction, and to be honest a little scary too, Most people I've talked to about it, have questioned the sanity of having "electricity through the air". But this is a sort of technology which is on the horizon of becoming popular and more than that, it's just about as safe as WiFi.

Over the Air Charging

While exciting, Over the Air charging is still in a nascent stage, and has been approached at with multiple angles, which vary in their implementation, efficiency and device safety. I'll be discussing three of the popular Over the Air Charging technologies for this piece:



Radio Frequency Charging

The way this works is, Radio Waves are essentially Electromagnetic Waves (much like X-Ray, microwaves and infrared waves). A device (Hub) transmits high frequency radio waves at a fixed frequency. The phone or any other smart device can receive those waves at that fixed frequency and convert the transmitted Alternating EM Wave, to a Direct Current Wave. This is effectively how FM Radio works but instead of data, it's power that the user gets.

Since, the EM Wave propagation attenuates (reduces) over a distance. The closer your device is to the radio wave transmitter, the faster it'll charge.

Is it Safe?
Yes. High frequency radio waves cannot penetrate human skin. And since most of the charging technologies use only the magnetic components of EM Wave, there isn't much of a risk anyway.

Why is it not taking the world by the storm?
The efficiency is not upto the mark, i.e. it just takes too long to charge the device at the moment. Given, that a lower efficiency isn't much of a concern once your device is consistently charging, but there's another concern around consistent charging. Lithium Ion Batteries only have a limited number of charge cycles they can go through, and if you're consistently charging for long durations, that could adversely affect your device's battery. Also, the efficiency isn't even high enough to charge your phone while you're using it. The charging efficiency i.e. the power it can transmit over

RF Charging is a 3 part balancing act between the desirable power, safe limits of power transmission and the distance up to which it can charge

a distance, to charge your device in a reasonable amount of time compared to current charging standards, is a major hurdle for these devices to become reality.

The efficiency though, is merely an end result of what a 3 part balancing act between the desirable power, the safe limits of power transmission via radio waves, and the distance to which it can-charge at the desired efficiency. You could have higher efficiencies but would it be safe for anything other than an in-lab environment? Or will the range be big enough?

And the other reason why companies like Power Caster and WattUp have not been getting much traction is, that they need strategic partnerships for the phones to have receivers and converters which can receive their RF Transmissions and convert them to usable energy to charge the device.

Ossia aims to provide a RF charging unit that mounts on office walls

Ultrasound Wave Charging

Instead of Radio Waves, uBeam's wireless chargers use Ultrasound Waves. In principle this is the same as how RF Charging works, but instead of Radio Waves, uBeam uses Ultrasound Waves.

There are major advantage to Ultrasound waves. First, The receivers are cheap. And the devices can charge while moving. And since Ultrasound waves can transmit data as well, this can be used to connect to other smart devices. Moreover, Ultrasound waves are generally safer than Radio Waves, since these are just sound waves and not EM waves (which are only safe to a certain limit of frequency), this is also technology that has had medical implementations for quite a while.

Having said that, uBeam's major disadvantage with Ultrasound Waves is that it needs a line of sight connection, which'd get blocked by physical barriers like Walls or Humans, and that can be a troublesome situation if your device needs to be in a specific desired location in the room to charge.

Power over WiFi

WIFi is almost everywhere! Cities have hundreds and thousands of WiFi Points and they basically use the same infrastructure that's needed to transmit power.

WiFi Routers can be forced to send out a constant 1W Signal, and there goes the need to have a rectifier to convert AC Power to DC. The convenience of having Power Delivered by your WiFi router is gigantous. You don't need an external hardware. Fewer Electronic components only mean that it's going to be cheaper and the adoption to PoWiFi is going to be really fast if it starts getting traction.

Having said that, PoWiFi also has its own set of limitations. PoWIFi is much less efficient than Radio Frequency Charging or Ultrasound charging, and basically cannot charge a mobile phone

PoWiFi is an exciting concept, but the power it can deliver is no where near to what's needed to charge a phone.

Resonant Beam Forming Charging

Pi's solution works better than most others, but that's also because of its modest ambitions.

At 12 inches of range it's just about contactless and doesn't have the convenience of other over the air charging tech

Resonant Beam Forming Charging, has a much more different approach to do Wireless over the air charging than PoWiFi, RF Charging or Ultrasound Charging.

Pi, a company that recently debuted this kind of a technology, aims to make a device where devices could huddle around it to get the charge. Resonant Charging is more similar to Qi based Pad Charging than any of the other above mentioned technology. Over here, the principles of pad based charging are put to use in an air medium, where a beam forming algorithm for the device is able to direct the generated magnetic field to the device's location.

As you'd expect, this type of charging has a smaller radius than other solutions. It's just a 12inch i.e. 30cm radius around the transmitter. So basically your devices are going to huddle around the charger instead of being in your pockets or your hands while charging.

Pi's solution works better than the rest and they were able to show of a working device at September's disrupt conference because they're ambitions are much lower. They're not promising long distance range for wireless charging or breakthrough charging tech, they're using existing technologies and algorithms to make charging *at least contactless*. Even if that means sitting around their charging unit like you'd do around a campfire.

As for others, there's still a good distance to cover in terms of the minimum efficiency you'd need to make these over the air charging devices work in a real world.

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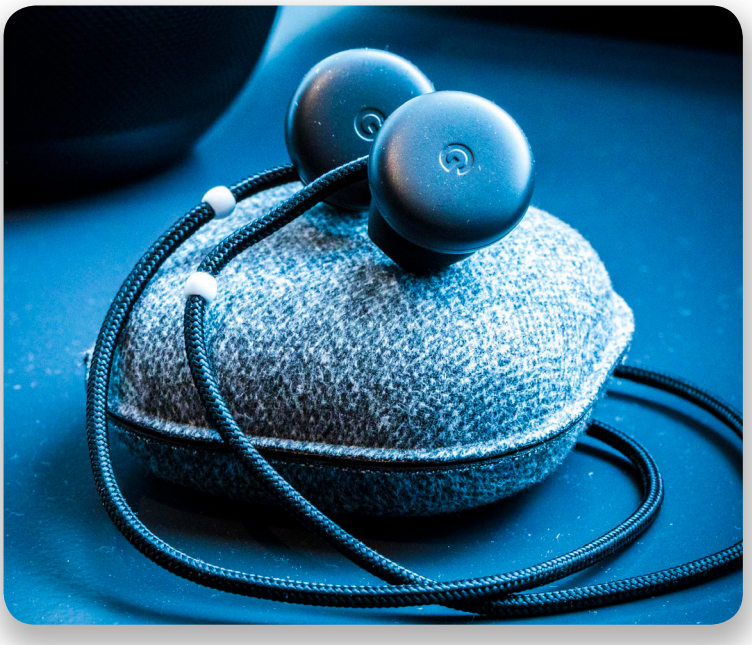
Over the Air Charging is a novel idea, and something that's been pursued for a long time now (The oldest references I found dated back to early 2000s), It's much more convenient than the traditional charging techiques or the Pad Based charging which is often erroneously referred to as "Wireless Charging". I think it's a future of charging mobile devices and we'll eventually look back at the era of Pad Based Wireless charging as a transitionary period to a much better technology.

Top Stories

from the world of technology in November 2017

1 Google's Babelfish like Headphones



Google's latest pixel phones lack a headphone jack (surprise!), so naturally, google had to do bluetooth headphones that'd go well with these devices. Google's Pixel Buds do just that and a little more.

The pixel buds can offer real time translation. Yes, if the person you're talking to is speaking a language you don't know, the pixel buds can use your phone's mic to translate him in real time for you. How's tat for a modern day Babelfish!

2 Ashes Cricket out now on consoles

Big Ant Studios' Cricket game got a new life this year with licensed English and Australian Cricket teams for this year's Ashes tournaments, and the makers of Don Bradman Cricket didn't let the opportunity pass without making significant improvements to the gameplay, adding mocapped stances and improving on their previous game!

Ashes Cricket is out on PS4 & XBox One. A PC release is expected next month.

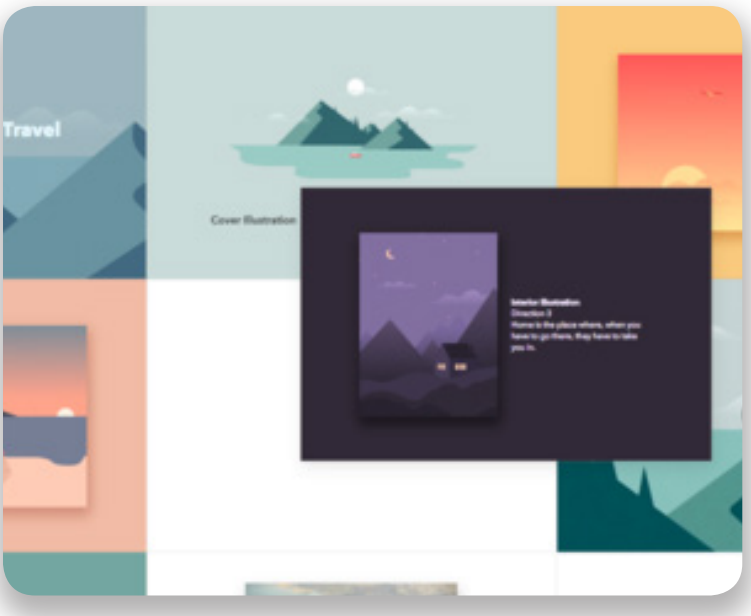
3 HomePod now coming in 2018

Apple's much awaited Music Speaker System + Home Automation device, a competitor to Sonos and Amazon's Echo, has been delayed until early next year. The company said it needed more time.

Earlier this month Apple also opened up a few SiriKit Domains for the HomePod.

4 Pixel 2 XL suffers from OLED issues

The larger of the two Pixel Phones this year feature an OLED screen. However, Google's implementation of the hardware came under scrutiny this month when Pixel users discovered jarring blue shifts when looking at the device at an angle, and display burn in, one week into using the device.



5 FiftyThree's new Slideshow app

FiftyThree, makers of the famed Paper app for iPad, and the team behind the ill-fated Microsoft Courier prototype, have released a brand new app on the App Store, for enterprise slideshows.

Paste by 53 offers collaborative editing options, comments and a simplified creation tool. You can also drag and drop your paper sketches into a Paste presentation.

State of Streaming Services 2017

Traditional TV Producers have begun offering their own streaming services.

Vidit Bhargava

Internet Video Streaming Services are the talk of the town this year. Technology Firms are becoming ‘producers’ to make their own “TV Shows” and traditional TV producers like CBS and Disney are working on their own streaming services so that they can offer their shows as ’exclusives’. Moreover there are more players joining in the Streaming services game, with Apple’s service being more or less an open secret at the moment.

The more these ‘exclusive heavy’ services multiply, the more fragmented this space gets, if you have to subscribe to each and every streaming service, just to watch that one tv show that you like, you’re more or less moving back to the DTH TV era. There’s no one place to access all movies or tv shows like there’s for streaming music or downloading apps.

The need for exclusives

There's nothing that differentiates one streaming service's app from another. Streaming Service Apps have more or less become dumb pipes to provide the video content endorsed or acquired by the service. Therefore, in a need differentiate their product, these services invest in exclusives. Exclusives are shows that are blessed by a particular service to see the light of the day, on their service, and no other. So, you can only watch Silicon Valley on HBO, you won't be able to watch it if you're only a Netflix or Amazon Prime subscriber. HBO has produced it and is only going to share it on the internet through their service, so that users are enticed to get a subscription for HBO Now.

Unfortunately, every service has chosen to make this decision. So you can only watch Stranger Things on Netflix, you can only watch the grand tour on Amazon Prime, A Handmade's Tail is a Hulu exclusive, and if you want to watch Game Of Thrones you need to be on HBO's service. So if you like to watch these four immensely popular shows, you're going to end up paying for a monthly subscription of each of these services. And this fragmentation is just getting started, there are going to be more services next year, Disney's already announced one.

Streaming Services at this point are no better than TV Producers of the yesteryears. They bet on a few shows which they think will drive up the Active user and new subscriber metric, and then gobble it up for their 'own' streaming service. Want to watch that new David Fischer show? You can't do it on Prime or HBO. You 'have' to have Netflix for it. The apps of Netflix or Prime Video are more or less TV Channels at the point. Designed to show the content blessed by them.

TV Channels and Producers jump into the streaming fray

In fact the difference between the two is so slim that the traditional TV Channls are coming up with their own services. In India, Sony Television Channels has it's own streaming service which provides access to 'exclusive shows', sport streams and live television. Bajaji Entertainment a major TV producer has it's own streaming service too and their model is more or less just about producing high-quality online video content, so as to get more subscribers, and it's already working. They're latest show, a period drama on India's freedom struggle, has gained much praise from the critics and has driven subscription numbers. In the US, we have Disney working on it's own service, CBS just launched their own with CBS All Access, and there are more coming. Exclusives are a familiar territory to the traditional producers, and they get a lot of content pretty easily just because of how long they've been in the game.

Traditional TV Producers find the race for exclusives a familiar territory.

Back to the Same Problem

Streaming services are creating the very problem they solved when they first lanched

As these services mushroom, I feel they'll end up creating the same problems that Internet streaming tried to solve in the first place. When Netflix first came out, it was one place to watch movies and TV Shows and the convenience of that helped Netflix get users. But as that base began to saturate, in a need to grow the service, Netflix began producing their own shows. And now, almost all of the streaming services follow this model, and we have a world where there's no convenience of "one place to watch all movies and tv shows". So what was the purpose of going online with the shows again? I really hope it wasn't just about watching them at any time you wanted to.

Four Great shows equals to four different subscriptions!

Need to cater to the indies

Moreover, there's so much interesting video content available online that is not on these streaming services, but on places like YouTube and Facebook, but there's little for these indie creators to sustain on them, or earn as much as some of the creators who make the same for streaming services do. I don't see a lot of streaming services actually empowering these indie creators to target their niche. With the exclusives, most of them are chasing are chasing big names in hollywood. In fact, democratising the platform might actually be a good differentiator for a service to compete at this point. When these services fight for empowering more creators they end up empowering users with genuinely interesting content.

Do I see this scenario changing anytime soon? I don't think so. But I'm optimistic that we'll eventually see the shows aggregating into one or two places

Unlocking new interactions with iPhone X

Vidit Bhargava

While there's a lot more that excites me in Apple's latest flagship iPhone. The iPhone X features two key interaction changes that I believe are going to be key components for the iPhone's future.

Proactive Authentication with FaceID

Every authentication option: password or fingerprint or even some of the facial scanning techniques has been about a 'It's me' approach towards authenticating user identity, i.e. The user tells the device through a unique key (His password or fingerprint), that it's him. But it is the user doing the work here. He's telling the device it's him, instead of the device figuring it out himself.

On the other hand, FaceID is the beginning of a proactive authentication system, where the device figures out itself that that it's the device's owner who is using it. It's a 'Oh! It's you' kind of authentication system where the user lifts his phone, the phone authenticates him and the device unlocks. The user's supposed to do no external work here. He's already facing the camera and doesn't really need to do any work. It's a more proactive way to authenticate a user's identity.

And while, we're not in the completely proactive authentication phase with the current FaceID implementation, in the sense that you still need to click a physical button to initiate the authentication process for payments, it's hard not to see a future where the user tapping the buy button or tapping the device to an NFC device doesn't automatically trigger this authentication process.

The idea here is, you no longer need to worry about the authentication process, typing in passwords, or putting your finger on a home button. It's the phone that's smart enough to understand that it's you, because it already authenticated you.

Your Face as an input

With the new depth mapping API for the front facing camera, we've been able to see stuff like Animoji which takes your facial expression and voice as it's input to animate an emoji. It's a fun demo and a great ice breaker for the new Depth Mapping techniques that convert your face as your input device.

But Animoji is just the beginning of an interaction paradigm where your face contributes to the mix. Our expressions, and facial movements invariably respond to the interfaces we see, if that response could be captured as an input to trigger more actions in the interface, that'll add a new dimension to the iPhone.

I'm really excited about the possibility of having your face map as an input for proactive authentication and as input device to control and manipulate interfaces. and it'll be interesting to see how developers create apps for the iPhone X, that makes use of the face as an input device.

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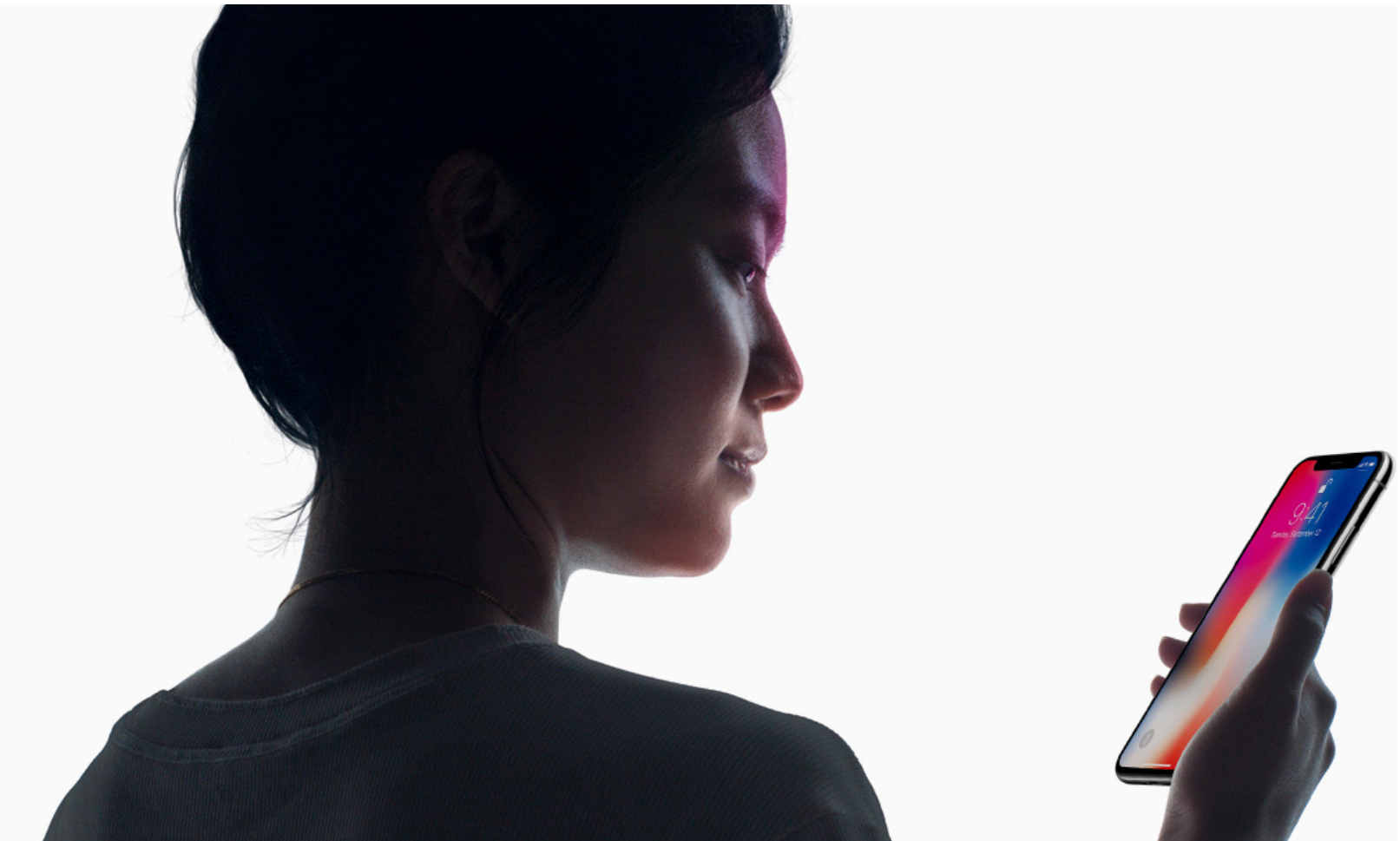
The iPhone X is an exciting device. It brings beefs up the iPhone line with some really interesting technologies and the true depth sensor (also referred by many as a notch), and the next few months will be really interesting, as developers role out updates to their apps with some interesting uses.



Pixel Quiz November 2017

Vidit Bhargava

Q1. In early 1993, Charlie Jackson and Jonathan Gay, founded FutureWave Software. The intention was to create a graphic design tool that would enable pen-input for users. And so, they released SmartSketch.

However, SmartSketch was a little ahead of its time and just as pen-computing didn't take off. However, around the time, the Internet was becoming very popular, so the creators of SmartSketch decided to take on Y (a popular tech in the field of internet) and in 1995 re-released SmartSketch.

SmartSketch's pivot to a more lucrative field would eventually result in Y's parent company acquiring FutureWave and rebranding Jackson and Gay's creation to X, something that would be known for years to come. What is X.

Q2. In October 2016, a dDOS attack, nearly took down more than half of Internet for some time. The largest of its kind, this dDOS attack was slightly different from all other such attacks, which made the scale of it so large.

The hackers used X, instead of traditional computers to orchestrate the formation of a giant botnet which would then kick in the attack. Because X are so loosely regulated and have few security standards, It was particularly easy to infect them with a malware which would gain access to these devices by using a table of more than 60 common factory default usernames and passwords. Identify X, a futuristic category of devices.

Q3. Every Image has a "focal region": A region where the image is most interesting. The engineers at X found a way to algorithmically extract that focal region from any image. They use this to generate promotional artworks.

Once X has a giant pool of artworks with small stylistic variations. They group them and conduct A/B Tests on users by showing a different group of artwork to different people. Since the homepage of X is largely a collection of spatially arranged artworks. X uses its acquired knowledge of what groups of artwork a user is most likely to be interested in. So every X profile looks slightly different even if the contents on the screen aren't. Identify X.

Q4. Dhruv Shringi is the co-founder of which famous Indina online ticketing service?

Q5. Derived from the latin word for elite, which language is an alternative alphabet for the English language that is primarily used on the internet and uses various combinations of ASCII letters to replace alphabets?

Answers to Pixel Quiz Julu 2017

1. Skunkworks

2. Atlassian

3. Goof-Ups in books due to contradictory info.

4. Pixo OS

5. They serve as room heaters