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Augmented Reality

“I feel that Augmented reality is perhaps the ultimate computer.” — Satya Nadella

What is Augmented Reality?

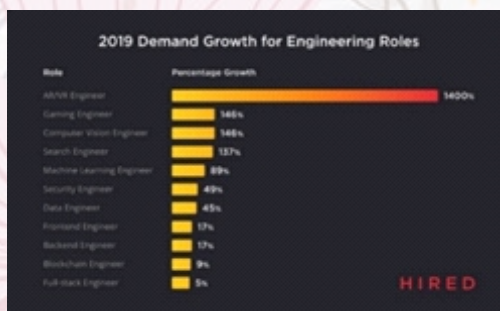
Augmented reality means “augment your reality”, Augmented reality is a view of the real, physical world in which elements are enhanced via computer-generated input. those inputs can also range from sound to video, to graphics to GPS overlays and more. The real world remains central to the experience and is enhanced through digital elements that generally interact with it.



“When we get to this [AR] world, a lot of the things we think about today as physical objects, like a TV, will be \$1 apps in an AR app store” — Mark Zuckerberg

Why Augmented Reality?

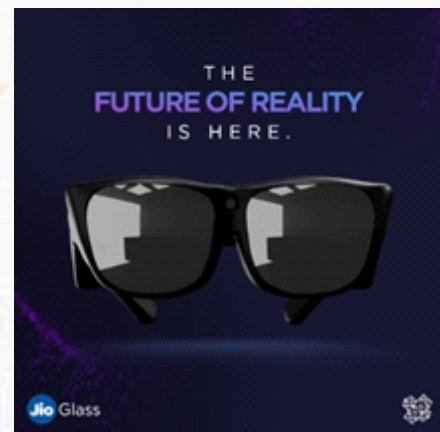
- Consumer choices are shifting as virtual era becomes greater state-of-the-art, and people more and more expect personalization, customizable preferences, and on-demand offerings.
- Augmented reality drives high levels of visual interest inside the brain, nearly double that of non-AR related tasks.
- AR drove better tiers of interest than some other medium, along with books, PDFs, motion pictures and much more. This makes AR the appropriate medium thru which to engage your learners with their training!



“I'm excited about AR because... AR allows individuals to be present in the world but hopefully allows an improvement on what's happening presently. Most people don't want to lock themselves out from the world...”
 — Tim Cook

Where is augmented reality used today?

- Social media programs use AR to create those fun filters we see on so many photos.
- Mobile game Pokémon move revolutionized mobile game using AR to permit people to hunt Pokémon.
- Ikea Palace: With this augmented reality app you can place digital furniture from the IKEA catalogue directly to your room. a whole new indoors design experience.
- Reliance Jio is the cutting-edge organisation to join the race to democratise mixed reality (MR) technology. The enterprise has advanced a Jio Glass that makes use of MR and Augmented reality (AR).
- Augmented reality remote assistance combines stay video streaming, in which pictures and videos are broadcast in real time, with augmented reality, an interactive technology that superimposes a pc-generated picture on a person's view of the physical environment.
- AR lets specialists be in more than one place at a time. If a field technician in a remote place gets stuck while troubleshooting a few systems, they can use an organization AR solution to instantly connect to a subject-matter expert (SME). The SME may be at the office, at domestic, or even the world over.
- DHL turned into one of the first companies to explore AR back in 2014 and has recently multiplied its “vision choosing application” worldwide. The third party logistics company gives warehouse people smart glasses (currently the latest model of Google Glass enterprise version) which help them discover, test, sort, and move inventory without using handheld scanners or referencing paper forms.



“Looking to the future, the next big step will be for the very concept of the 'device' to fade away” — Sundar Pichai

What are the tools of Augmented Reality?

- Apple ARKit
- Google ARcore
- Sceneform
- Vuforia
- Android Studio
- Unity 3D
- WebAR
- Amazon Sumerian

“The Internet is the first thing that humanity has built that humanity doesn't understand, the largest experiment in anarchy that we have ever had.” — Eric Schmidt

What is the best way to make and learn augmented reality applications?

·Unity 3D | Vuforia | C#

- 1.Unity Editor is a popular and useful authoring platform to create cutting edge augmented reality stories for both hand held gadgets and virtual eyewear.
- 2.Vuforia Engine is a software development kit (SDK) for developing Augmented reality apps.
- 3.Language it's used in Unity is referred to as C# (pronounced C-sharp). all of the languages that unity operates with are object-orientated scripting languages.

Unity 3D

- <https://unity3d.com/get-unity/download>
- <https://docs.unity3d.com/Manual/AROverview.html>
- <https://unity3d.com/learning-c-sharp-in-unity-for-beginners>

Vuforia

- <https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity.html>
- <https://developer.vuforia.com/downloads/sdk>
- <https://library.vuforia.com/platform-support/vuforia-engine-recommended-devices.html>
-

ARCore | Android Studio | Java/Kotlin | Sceneform

1. ARCore is Google's platform for building augmented reality stories. using distinctive APIs, ARCore allows your smartphone to feel its surroundings, apprehend the world and have interaction with data.

2. Scene form is a 3D framework that permits us to render 3D models through the usage of a high-level graphics API. It comes with a plugin that helps you to import, preview and construct 3-D assets at once from Android Studio.

ARCore : <https://developers.google.com/ar/develop/java/quickstart>

ARCore Supported Devices : <https://developers.google.com/ar/devices>

Sceneform : <https://developers.google.com/sceneform/develop/getting-started>

Online Courses & Certifications

Udemy

<https://www.udemy.com/course/develop-augmented-reality-book-ar-business-card-with-unity/>

<https://www.udemy.com/course/create-augmented-reality-apps-using-vuforia-in-unity-sdk/>

Coursera

<https://www.coursera.org/learn/ar>

YouTube

ARCore Playlist : https://www.youtube.com/playlist?list=PLsOU6EOcj51cEDYpCLK_bzo4qtjOwDWfW

My Channel : <https://www.youtube.com/channel/UCXB8M4-ZmiSTkkwZ3Zrc04A>

*“Live as if you were to die tomorrow. Learn as if you were to live forever.”
— Mahatma Gandhi*

Samsung introduces upgraded network solutions

Samsung Electronics said on 23rd July that it has released upgraded software-defined networking (SDN) solutions to help mobile operators and enterprises better manage their 5G networks.

The South Korean tech giant said its new SDN solutions will support enterprises in various sectors, including education, retail and energy, introducing new 5G application, services and infrastructure.

SDN is a network architecture approach that enables the network to be easily controlled via software solutions. It allows better automation and programmability in the entire network from access to the core, increasing operational efficiency.

"With an architectural shift from hardware-based deployment to software-centric network design, SDN is highly secure, scalable and adaptable, especially helpful in advancing private networks," Samsung said.

Its SDN portfolio covers all layers of the SDN architecture, including controllers, orchestrators, switches and routers, according to the company.

Samsung's SDN solutions can automate end-to-end network slicing, allowing telecom operators to provide customized services.

Its SDN is based on the Open Network Operating System (ONOS), connecting switches and routers from various suppliers, and comes with enhanced UX design.

Samsung, the world's largest smartphone vendor, is one of the major suppliers of 5G end-to-end solutions, including chipsets, radios and cores.



Wirelessly powered drone achieves flight with microwave beam

Rockets typically use about 90 per cent of their fuel escaping the Earth's atmosphere. Researchers at the University of Tsukuba in Japan believe this limitation could be overcome by wirelessly transmitting the necessary power to the rocket.

Previous analyses of this kind were carried out decades ago and mostly considered microwaves of a frequency in the low gigahertz (GHz) range. Given that the power transmission efficiency increases as the operating frequency is raised, the team behind this latest research used microwaves with a relatively high frequency (28GHz).

The team managed to get a drone weighing roughly 0.4kg to hover for 30 seconds at a height of 0.8m above the source of the microwave beam.

"We used a sophisticated beam-tracking system to ensure that the drone received as much of the microwave power as possible," said Kohei Shimamura, lead author. "Moreover, to further increase the transmission efficiency, we carefully tuned the phase of the microwaves using an analogue phase shifter that was synchronised with GPS units."

The researchers measured the efficiencies of the power transfer through the beam (4 per cent); the capture of microwaves by the drone (30 per cent); the conversion of microwaves to electricity for propulsion (40 per cent), and other relevant processes.

Based on this information and an analytical formula, they calculated the overall power transmission efficiency in their experiment was around 0.43 per cent. For comparison, in a previous study the team measured the total transmission efficiency for a fixed-position (rather than free-flying) drone to be 0.1 per cent.

"These results show that more work is needed to improve the transmission efficiency and thoroughly evaluate the feasibility of this propulsion approach for aircraft, spacecraft and rockets," Shimamura said. "Future studies should also aim to refine the beam-tracking system and increase the transmission distance beyond that demonstrated in our experiment."

The researchers hope that although microwave-powered rocket propulsion is still in its early stages, it could someday become a superior way to launch rockets into orbit given the high onboard-fuel demands of conventional propulsion techniques.

Last year, engineers demonstrated a wireless charging solution that can power objects in motion that could one day allow electric cars to be charged while they are driving.



AI system could help protect health of US navy divers

Researchers in the US have received funding to develop an artificial intelligence (AI) system that can help protect divers from waterborne bacteria, parasites, and other harmful pathogens and microbes.

The research team at the University of Illinois Chicago (UIC) was awarded a grant of \$725,000 (£520,000) by the US Office of Naval Research to pursue the project.

Sailors are sent into all kinds of water as part of their service in the US Navy, but they have limited resources to understand in real-time the health risks that may exist when they conduct underwater duties – from fleet maintenance and repairs to search and rescue and research missions.

The most reliable water testing technologies typically rely on lab-based analysis of samples and scientists knowing which microbes to screen. But with dynamic weather, currents, water temperatures, and sewage and pollution factors, the exact condition of water, particularly of coastal water, at a specific time is hard to predict.

“By the time a water sample arrives at a lab and is tested, the conditions may have changed,” said Dr Samuel Dorevitch, associate professor of environmental and occupational health sciences at the School of Public Health. “If Navy divers had real-time information, they could select the best protective equipment, dive duration and take other measures to prevent the various health issues, like heat stress or gastrointestinal, skin, and respiratory infections that may result from microbes in water.”

The researchers on the project believe that a novel approach using artificial intelligence can make a difference in tackling this widespread issue.

“Artificial intelligence offers a way to synthesise a vast amount of information quickly for a specific calculation, and this technology, if we can bring it to fruition, provides an opportunity for us to improve the tools available to the Navy,” said Isabel Cruz, a professor of computer science at the College of Engineering.

The researchers hope they can develop a system that can be used in any location by divers to analyse water conditions through a combination of user-provided and web-based information and human data, such as the age of the divers, their health, and the size of the diving team.

“This project is both exciting and challenging because of its multidimensionality,” said Cruz. “We hope to pull information from many sources that offer different data, and we will have to integrate data that are quite complex, heterogeneous, and often without metadata.”

Cruz said that the team intends to build the AI and machine learning methods in stages. “If we can teach our system to reliably and accurately filter and prioritise all these data for risk prediction, I think we will have something remarkable,” she continued.

Meanwhile, Dorevitch added that if the team could provide divers or their commanders with a handheld device or app to evaluate the ever-changing ecosystem of a particular body of water and any potential health risks at the time they enter the water, parties involved would be better able to plan their mission for optimal health and safety.

“For those in the Navy, getting in the water is not optional and anything we can do to aid quick, data-driven decision-making for mitigating health risk is beneficial,” he concluded.



Laser technique pushes data at 40Tbit/s through existing internet cabling

Researchers have found a way to push more data through existing internet cabling infrastructure reaching speeds of up to 40Tb per second.

The speeds, which are fast enough to download around 5,000 standard-definition Netflix films in a second, were achieved by using a new way of splitting up light channels to deliver more information inside and between data centres.

Instead of using a single channel, the team use multiple wavelengths to deliver information all on a single Photonic Integrated Circuit (PIC).

PICs use photonics or light-based technology to deliver much higher bandwidth in a power-efficient manner than traditional chips.

By using what are known as optical combs, a single laser can be used to generate a broad spectrum of equally-spaced optical frequencies which enable higher capacity internet traffic on a single fibre without upgrading existing infrastructure.

It does this by eliminating 'guard-bands' or wasted chunks of bandwidth needed in traditional systems that prevent interference between data channels.

Frank Smyth, founder of Dublin-based Pilot Photonics, which is working on the project as part of a pan-European collaboration, said: "A way to visualise how our photonic integrated circuits are helping the flow of information between data centres is to think of road to rail.

"On the road, the lanes must be much wider than the cars because the driver can veer left and right to some degree. This extra lane space represents the guard bands between wavelengths that are used in optical systems today.

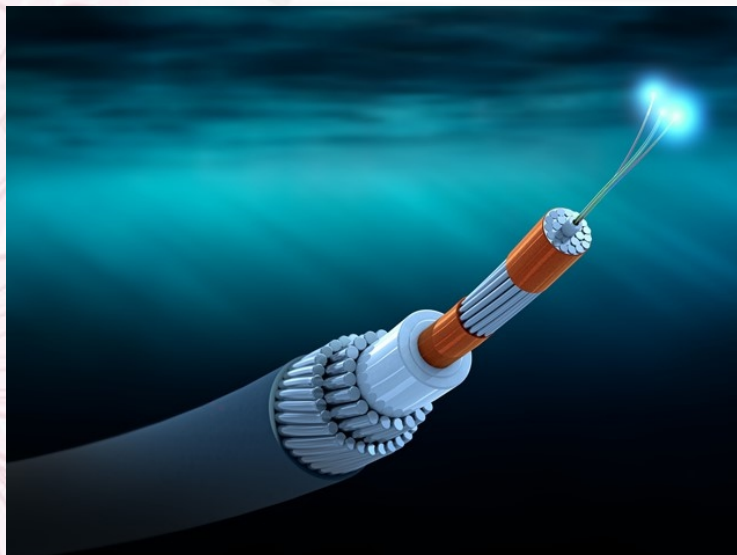
"With rail, you can pack trains right up side-by-side because they are on fixed tracks and cannot veer off them; this is like using an optical comb. The trains can't bump into their neighbours because they are on fixed tracks. Data channels based on an optical comb can't interfere because the spacing between them is physically and fundamentally fixed.

"Rather than growing data rates on a single wavelength, our technology allows us to use multiple wavelengths at a lower speed, thus removing integrity pressure on a single band. These multiple wavelengths create a single channel known as a 'superchannel', enabling longer distances to be travelled by the data and making it easier to maintain good signal integrity.

"Innovations such as ours solve a real problem for our customers in the industry who need to keep up with society's insatiable demand for new bandwidth-intensive data services without significant price increases."

Last week, Openreach and Nokia conducted tests on a new 'Full Fibre' technology that can deliver download speeds up to 25 gigabits per second to UK households.

Currently, the fastest speeds available to consumers top out around 1Gbit/s, and even these speeds are only scantily available in the UK.



Cyber attack takes northern trains' ticket machines offline

Self-service ticket machines operated by the Northern Trains rail franchise have been targeted by a ransomware attack which has taken many of them offline.

The ticketing system has been offline since last week while an investigation is being conducted, but Northern Trains said that these are the only machines affected.

The operator installed more than 600 new ticket machines across the network earlier this year as part of a £17m scheme to provide passengers with modern touch-screen machines at over 400 stations across the north of England. The servers that operate these ticket machines have now been impacted by the suspected cyber attack.

“This is the subject of an ongoing investigation with our supplier, but indications are that the ticket machine service has been subject to a ransomware cyber attack,” Northern said. It added that no customer or payment data had been compromised and that customers could still buy train tickets online.

Flowbird Transport Intelligence, the supplier of the ticket machines, said it had identified the cyber attack through its monitoring systems. “We immediately instigated our major incident procedure in order to protect other parts of the network and our checks have shown there has been no compromise to any personal data,” a spokesperson said.

Northern was previously operated by Arriva Rail North, but the private operator ran the network so incompetently, with expensive trains that often ran late to the chagrin of its passengers, that the government was forced to step in last year and effectively nationalise the line.

A Which? study in 2018 found that Arriva Rail North had the lowest rail franchise customer satisfaction in the UK, coming 30th out of 30, with a commuter customer satisfaction score of just 32 per cent.

The government was recently urged to boost funding for high-speed rail infrastructure in the North of England due to fears that the project could be scrapped.

The Northern Powerhouse Rail (NPR) scheme – sometimes described as HS3 – aims to connect Northern cities via a high-speed east-west route. The proposed rail infrastructure would link Manchester to Leeds via Bradford and eventually extend to Newcastle and Hull.

However, recent reports have suggested that the government is considering scrapping those proposals in order to plough more funds into HS2, which has seen its overall estimated costs consistently balloon year after year. The Institute for Government suggests that in 2009, the UK government stated that the HS2 project would cost £37.5bn to complete. The most recent estimate from HS2 Ltd put the cost at more than double this amount, at around £78bn. Independent estimates put the estimated final cost higher still, at £110bn.



Scientists develop world's thinnest magnet

Scientists in the US have developed an ultrathin magnet that operates at room temperature. They believe it could lead to new applications in computing and electronics and new tools for the study of quantum physics. According to the researchers, the magnet could make advances in next-gen memories, computing, spintronics – such as high-density, compact spintronic memory devices – and quantum physics. It was developed by scientists at the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) and UC Berkeley. “We're the first to make a room-temperature 2D magnet that is chemically stable under ambient conditions,” said senior author Jie Yao, a faculty scientist in Berkeley Lab's Materials Sciences Division and associate professor of materials science and engineering at UC Berkeley. Graduate student at UC Berkeley, Rui Chen, added:

“This discovery is exciting because it not only makes 2D magnetism possible at room temperature, but it also uncovers a new mechanism to realise 2D magnetic materials.” The magnetic component of today's memory devices is typically made of magnetic thin films. But at the atomic level, these magnetic films are still three-dimensional – hundreds or thousands of atoms thick. For decades, researchers have searched for ways to make thinner and smaller 2D magnets and thus enable data to be stored at a much higher density. Previous achievements in 2D magnetic materials have brought promising results. But these early 2D magnets lose their magnetism and become chemically unstable at room temperature, according to experts. “State-of-the-art 2D magnets need very low temperatures to function. But for practical reasons, a data centre needs to run at room temperature,” Yao said. “Theoretically, we know that the smaller the magnet, the larger the disc's potential data density. Our 2D magnet is not only the first that operates at room temperature or higher, but it is also the first magnet to reach the true 2D limit: It's as thin as a single atom!”

The researchers said their discovery will also enable new opportunities to study quantum physics. “Our atomically thin magnet offers an optimal platform for probing the quantum world,” Yao said. “It opens up every single atom for examination, which may reveal how quantum physics governs each single magnetic atom and the interactions between them. With a conventional bulk magnet where most of the magnetic atoms are deeply buried inside the material, such studies would be quite challenging to do.

“The researchers synthesised the new 2D magnet – called a cobalt-doped van der Waals zinc-oxide magnet – from a solution of graphene oxide, zinc, and cobalt. Just a few hours of baking in a conventional lab oven transformed the mixture into a single atomic layer of zinc oxide with a smattering of cobalt atoms sandwiched between layers of graphene. In a final step, graphene is burned away, leaving behind just a single atomic layer of cobalt-doped zinc oxide. To confirm that the resulting 2D film is just one atom thick, Yao and his team conducted scanning electron microscopy experiments at Berkeley Lab's Molecular Foundry to identify the material's morphology, and transmission electron microscopy imaging to probe the material atom by atom. With proof in hand that their 2D material really is just an atom thick, the researchers went on to the next challenge that had confounded researchers for years: demonstrating a 2D magnet that successfully operates at room temperature.

The research team's lab experiments showed that the graphene-zinc-oxide system becomes weakly magnetic with a 5-6 per cent concentration of cobalt atoms. Increasing the concentration of cobalt atoms to about 12 per cent results in a powerful magnet. They also found that a concentration of cobalt atoms exceeding 15 per cent shifts the 2D magnet into an exotic quantum state of “frustration,” whereby different magnetic states within the 2D system

compete with each other. And unlike previous 2D magnets, which lose their magnetism at room temperature or above, the researchers found that the new 2D magnet not only works at room temperature but also at 100°C. According to Chen, zinc oxide's free electrons could act as an intermediary that ensures the magnetic cobalt atoms in the new 2D device continue pointing in the same direction – and thus stay magnetic – even when the host, in this case, the semiconductor zinc oxide, is a non-magnetic material.

“Free electrons are constituents of electric currents. They move in the same direction to conduct electricity,” Yao added, comparing the movement of free electrons in metals and semiconductors to the flow of water molecules in a stream of water.

The researchers say that new material – which can be bent into almost any shape without breaking and is one millionth the thickness of a single sheet of paper – could help advance the application of spin electronics or spintronics, a new technology that uses the orientation of an electron's spin rather than its charge to encode data. “Our 2D magnet may enable the formation of ultra-compact spintronic devices to engineer the spins of the electrons,” Chen said.



Sensors on floor of Atlantic ocean to measure earth's 'pulse'

Some 50 highly sensitive seismometers are to be placed on the floor of the Atlantic Ocean in order to record the Earth's 'pulse' and gain a better understanding of the movement of matter deep within its interior.

The seismometers, which detect vibrations due to seismic waves, will be deployed in an array across a region encompassing the Canary Islands and the archipelagos of Azores and Madeira. They will continuously record Earth's ground motions over the course of a year.

The project particularly aims to gain more knowledge about massive “upwellings” of material pushing up from Earth's mantle, which are poorly understood because they can occur far from the boundaries of continental plates and are therefore not covered by plate tectonic theories.

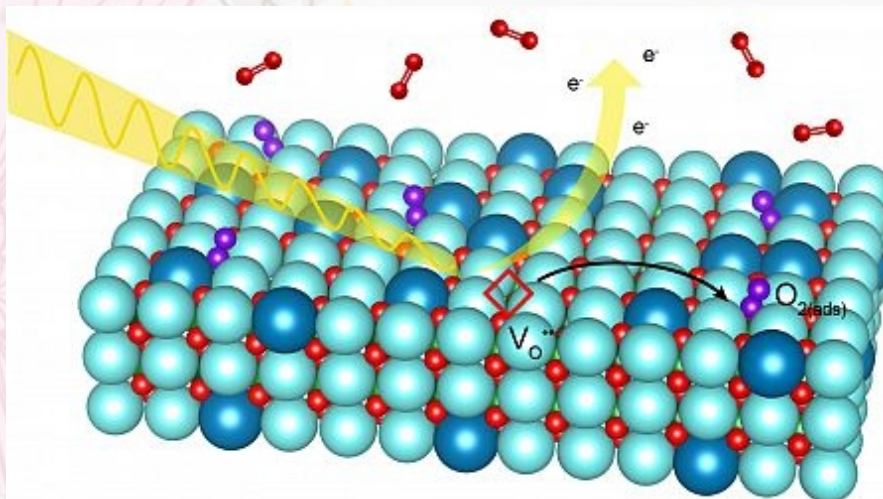
Professor Ana Ferreira of UCL Earth Sciences said: “This is a first of a kind seismic experiment. It is the first time we have covered such a large region of the North Atlantic Ocean with these highly sensitive instruments. By analysing their data, we hope to better understand the massive motions occurring hundreds of kilometres deep in the Earth's mantle – in particular, upward flows of material that we still do not understand very well. These motions are what ultimately cause volcanic eruptions and can also lead to earthquakes.”

The project will use a new seismic imaging method that is able to characterise the structure under the Earth's surface by analysing waves previously used by astrophysicists to study distant galaxies.

Ferreira added: “Our data will also have a tremendous legacy, enabling a wide range of research activity from tracking whales via the sounds they make as they pass close to the seismometers, to monitoring earthquakes and volcanic tremors. The data can also be used to examine interactions between the atmosphere, oceans and solid Earth.”

Over the next five weeks, Ferreira will lead an expedition on the research vessel Mário Ruivo to carefully drop the seismometers to the ocean floor, where they will anchor themselves for a year before being collected.

Last year, Seismologists across Europe looked at the effects of the Covid-19 lockdowns on seismic activity and found a notable drop in ground vibrations.



Microsoft offers cloud-based version of windows as home working ramps up

Microsoft has announced that businesses will soon be able to access its Windows operating system directly from the cloud, potentially allowing them to cut the amount of physical hardware they need to maintain and operate on site. Dubbed Windows 365, the service will allow the full Windows 10 experience, including apps, data and settings, to be accessed directly from Microsoft's Azure cloud. It will secure and store information in the cloud rather than on the device.

Windows 365 will also create a new hybrid personal computing category called Cloud PC, which uses both the power of the cloud and the capabilities of the device it's being used on. "With Windows 365, we're creating a new category: the Cloud PC," said Microsoft CEO Satya Nadella.

"Just like applications were brought to the cloud with SaaS [software as a service], we are now bringing the operating system to the cloud, providing organisations with greater flexibility and a secure way to empower their workforce to be more productive and connected, regardless of location." Microsoft believes the new platform is particularly relevant to the recent shift in working patterns and a broad shift to home working since the start of the Covid-19 pandemic.

At the start of the pandemic last year, hacking activity against corporations in the US and other countries more than doubled as cyber criminals took advantage of weakened security that resulted from home working policies. "Hybrid work has fundamentally changed the role of technology in organisations today," said Jared Spataro, corporate vice president, Microsoft 365.

"Today's announcement of Windows 365 is just the beginning of what will be possible as we blur the lines between the device and the cloud." Windows 365 offers users "instant-on boot" to their personal desktop, as well as allowing IT departments to scale up or down the processing power and storage as required. The service will roll out on 2 August and can be accessed by anyone with access to a web browser compatible with HTML 5, a standard broadly supported by all the major browsers.

Andrew Hewitt, an analyst at Forrester Research, said the move would help Microsoft defend its dominant market share in the face of strong competition from operating systems from Apple and Google that are easier for schools and businesses to manage. Microsoft unveiled Microsoft 11 last month which features a new, centred Start menu, the ability to run Android apps, and various gaming features. It comes nearly six years since the release of Windows 10, which Microsoft originally said would be the last version of the operating system.



Photos in iOS 15 can identify people by their upper bodies

Apple has detailed how it used machine learning advancements to introduce significantly improved people recognition in iOS 15, including in situations when a face isn't clearly visible.

The company lists "improved recognition for individuals" as a new feature in the iOS 15 version of the Photos app, though the web page is sparse on details.

However, a new blog post on Apple's machine learning site reveals that the Photos app can identify people in a variety of scenarios, including if their faces aren't clear to the camera.

One of the methods Apple uses to achieve this is to match faces and upper bodies of specific people in the images, reports Apple Insider.

"Faces are frequently occluded or simply not visible if the subject is looking away from the camera," Apple wrote.

"To solve these cases, we also consider the upper bodies of the people in the image, since they usually show constant characteristics -- like clothing -- within a specific context. These constant characteristics can provide strong cues to identify the person across images captured a few minutes from each other," it added.

The company takes a full image as an input, and then specifically identifies the detected faces and upper bodies.

It then matches the faces to the upper bodies to improve individual recognition in situations where traditional facial recognition would be impossible.

The mechanism uses on-device machine learning to ensure privacy. Apple has also taken steps to ensure that the process minimizes memory and power consumption.

"This latest advancement, available in Photos running in iOS 15 significantly improves person recognition. Using private, on-device machine learning, we can correctly recognize people with extreme poses, accessories, or even occluded faces and use the combination of face and upper body to match the people whose faces are not visible at all," Apple wrote.



A controversial tool calls out thousands of hackable websites

One of the web's most controversial cybersecurity projects is being brought back to life next week. PunkSpider—essentially a tool that crawls the internet to create a searchable database of hackable sites across the web—is being resurfaced at next week's Defcon cybersecurity conference, Wired reports. This is the first time people will be able to use the tool since it went dark in 2015.

In a nutshell, PunkSpider works by automatically scanning sites on the open web and “fuzzing” each one—essentially hacker-speak for feeding data into the code underlying a website to see what vulnerabilities jump out. In this case, PunkSpider will be looking for sites susceptible to some of the more common exploits in a hacker's arsenal, like SQL injections and cross site scripting. Despite the fact that these are considered pretty easy hacks to pull off (and protect against), there are tons of sites across the web that leave themselves wide open.

Back in 2019, for example, HackerOne revealed that the top vulnerability that white-hat hackers were reporting through its bug bounty program was the aforementioned cross-site scripts—essentially exploits that let hackers inject malicious links into otherwise benign (and often neglected) sites. And more recently, we've seen some high-profile sites like the far-right refuge Gab get hit by SQL injections; in Gab's case, the site ended up leaking 70 gigabytes of its user's data as a result.

PunkSpider's original iteration launched ten years ago, the pet project of software dev Alejandro Caceres and his software firm, Hyperion Gray. But pretty soon, Caceres was facing technical—and fiscal—roadblocks that resulted in his tool only scanning the web once a year, before collapsing entirely. Earlier this year though, the Virginia-based tech firm QOMPLX acquired Hyperion Gray and announced it would be rebooting PunkSpider not long after.

The new project will feature a database that users can search using a site's URL or the type of vulnerability they're curious about, along with a Chrome-based browser extension that checks the websites you're visiting for any apparent security flaws. Depending on how riddled with bugs a site might be, PunkSpider will assign a rating to a given site using a “dumpster fire” rating system that rates (as the name suggests) how much of a dumpster fire that site's security actually is.

But with any of these sorts of hacker-friendly search engines—like PunchSpider, Shodan, or Censys—there's always an ethical question that comes with releasing them to the public. On one hand, being tipped off about a site vulnerability might convince that site's operator to get their shit together and close that gap. On the other, having a list of publicly accessible, easily exploitable sites means that anyone, good or bad, is free to poke around.

That means for all the good Caceres's tool might be doing for the cybersecurity community writ large, there's the very real possibility that it will open some of these sites to harmful attacks that they wouldn't otherwise be struck with. At the very least, this is ample motivation for these operators to start taking their security seriously.



Scientists just 'looked' inside mars. here's what they found

NASA's InSight mission has finally peered inside Mars — and discovered that the planet's crust might be made of three layers. This is the first time scientists have directly probed the inside of a planet other than Earth, and will help researchers to unravel how Mars formed and evolved over time.

Before this mission, researchers had measured only the interior structures of Earth and the Moon. “This information was missing, until now, from Mars,” said Brigitte Knapmeyer-Endrun, a seismologist at the University of Cologne in Germany, in a prerecorded talk played at the virtual American Geophysical Union meeting on 15 December. She declined an interview with *Nature*, saying that the work is under consideration for publication in a peer-reviewed journal.

It is a major finding for InSight, which landed on Mars in November 2018 with a goal of working out the planet's internal structure. The InSight lander squats near the Martian equator, on a smooth plain known as Elysium Planitia, and uses an exquisitely sensitive seismometer to listen to geological energy thrumming through the planet. So far, the mission has detected more than 480 'marsquakes', says Bruce Banerdt, the mission's principal investigator and a scientist at the Jet Propulsion Laboratory in Pasadena, California. Mars is less seismically active than Earth, but more so than the Moon.

Just as they do with earthquakes on Earth, seismologists are using marsquakes to map the red planet's interior structure. Seismic energy travels through the ground in two types of waves; by measuring the differences in how those waves move, researchers can calculate where the planet's core, mantle and crust begin and end, and the general make-up of each one. Those fundamental geological layers reveal how the planet cooled and formed billions of years ago at the fiery birth of the Solar System. Now, “we have enough data to start answering some of these big questions”, says Banerdt.

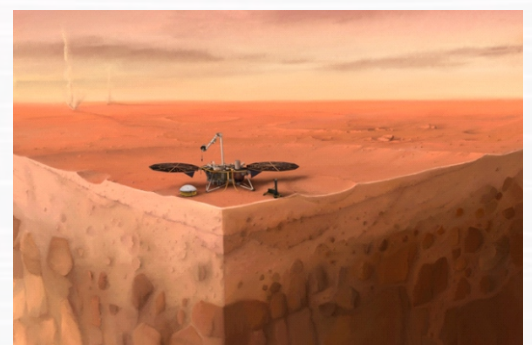
Earth's continental crust is generally divided into sublayers of different types of rock. Researchers had suspected, but didn't know for sure, that the Martian crust was also layered, says Justin Filiberto, a planetary geologist at the Lunar and Planetary Institute in Houston, Texas. Now, InSight's data show that it is made up of either two or three layers.

A three-layered crust would fit best with geochemical models³ and studies of Martian meteorites, says Julia Semprich, a planetary scientist at the Open University in Milton Keynes, UK.

Depending on whether the crust actually has two or three layers, it is either 20 or 37 kilometres thick, Knapmeyer-Endrun said during her talk. That thickness probably varies at different locations around the planet, but is likely to be no greater than 70 kilometres on average, she added. On Earth, the crustal thickness varies from around 5 to 10 kilometres beneath the oceans, to around 40 to 50 kilometres beneath the continents.

In the coming months, InSight scientists plan to report measurements taken even deeper in Mars, says Banerdt — ultimately revealing information about the planet's core and mantle.

Along with listening to marsquakes, InSight's other big scientific goal is to measure heat flow through the Martian ground using a probe dubbed the mole. It was meant to bury itself deep in the soil, but has struggled to do so — at one point even popping out of the ground altogether. The mole has finally managed to get itself several centimetres deep, says Banerdt, and will try digging one final time in the coming weeks before giving up. “We're at what we consider to be the end game now,” he says.



These bendy plastic chips fit in unusual places

Researchers think these flexible semiconductors will be able to monitor your heartbeat or tell you whether your milk has spoiled. Like anyone who designs computer chips for a living, James Myers is, at his core, a silicon guy. Silicon is brilliant, brilliant because it's a natural semiconductor—able to both conduct electricity and act as an insulator, depending on the conditions—and because it can be engineered at small scale. Those attributes have made it the bedrock of virtually every technology we use today.

Why turn back the technological clock? Because modern silicon chips are brittle, inflexible wafers of electronics. Under stress, they crunch. And while silicon is cheap, and getting cheaper, there are some use cases where it may never be cheap enough. Consider a computer chip placed inside a milk carton, replacing a printed expiration date with a sensor that detects chemical signs of spoilage. Useful? Sort of! But it's only worth adding to billions of cartons of milk if the cost is minimal. One application Arm is testing is a chest-mounted chip that monitors a patient for arrhythmia—an inconsistent, lilted heart beat—and is meant to be discarded after a few hours. For that, you want a computer that's cheap but, even more importantly, one that bends. “It needs to move with you and not pop off,” Myers says.

A number of materials could theoretically meet those needs. Researchers have built transistors from organic materials and designed substrates—that's the wafer the transistors go into—out of metal foils and even paper. The chip Myers' team described on Wednesday (21st July) is composed of “thin-film transistors” made from metal oxides—a mix of indium, gallium, and zinc—that can be made thinner than their silicon counterparts. The substrate is polyimide, a kind of plastic, rather than a silicon wafer. It's cheap, thin, and flexible—and also a bit of a pain to engineer. Plastic melts at a lower temperature than silicon, meaning some production techniques involving heat are no longer usable. And the thin transistors may contain imperfections, meaning energy doesn't move around

the circuitry in ways that chipmakers expect. Compared with modern chips, the design also uses a lot more power. These are the same issues that bedeviled chipmakers in the 1970s and '80s, Myers points out. He can now sympathize with his older colleagues.

Compared with the billions found in modern 64-bit silicon processors, 18,000 gates don't sound like much, but Myers speaks of them with pride. Sure, the microprocessor doesn't do much; it just runs some test code he wrote five years ago that makes sure all the components are working. The chip can run the same sort of code as one of Arm's common, silicon-based processors.

Myers says the plan for these small chips is to use wireless charging with technology similar to what's used to pay with a smartphone. But he acknowledges that the chip needs to be more energy-efficient—and he believes it can be, up to a point. The current design can be made smaller, more efficient, perhaps enough to scale to 100,000 gates, he says. But that's likely the limit. The reason is its rather simple design. Transistors come in two flavors, called “n” and “p.” They complement each other. One turns on when a voltage is supplied and off when it isn't; the other type does the opposite. “You really want to have both of them,” Pop says. One reason the Arm chip leaks so much energy is that it has only the n type. P-type transistors are more difficult to engineer using the materials Arm and PragmatIC have chosen.

Which flexible materials ultimately make sense will depend on how a chip needs to be used, Pop explains. Silicon, for example, wasn't always destined to be at the heart of our devices. For a time, scientists thought that would be germanium—an element that's a superior semiconductor to silicon. But it isn't called “Germanium Valley.” Silicon turned out to be easier to obtain and, in some respects, easier to engineer. Cheap, flexible chips are at their own early stage.

Google working on Switch to Android app for users to copy data and apps from iPhone

Google is possibly working on a new app that will make data transfer from an iOS device to an Android smartphone much easier for many. Here is a look at how the new feature would work. Apple recently introduced a new update for its Move to iOS app to enable easy data transfer from an Android to an iOS device. Google might soon return the favour with a new iOS app that will let iPhone users transfer their data to an Android smartphone easily.

Due to be called "Switch to Android," the app is reportedly under development by Google at present. As the name suggests, the app will likely be a data transfer app like any other, only more focused on those switching from iOS to Android.

The speculation for the upcoming app gems from a new APK teardown by 9to5Google. In a recent report, the publication mentions spotting a Google-developed "Switch to Android" app for iOS. The traces of the app were found in a recent update of Android's official "Data Restore Tool" to version 1.0.382048734.

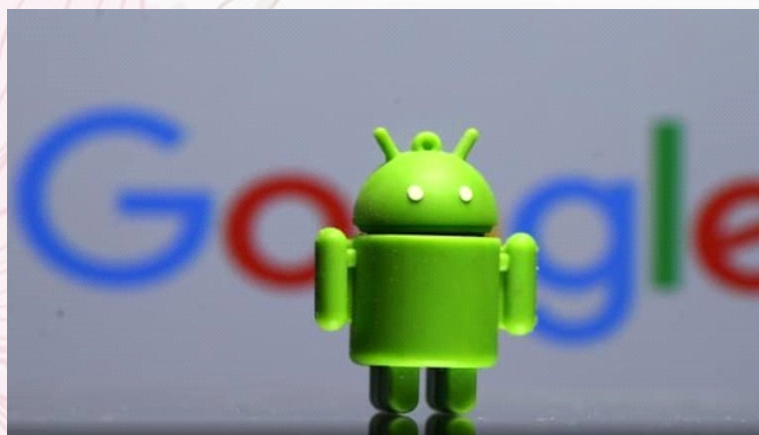
The report mentions that the app is similar to Apple's "Move to iOS" app for Android. The one big change that the update hints at, though, is the ability to transfer apps and related data from iOS to Android.

This feature is currently absent from the prevalent process of switching from an iPhone to an Android device. At present, we can upload or back up all of our files to Google Drive from an iPhone to retrieve them on an Android later and complete the switch. No apps or app data, however, can be transferred this way.

With the "Switch to Android" moniker, the Data Restore Tool's text has been altered at several places to mention the added ability. It now specifically mentions "apps" under the various lists of items that can be transferred from iOS to Android through the new feature.

From what was observed by 9to5Google, the data transfer will take place over a local Wi-Fi network or a hotspot on the Android. The iPhone can be connected to this hotspot to start with the data transfer, much like how apps like WeTransfer, JioSwitch and others work.

The one big problem to be faced when migrating from iOS to Android is that of corresponding apps on their app stores. It is yet unclear how the Switch to Android app will work for this, allowing users to transfer the same apps they had on their iPhones to an Android. It might require a manual input at some point, but as long as the apps are correct and are downloaded on their own, it should be a handy app for many users.



How to protect your remote workers from drive-by cyberattacks

Despite thinking that we have basic security in place, cyberattacks are regular since hackers are always finding new ways to break in with malicious software. A 'drive-by' attack, also known as 'drive-by download', is a cyber social threat that cybercriminals generate to surreptitiously sneak into your organisation's data networks or to unload harmful viruses or malware in your systems. Drive-by attack victims are initially lured into visiting infected websites through hidden links, text messages, emails, and other ways. Once a victim falls for the trap and visits the website, the aforementioned malware is downloaded onto their device, to devastating results.

Problems like these and chances of these attacks happening have increased multi-fold ever since we all started working from home thanks to the Covid-19 induced lockdowns globally. Despite thinking that we have basic security in place, cyberattacks are regular since hackers are always finding new ways to break in with malicious software. The onus lies both on the employer and the employee to remain vigilant.

What are drive-by cyberattacks?

Drive-by attacks, generally, are caused due to the negligence of the employees working in your organisation. Such attacks can be dealt with easily with advanced data security tools.

In today's era of remote working, here's what organisations and their employees can do to prevent or mitigate the impact of such cyber threats:

Block potentially harmful websites

Your employees must be strictly instructed to not visit shady websites or open random 'lottery ticket victory' links received via their emails or text messages. Such links are usually the triggers for drive-by attacks.

Secondly, your organisation must install premium website blockers or antivirus applications on your employee's devices the day they join your organisation. Such tools can keep your workers from visiting shady websites and subsequently falling prey to drive-by attacks. As a result, whether your employees are working in their offices or remotely, they will be protected against such attacks.

Install multi-factor Authentication systems

As we know, IAM (Identity and access management) is a crucial aspect of data security. So, your organisation must use two or three-stage authentication systems to safeguard your cloud databases and operational networks. Tightening log-in controls with contextually aware security systems will be like shutting the digital door on the faces of most cybercriminals.

A data security firewall system is the best solution to deal with such threats as it is designed to continually monitor your organization's data networks for all kinds of cyber threats before handling them (if they appear) in a hassle-free way.

