DIGITAL MINDS

VOLUME-9

Bunts Sangha's
S.M.Shetty Collage of Science, Commerce &
Management Studies
Hiranandani, Powai, Mumbai-76

Department of Information Technology

In

Collaboration with IT association

Presents

"Digital Minds"

Volume – 9 (2020-21)

Coordinator`s Message

Congratulations to the students and faculty associated to magazine committee for successfully publishing the Eighth issue of departmental technical magazine Digital Minds. Digital Minds is creating platform which provides an opportunity to the students and staff to express their original thoughts on technical topics.

The magazine plays an instrumental role in providing exposure to the students to develop written communication skills and command over the language. It is a step towards building professional and ethical attitude in them. The entire journey of creating Digital Minds is an outcome of rigorous effort made by students and faculty. Students not only gain the knowledge about the latest technological developments and advancements through reading and writing articles but they also develop verbal and written communication skills.

This issue has expanded its scope by introducing articles by major stakeholders. Apart from students and faculty, inputs have been collected from alumni, parents and industry experts.

This has been an exciting year for the students, for the teaching staff, and more importantly for the Department of information Technology as a whole. We have undergone many changes to the way we operate and have re-evaluated all our activities and priorities.

It has been a year in which our overarching principle has been to renew our commitment of being a team led by and for its members, to seek the involvement of all, and to provide even more value to the entire college.

In practical terms, this means that we are taking definite steps to address the technical challenges that have evolved in recent years. Although the entire department contributed, and I was privileged to lead the effort, much credit should go to the Teachers members and Students.

In Information Technology you will study and apply your knowledge in understanding what computers are, as how to program them, tools to write a program, the rules when converting the written program understandable by the computers, the interface between the computer and the user, the computer graphics, computer networking, managing the software database, software engineering and testing them efficiently and more.

On concluding note, I would like to thank all the stakeholders for their involvement and encouragement and wish all the best for their bright future.

Dr. Tushar Sambare
Co-ordinator
Department of Information Technology

Principal`s Desk

The Bunts Sangha's S.M.Shetty College believes in all round development of students through holistic education. The Vision of the college, **'Personality Development for Nation Building'** is the guiding principle of all our activities and efforts.

The Innovations and Best Practices implemented in the college are aligned with the Vision and Mission which has given an identity to the college. One such innovative and best practice is **'Sharpening Skills in Teaching and Research.'** In the pursuit of Mission of the college, various co-curricular, extra-curricular activities and extension and outreach programs have been designed and implemented for the benefit of students. A separate Research Cell has been started for students to encourage and develop research bent of mind among them. Each program brings out magazines by motivating students to write articles in them.

"Digital Minds" is a platform where young minds can participate, discuss, explore, analyze and contribute something resourceful in the progressive domain of technology. It is a yearly student's magazine publishing study and research articles on varied aspects of technology.

I wish that our students will come forward to learn, go forth to serve and excel into the world with great strength, not only to do job but to remain beautiful human beings.

Dr. Sridhara Shetty

   Principal

Editor`s desk

In the Pandemic Era the Information and Communication technology to be precise has become a driving force behind the growth of Digital communication. Various technology innovations and applications have been developed to fight the coronavirus pandemic. The pandemic also has implications for the design, development, and use of technologies. The explosive growth in device connectivity is leading us into a new era of ubiquitous communication that is already changing the way we live and work. It has been provided the distinctive e-learning platform.

Nowadays, mobile phones are dethroning the personal computer and computing is evolving faster to become disembodied more like a cloud, becoming accessible more easily whenever needed. Internet has become an integral part of our lives. We appreciate the student's contribution in the magazine "Digital Minds". This magazine comprising of many technological innovative concepts IT and Computer Science field. Technology is evolving rapidly. This magazine gives the platform for the research bent of mind for the students. It gives an immense push up for the students to research in various areas.

"Technology is best when it brings people together."

- **Matt Mullenweg**

Asst. Prof. Sheetal Khanore

Content

SATELLITE CONSTELLATIONS

For nearly half of the population of the world, reliable internet is still hard to come by. There are more than 10,000 customers using Starlink, SpaceX's ambitious project. An interconnected network of thousands of satellites, providing high speed broadband Internet across the globe. Starlink is still in beta and currently serve selected customers in the northern US, Canada, The UK, Germany and New Zealand, experts estimate there are around 70 million household worldwide that are good candidates for satellite-based consumer broadband and have the capacity to pay. Amid a global pandemic that's kept employees from going to offices and children from schools, the need for universal broadband has become undeniable. If the service expands to its intended global customer base, Starlink could be key to SpaceX's success. It would be fair to say that the majority of SpaceX's valuation today is tied to the Starlink business model. Generally speaking, the global launch industry is about a $5 billion a year industry. SpaceX in previous discussions has talked about a $30 billion a year opportunity in the Starlink business.

The basis of Starlink's Internet service involves 3 components: a satellite dish, ground stations and the satellites themselves. The service is meant for customers who live in a sparsely populated area that's not being served by traditional Internet companies. Given the high cost of laying cable or fibre which can be as much as $20,000 per Kilometre, terrestrial service providers tend to focus on urban and suburban areas with high density. It simply does not make economic sense to reach out consumers in low density areas. So far SpaceX has launched over 1,385 satellites in orbit, but the company plans to deploy 4,425

SATELLITE CONSTELLATIONS

Satellites by 2024. By the time SpaceX is done building its global Starlink satellite system known as a constellation, the company will have about 12,000 satellites in the orbit. And not yet approved by the FCC, SpaceX has requested permission to launch an additional 30,000 satellites which would bring their total to 42,000. Unlike traditional Internet satellite which are as big as a school bus in orbit at around 36,000 kilometres above Earth's surface, Starlink satellites are much smaller and closer at about 550 kilometres above Earth's surface, but the satellite's closer placement means they can see less of the Earth at any given point in time, which is why SpaceX need so many.

On the flipside, SpaceX claims that this closer orbit allows the system to have a lower signal delay, known as latency. In a filing to the FCC, SpaceX added that Starlink's aims to exceed speed of 100 megabits per second for downloads and 20 megabits per second for uploads. To do this the company is developing technology known as Intersatellite links. It has an optical sensor which is effectively a laser that points from one satellite then connects to another optical sensor on another satellite creating a grid that can drastically increase the speed because it is now moving signal from one satellite to the other at the speed of light. Another benefit is reducing the amount of infrastructure needed, given Starlink's current architecture it is estimated that they will need more than 100 ground stations in the US. However, if they move to the laser communications on the satellites, they can greatly reduce the number of ground stations needed as well as the complexity of the overall system on a global basis.

Starlink is initially targeting the consumer market but there's a lot of room for the service to expand. The intended markets for Starlink for government subsidies. In Canada, the government of Quebec has invested $400 million in Telesat. In China, satellite maker Comsat received a massive Government investment as part of the country's new infrastructure drive. The US too is betting big, last year the FCC awarded Starlink $900 million in subsidies to bring Internet to rural areas and in late March, President Biden said that his administration with spend 100 billion dollars to expand broadband access to Americans as part of its $2 trillion infrastructure plan. SpaceX is also in talks with the UK where Starlink could earn funding as part of the country's $6.9 billion Internet infrastructure program.Starlink's potential is huge, provided the project can overcome some major hurdles. One of the challenges of building out a new satellite network is that all the capital expenditure needs to go upfront before the very first customer can be signed up. It is estimated that it would cost upwards of $10 billion to get Starlink running in an operational capacity. Starlink is still early on in development, so it's not perfect. SpaceX makes this clear on its website saying that there may be periods when customers experience no connectivity, but service will improve as the company launches more satellites. However, having thousands of new

satellites orbiting the Earth comes with its own set of problems. Initial launch of SpaceX's Starlink satellites in May of 2019 took astronomers by surprise. The satellites were very bright especially as they are raising up to final orbit. This brought up a significant issue, because they were so bright and there was increasingly more and more of them covering different parts of the sky. Astronomers started seeing them popping up and ruining different imagery and causing all sorts of distortio

CTIO/NOIRLab/NSF/AURA/DECam DELVE Survey
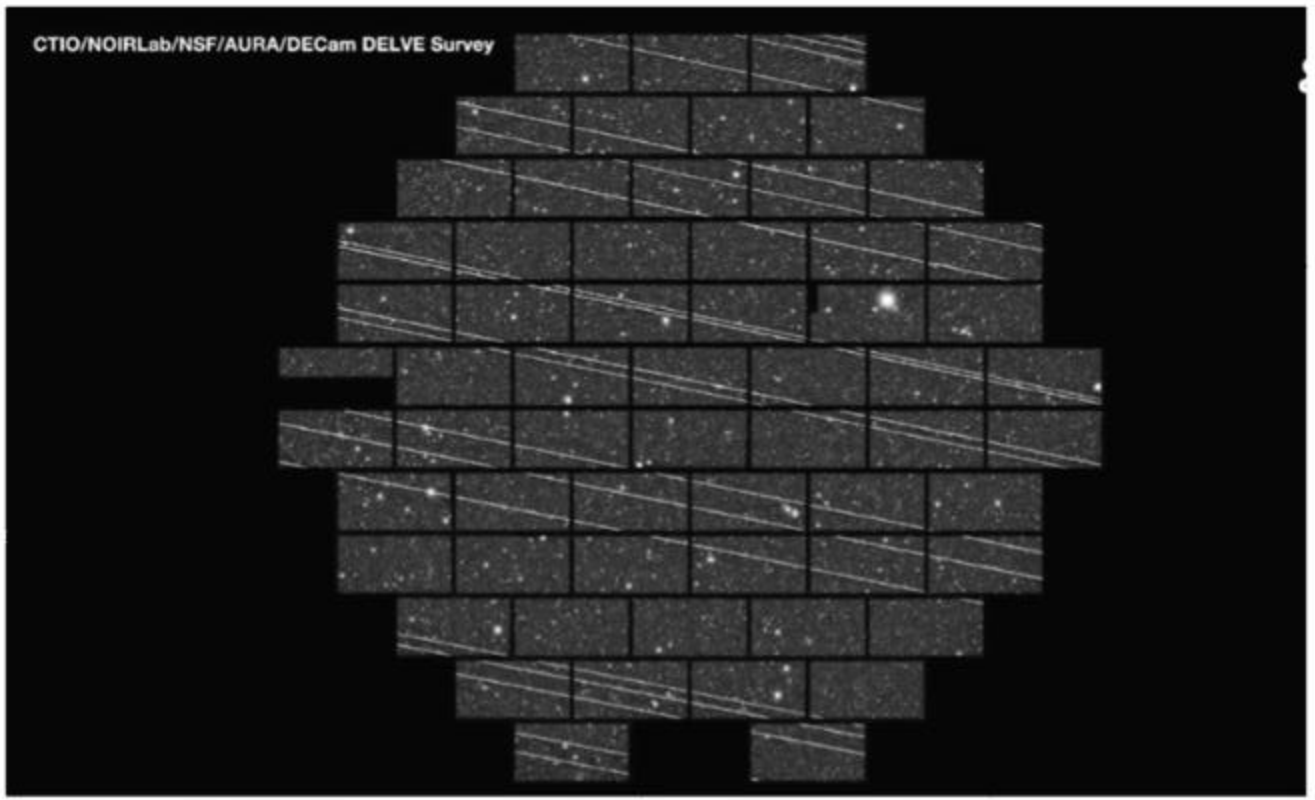
The telescope meant to see images of distance stars and galaxies instead captures the light trails of 19 Starlink's satellites.

When the American Astronomical Society (AAS), NOIRLab and others contacted SpaceX, they tried to paint them in a dark material, but the problem was they were still too bright, and they also got pretty hot. So, they instead came up with what are known as sun visors which helps keep the reflectivity of the solar panels from creating a lot of light. They also changed the orientation of the satellites themselves, so instead the whole panel catching the sunlight and reflecting down to Earth it was just only a piece of it. The huge concentration of satellites also worries radio astronomers who say that the interference from radio frequencies of Internet satellites could hinder the ability of their instruments to look for organic and water molecules in space. Then there's a problem of congestion, since Russia first launched Sputnik in 1957, Over 10,600 objects has been sent into outer space. If SpaceX were to launch all the satellites that it has requested, the company would be responsible for almost 4-fold increase in the number of spacecrafts launched by all of humanity, with the lifetime of Starlink's satellites only being around 5 years, experts are also worried about space debris. SpaceX has said that it plans to deorbit satellites that are nearing the end of their life by pushing them back into Earth's atmosphere where they will burn up during re-entry.

SATELLITE CONSTELLATIONS

SpaceX is currently the leader in low Earth orbit satellite Internet, but competition is heating up. Amazon has said that it will invest over 10 billion dollars in its satellite Internet network known as Project Kuiper. UK satellite maker OneWeb recently launched another 36 satellites in orbit, bringing its total number to 146. The company says it expects to begin limited service by the end of the year, unlike SpaceX, its service is geared towards enterprise customers. Finally, Canadian satellite company, Telesat has said that it will begin Commercial Services for its satellite Internet in the second half of 2023. If SpaceX is successful, it plans to put Starlink satellites around Earth orbit and in orbit around Mars, which will allow humanity to have this expansive not just global satellite system but multi-planetary satellite system.

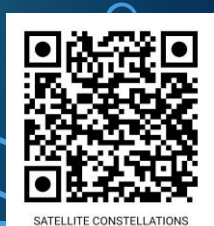## Sources:

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UN Office for Outer Space Affairs

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SATELLITE CONSTELLATIONS

APPLES LIDAR TECHNOLOGY

What is LiDAR?

A **Light detection and ranging** scanner/sensor determines the distance between itself and the object by monitoring how long it pulse of light to bounce back. Its like radar but instead of radio waves it sends infrared lights.

One of the main uses of LiDAR is to take the Data captured and then make 3D models, which further helps in construction and engineering projects. There are three primary components of a LiDAR device—the scanner, laser, GPS receiver. Other elements that play a very important role in the data collection and analysis are the photodetector and optics.
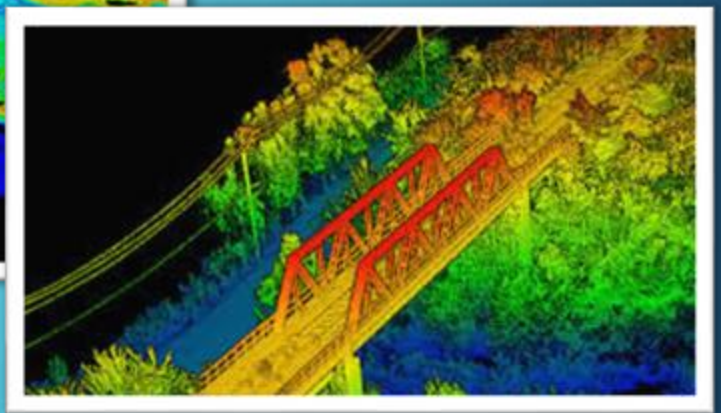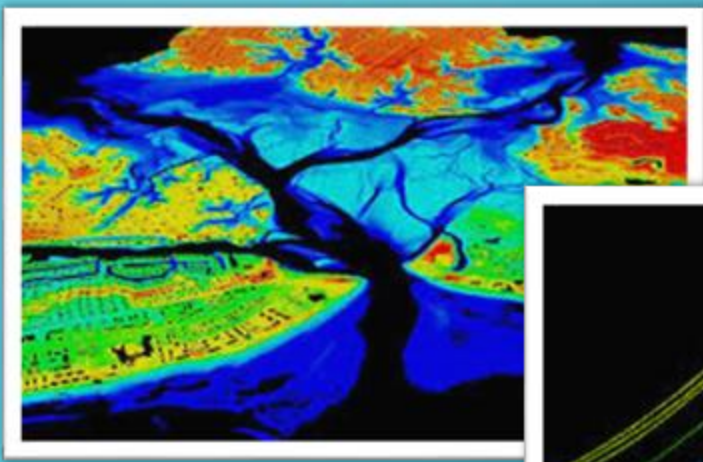
Apple's promise

At the unveiling of the iPhone 12, Apple showed the capabilities of its new lidar sensor. Apple says lidar will enhance the iPhone's camera by allowing more rapid focus, especially in low-light situations. And it may enable the creation of a new generation of sophisticated augmented reality apps.

LIDAR

A new platform and opportunity app developers:

Releasing LiDAR technology to the iPad makes this technology more accessible than ever for the consumer. With the launch of the iPad on march last year a concern arose among consumers that they won't be able to experience the LiDAR to its full capacity. Apple has long been anticipating the push of AR. This push became particularly evident in 2017 when they released the AR Kit, a package developed by Apple to help encourage and aid developers in integrating AR into their apps. Apple has since released AR Kit 2 and 3 with better resources.

How the iPhone uses LiDAR:

Apple uses this technology a bit differently than a speed gun or a construction site. The LiDAR scanner in the iPhone and iPad has an effective range of around 16 feet.

The primary purpose of LiDAR in the iPhone is to improve augmented reality (AR) implementation. It will give apps more useful and accurate information about their surroundings, for smoother and more reliable AR.

In reality, LiDAR scanners are likely to improve on two main things: virtual object placement like shopping apps and AR gaming. These are already available on the non-LiDAR iPhones, but it adds an extra layer of accuracy to things like dimensions and the precise distance to an object in a room.

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LIDAR

QUANTUM SUPREMACY

Google **Has provided the first clear proof of a quantum computer outperforming a classical one.**

Quantum computers store and process data in a way completely differently from the ones we're all used to. In theory, they could tackle certain classes of problems that even the most powerful classical supercomputer imaginable would take millennia to solve, like breaking today's cryptographic codes or simulating the precise behaviour of molecules to help discover new drugs and materials.

There have been working quantum computers for several years, but it's only under certain conditions that they outperform classical ones, and in October Google claimed the first such demonstration of "quantum supremacy." A computer with 53 qubits—the basic unit of computation—did a calculation in a little over three minutes that, by Google's reckoning, would have taken the world's biggest supercomputer 10,000 years, or 1.5 billion times as long. IBM challenged Google's claim, saying the speedup would be a thousandfold at best; even so, it was a milestone, and each additional qubit will make the computer twice as fast.

QUANTUM SUPERMACY
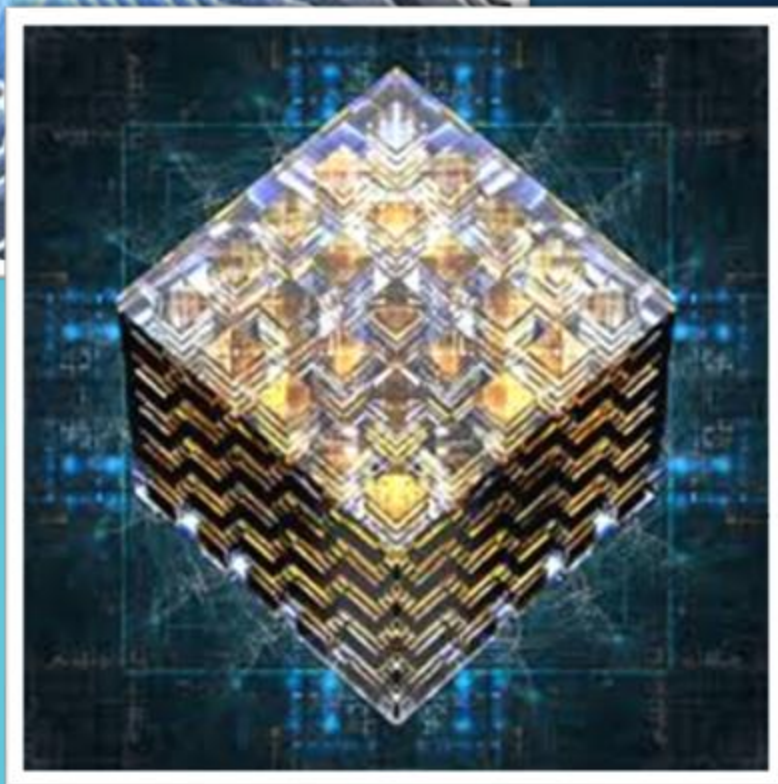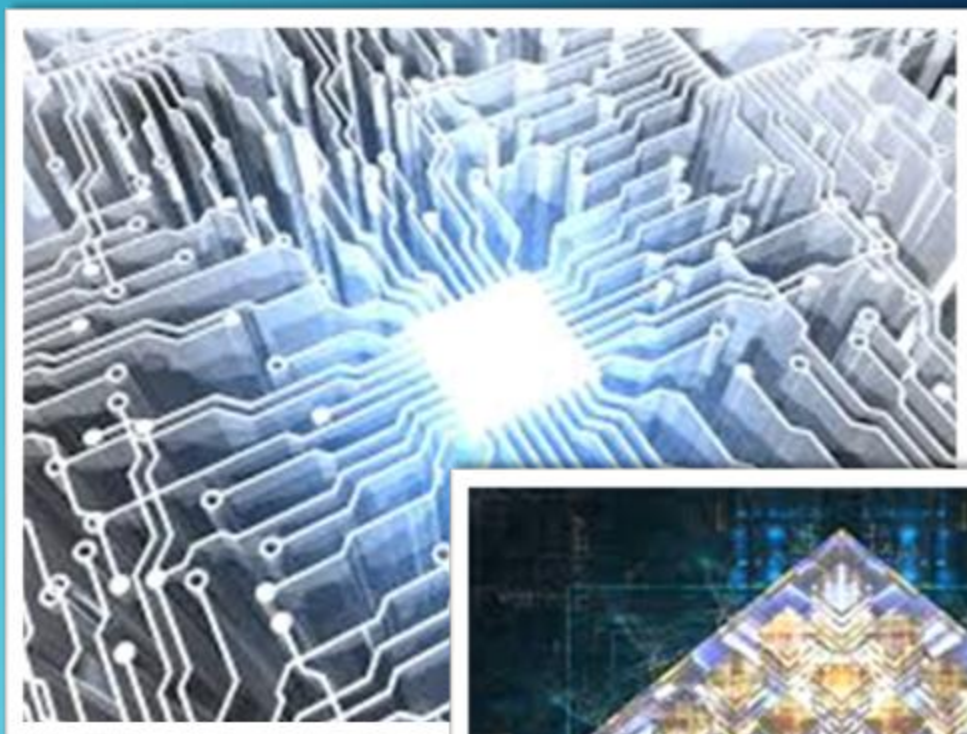
However, Google's demo was strictly a proof of concept—the equivalent of doing random sums on a calculator and showing that the answers are right. The goal now is to build machines with enough qubits to solve useful problems. This is a formidable challenge: the more qubits you have, the harder it is to maintain their delicate quantum state. Google's engineers believe the approach they're using can get them to somewhere between 100 and 1,000 qubits, which may be enough to do something useful—but nobody is quite sure what.

And beyond that? Machines that can crack today's cryptography will require millions of qubits; it will probably take decades to get there. But one that can model molecules should be easier to build.

Resource: https://www.technologyreview.com/10-breakthrough-technologies/2020/#quantum-supremacy

As the famous quote says 'If you can't win the game, change the rules'. Quantum Supremacy changes every fundamental rule of the computational game.

BEULAH SUNDAR
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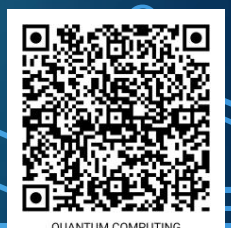
QUANTUM COMPUTING

Quantam Computers perform calculations base d on the probability of an object's state before it is measured – instead of just 1s or 0s – which means they have the potential to process extially more data compared to classical computers. In quantum computing, operations instead use the quantum state of an object to produce what's known as a qubit. These states are the undefined properties of an object before they've been detected, such as the spin of an electron or the polarisation of a photon.

In this article, we are going to talk about some of the top quantum Computing applications in real world – Artificial Intelligence & Machine Learning Computational Chemistry.Drug Design & Development. .Cybersecurity & Cryptography. Financial Modelling.Logistics Optimisation. Weather Forecasting.

There are three types of quantum computers that are considered to be possible by IBM.

1)   Quantum Annealer is the easiest to build and also the weakest. Today's classical computer can outperform this kind of quantum computer for everyday tasks like email, video creation, gaming, etc. However, the Quantum Annealer is superior in the ability to factor very large numbers (breaking encryption) and to solve optimization problems (like analyzing route data for mapping applications). D-Wave Systems was one of the first companies to announce a commercially available quantum computer and utilizes Quantum Annealing for it's core processing.

2)   Analog Quantum Computer or the Analog Quantum computer is where the mainstream is heading now and largely because a Analog Quantum Computer is far faster than today's traditional computers and has incredible computational benefits. This form of quantum computer is more difficult to manufacture, but it holds great promise for solving massive problems in

Quantum chemistry, material science, quantum dynamics, sampling, and optimization problems. The Analog Quantum computer can be used to break current encryption standard using encryption breaking algorithms, like SHOR's or Grover's.

3 Universal Quantum Computer is the most complex to build but is the most powerful. It will have more than 100,000 qubits and require massive amounts of energy to operate. Universal Quantum Computers can be used for secure computing, machine learning, quantum dynamics, optimization problems, material science, quantum chemistry. It can break encryption even faster than any other form of quantum computer.

Quantum computing is the exploitation of collective properties of quantum states, such as superposition and entanglement, to perform computation. The devices that perform quantum computations are known as quantum computers.

Sources from where you can know more about Quantum Computing:

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3) https://www.technologyreview.com/2019/01/29/66141/what-is-quantum-computing/

FATHER OF QUANTUM COMPUTING – David Deutsch

VRUSHALI LALE
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QUANTUM COMPUTING

THE INTERNET AND IT'S UNKNOWN

Every now and then we speak about the internet, the internet itself being vast has quite a lot of things under it's roof but in today's world we mostly speak about how accessible the internet is, we all know dark web but do we really know what is Dark web, what all it contains and how it works??

To understand all this we first need to understand the levels of internet

There are 7 levels of the internet namely :-

1. Clearnet

2. Surface Web.

3. Bergie Web

4. Deep Web

5. Darknet

6. Private Web

7. Marianas Web.

The levels 0 through 2 are common webpages, 3 is a bit darker and you need a proxy, 4 you need TOR browser, and 5 you have to figure out what is Polymeric Falcighol Derivation.

Level 6 is an in-between level.

Level 7 and 8 is where everything lies!! The Holy Grail of the Mighty Internet!
Did you know that only 0.004% is accessible to the public. Yes that's 0.004%. This 0.004% of the internet is accessible to the public in the form of over 4.5 billion indexed websites. Which means that 99.996% of the internet is inaccessible without permissions and passwords and is not indexed by standard search engines. This 99.996% of data is called the deep web.

INTERNET
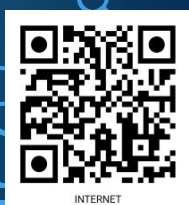
Estimates based on extrapolations from a study done at University of California, Berkeley in 2001, speculate that the deep Web consists of about 7,500 terabytes. More accurate estimates are available for the number of resources in the deep Web: He detected around 300,000 deep web sites in the entire Web in 2004, and, according to Shestakov, around 14,000 deep web sites existed in the Russian part of the Web in 2006.

So we all know what dark web is! The name says it all, but there are different levels in dark web as well, many legal and illegal activities are held, they say that the darkness web is legal but it's activities aren't .

The deepest level of internet also known as Mariana's web named after the world's deepest trench Mariana Trench.

Mariana web/Invisible Web is said to be the ruler of internet. It works on Quantum Computers/ Computing.

What is Quantum Computer?

A quantum computer harnesses some of the almost-mystical phenomena of quantum mechanics to deliver huge leaps forward in processing power.

Today's computers use bits—a stream of electrical or optical pulses representing 1s or 0s. Quantum computers, on the other hand, use qubits, which are typically subatomic particles such as electrons or photons. Generating and managing qubits is a scientific and engineering challenge.

Qubits can represent numerous possible combinations of 1 and 0 at the same time. This ability to simultaneously be in multiple states is called superposition. To put qubits into superposition, researchers manipulate them using precision lasers or microwave beams.

Researchers can generate pairs of qubits that are "entangled," which means the two members of a pair exist in a single quantum state. Changing the state of one of the qubits will instantaneously change the state of the other one in a predictable way.

INTERNET

Although quantum computing is still in its infancy, experiments have been carried out in which quantum computational operations were executed on a very small number of qubits (quantum bits).Both practical and theoretical research continues, and many n seeational government and military funding agencies support quantum computing research to develop quantum computers for both civilian and national security purposes, such as cryptanalysis.

In plain sense to access this level we need a quantum computer. Contents in this level range from various things to different things as heavily illegal contents, to numerous research plans and blue prints. Information of human experiment successes by Nazi scientist during World War II and work of Josef Mengele a Nazi scientist who conducted different human experiments at that time, research paper and documents of these experiments can be found in this level. Basically many different legally banned stuff can be found!

But who is behind this Circus Play ??

The internet is governed by a system known as the Primarch System. The Primarch system is what controls the Internet. No government or organization has control of it. Nobody even knows what it is. The system is an anomaly discovered in the 2000's. It is unresponsive, but sends out unalterable commands to the entire net, randomly.

But will Deep Web be accessible easily to the public like the surface web in the future of the IT Field?

Will all of us really understand what is the Primarch System and how it functions or can we even contact it?

YOHAN DSOUZA
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MEDIATEK DIMENSITY 1200 SOC LAUNCHED IN INDIA

MediaTek has finally launched its flagship, 5g-ready Dimensity 1200 chipset in India. The announcement was made at the 8th MediaTek Technology Diaries virtual event where the company not only made the chipset official for the country but also gave Realme India's CEO, Madhav Sheth, the stage to confirm that the company will be the first to launch a MediaTek Dimensity 1200 chipset phone in India.

Talking about the launch of the MediaTek Dimensity 1200, Managing Director, MediaTek India, Anku Jain, said, "MediaTek Dimensity 1200 reiterates our focus on 5G and commitment to deliver compelling technologies. It will enable our OEMs to build competitive products that enable premium and incredible experiences. The SoC will mark a new beginning for the smartphone segment in India with its flagship features that blend the best of all worlds – be it processor technology, camera, AI features, gaming or connectivity enhancements. With flagship 5G chipset technology, MediaTek Dimensity 1200 SoC will take user experience to the next level be in terms of AI, camera, processor speed, gaming capabilities and much more. We expect more OEMs to launch MediaTek Dimensity 1200 powered smartphones in the near future".

MEDIATEK DIMENSITY 1200: WHAT'S IT ALL ABOUT?

The MediaTek Dimensity 1200 SoC is a 6nm chip that features an octa-core CPU. At the heart of the chip is a prime Cortex-A78 core clocked at 3.0GHz and three Cortex-A78 performance cores running at 2.6GHz and four power-efficient Cortex-A55 cores clocked at 2.0GHz. MediaTek claims that the processor is 22% faster and 25% more power-efficient than previous generation processors. This is supported by Mali-G77 GPU and up to 16GB LPDDR4x memory.

MEDIATEK DIMENSITY

The new MediaTek chipset also promises improved performance with support for MediaTek HyperEngine 3.0 gaming technology. It also promises to enhance the smartphone gaming experience with improved wireless audio and Ray Traced graphics capabilities.

The MediaTek Dimensity 1200 supports up to a 200MP camera or two cameras of 32MP and 16MP respectively with features like 4K UHD HDR video recording and five-core HDR-ISP. The Dimensity 1200 supports Full HD+ displays at up to 168Hz refresh rate while the Dimensity 1100 supports 144Hz refresh rate display.

This chipset was launched earlier this year in January and is currently the flagship offering from MediaTek. It is a powerful 5G SoC that offers up to 22 percent faster CPU performance and is 25 percent more efficient when compared to the previous-gen chipsets. It is built on a 6nm process and has a clock speed of 3GHz while being coupled with an ARM Mali-G77 MC9 GPU and a six-core MediaTek APU 3.0. Thanks to the new APU, the chipset delivers almost 13 percent better performance in AI features, fast refresh rates, game enhancements, and others.

ADARSH GUPTA
S. Y. B. Sc. IT

MEDIATEK DIMENSITY
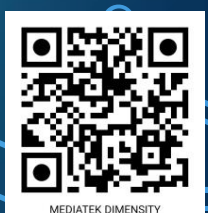
BIMOZ – WORLD'S LIGHTEST AND SMARTEST E-BIKE DRIVE

A electric bicycle, also known as an e-bike or ebike, is a bicycle with an integrated electric motor used to assist propulsion. Many kinds of e-bikes are available worldwide, but they generally fall into two broad categories: bikes that assist the rider's pedal-power (i.e. Pedelecs) and bikes that add a throttle, integrating moped-style functionality. Both retain the ability to be pedaled by the rider and are therefore not electric motorcycles.

E-bikes use rechargeable batteries and typically travel up to 25 to 32 km/h (16 to 20 mph). High-powered varieties can often travel more than 45 km/h (28 mph). In some markets, such as Germany as of 2013, they are gaining in popularity and taking some market share away from conventional bicycles,[2] while in others, such as China as of 2010, they are replacing fossil fuel-powered mopeds and small motorcycles.

E-BIKE

E-bikes function like hybrid electric vehicles since the electric motor combines battery propulsion with another source of electricity but this time by pedal power instead of internal combustion engine power so in some cases the terms used would be hybrid electric bicycle or hybrid pedal-electric bicycle

Depending on local laws, many e-bikes (e.g., pedelecs) are legally classified as bicycles rather than mopeds or motorcycles. This exempts them from the more stringent laws regarding the certification and operation of more powerful two-wheelers which are often classed as electric motorcycles. E-bikes can also be defined separately and treated under distinct Electric bicycle laws.

E-bikes are the electric motor-powered versions of motorized bicycles, which have been in use since the late 19th century.

• Bimoz say other selling points are:

High performance, sub-2 kg 250W motor (with standard battery)
Direct drive technology without motor gears
It can become your personal trainer. Using the bimoz app you can 'cycle up mountains', even on the flat, as pedal resistance can be programmed into the unit.

1: ELECTRIC WHEELS

SUPERPEDESTRIAN
An all-in-one rear wheel, nice design, natural feel and handling, but heavy, hard to install, requires tools, skills, time.

GEOORBITAL
An all-in-one front wheel, easier to install, but less natural feel, handling is changed. Might be dangerous - if for some reason the wheel stops spinning, the rider may flip over.

2. MID DRIVES

BAFANG, BIMOZ, BOSCH, SHIMANO, ETC
Very powerful and suitable even for mountain bikes, but really hard to install, require good set of skills and time. Some of them (like Bosch and Shimano) require a bicycle frame specifically built to accommodate the drive and not suitable for retrofits.

3: FRICTION DRIVE DEVICES

RUBBEE, ADD-E, ETC
Rubbee is removable, both are relatively easy to install, even though still require some tools and skills, but they wear out the tire and are very easy to lose the friction of the wheel.

4. CONVERSION KITS

A bunch of parts, cumbersome to install, heavy.

AYUSH GUPTA
F. Y. B. Sc. IT

E-BIKE

DIGITAL MONEY

The rise of digital currency has massive ramifications for financial privacy.

- **Why it matters**

As the use of physical cash declines, so does the freedom to transact without an intermediary. Meanwhile, digital currency technology could be used to splinter the global financial system.

- **Key players**

People's Bank of China, Facebook

- **Availability**

This year

Last June Facebook unveiled a "global digital currency" called Libra. The idea triggered a backlash and Libra may never launch, at least not in the way it was originally envisioned. But it's still made a difference: just days after Facebook's announcement, an official from the People's Bank of China implied that it would speed the development of its own digital currency in response. Now China is poised to become the first major economy to issue a digital version of its money, which it intends as a replacement for physical cash.

China's leaders apparently see Libra, meant to be backed by a reserve that will be mostly US dollars, as a threat: it could reinforce America's disproportionate power over the global financial system, which stems from the dollar's role as the world's de facto reserve currency. Some suspect China intends to promote its digital renminbi internationally.

Now Facebook's Libra pitch has become geopolitical. In October, CEO Mark Zuckerberg promised Congress that Libra "will extend America's financial leadership as well as our democratic values and oversight around the world." The digital money wars have begun

Digital money is a currency that exists purely in digital form. It is not a tangible asset like cash or other commodities like gold or oil. Digital Money can include cryptocurrencies, but it is not limited to them. Most of the digital money owned in the world is owned by banking institutions.

KEY TAKEAWAYS

Digital money is a currency that exists purely in digital form. It is not a tangible asset like cash or other commodities like gold or oil.

Digital money can include cryptocurrencies, but it is not limited to them. Most of the digital money owned in the world is owned by banking institutions.

Banks have been able to keep their cost-of-business lower thanks to digital money since they do not need to pay rent on as many physical locations or keep paying for retail employees they don't need.

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DIGITAL CURRENCY

INTELLIGENT APPS

What are Intelligent Apps?

Intelligent Apps are the application which gets constant and authentic information from client connections and different sources so as to give proposals and make expectations. It offers customized and versatile client encounters; information investigation and AI are the centre parts of smart applications. After secure, the clients' needs, these applications convey logical and pertinent data just as assess the clients about up and coming issues before they emerge. With the help of a high level of prescient investigation, intelligent applications foreshadow the clients' conduct to make data accessible without any problem.

Artificial Intelligence is utilized in building up an astute application that is greatly modern by having calculations; it computerizes how much errands to be performed. There are a few B2C organizations would embrace and execute keen applications by having expanding energetic willingness, yet its versatility and development are normal in B2B situations. Highlights incorporate –

IA take a shot at a huge measure of information; it can peruse and store an immense range of human interactions. It joins forms with tangible data sources and fuelled by IOT which may come up with important bits of knowledge.

Another fascination for which huge partnerships and new businesses go for intelligent applications is versatility. It gives more significant yields on speculation. Subsequently, the feeling of smoothly intrinsic the conduct which permits applications to adjust things to new requests, inferable from its supported learning way.

A really intelligent application can deliver results just by understanding motions, movements and speech inputs. It likewise permits clients to get rid of the need to utilize the business key.
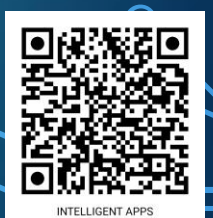
INTELLIGENT APPS AT WORK

Those days have gone when workers were delighted with basic portable empowered access to key business applications and information. The present computerized locals request substantially more than this, they foresee clever client experience and exceptionally useable as offered by buyer applications. Furthermore, insightful applications guarantee to give the equivalent. Also, IA helps representatives to achieve their work in an alternate way, for example, -

By offering exceptionally customized and setting delicate data, insightful applications empower laborers' to rapidly channel and streamline profoundly appropriate data based on their requirements. It encourages the dynamic procedure.

For the versatile workforce, intelligent applications can give the perfect data to do their present place of employment in a powerful way.

It automates complex issues by means of preparing them into regular language, IA adds to upgrading yield, help up reaction time.

In future close by, enterprises will keep on utilizing their legacy devices or frameworks to discover to use IA to broaden their business activities or procedures. For example — basic applications for example messages couldn't leave totally; right now, can create intelligent applications with the component to alarm representatives about messages who encourages fast activities. The general goal of intelligent applications is to work in congruity with surviving instruments and render more focused on and customized data; it drives representatives' will have the option to expand quality and yield in their activity.

Since past decades, administrators are focusing to sanction their computerized data activities and for this reason, they have to add intelligent applications to their outline. The rise of new IA guarantees new development zones, continuous securing, inward and outer information sources, putting the best innovation to utilize, handling and examination.

All things considered, it may sound insane, however the intelligent applications can and do communicate for our sake. These applications use huge amounts of calculations to anticipate whom we need to speak with and dependent on your previous reactions and responses, these Applications are competent to distinguish what you may answer or impart to a specific message that has been gotten. These reactions are too genuine that the one the smart applications are speaking with won't understand that s/he is conversing with an application and not you.

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INTELLIGENT APPS

TECHNOLOGY OF 3D PRINTER

3D printing, also known as additive manufacturing (AM), refers to various processes used to synthesize a three-dimensional object.[1]In 3D printing, successive layers of material are formed under computer control to create an object.[2] These objects can be of almost any shape or geometry, and are produced from a 3D model or other electronic data source. A 3D printer is a type of industrial robot.

Futurologists such as Jeremy Rifkin [3] believe that 3D printing signals the beginning of a third industrial revolution,[4] succeeding theproduction line assembly that dominated manufacturing starting in the late 19th century. Using the power of the Internet, it may eventually be possible to send a blueprint of any product to any place in the world to be replicated by a 3D printer with "elemental inks" capable of being combined into any material substance of any desired form.

3D printing in the term's original sense refers to processes that sequentially deposit material onto a powder bed with inkjet printer heads. More recently, the meaning of the term has expanded to encompass a wider variety of techniques such as extrusion and sintering-based processes. Technical standards generally use the term additive manufacturing for this broader sense.

By the early 2010s, the terms 3D printing and additive manufacturing developed senses in which they were synonymous umbrella terms for all AM technologies. Although this was a departure from their earlier technically narrower senses, it reflects the simple fact that the technologies all share the common theme of sequential-layer material addition/joining throughout a 3D work envelope under automated control. (Other terms that have appeared, which are usually used as AM synonyms (although sometimes ashypernyms), have been desktop manufacturing, rapid manufacturing [as the logical production-level successor to rapid prototyping], and on-demand manufacturing [which echoes on-demand printing in the 2D sense of printing].) The 2010s were the first decade in which metal parts such as engine brackets[15] and large nuts[16] would be grown (either before or instead of machining) in job production rather than obligately being machined from bar stock or plate.
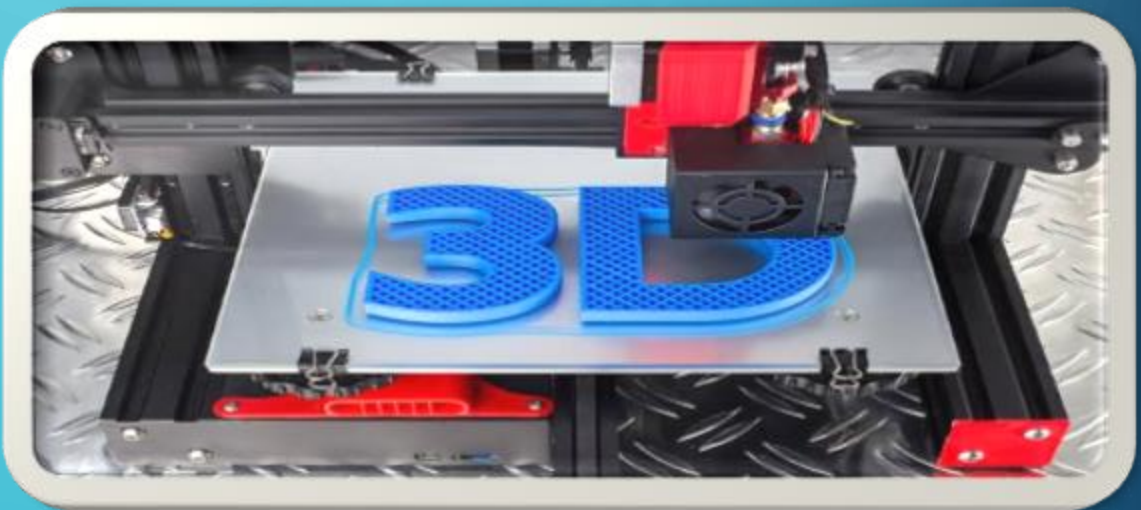
3D PRINTING

3D printable models may be created with a computer aided design (CAD) package, via a 3D scanner or by a plain digital camera and photogrammetry software. 3D printed models created with CAD results in reduced errors and can be corrected before printing, allowing verification in the design of the object before it is printed.

The manual modeling process of preparing geometric data for 3D computer graphics is similar to plastic arts such as sculpting. 3D scanning is a process of collecting digital data on the shape and appearance of a real object, creating a digital model based on i

A large number of additive processes are now available. The main differences between processes are in the way layers are deposited to create parts and in the materials that are used. Some methods melt or soften the material to produce the layers, for example. Selective laser melting (SLM) or direct metal laser sintering (DMLS), selective laser sintering(SLS), fused deposition modeling (FDM),[25] or fused filament fabrication (FFF), while others cure liquid materials using different sophisticated technologies, such asstereolithography (SLA). With laminated object manufacturing (LOM), thin layers are cut to shape and joined together (e.g., paper, polymer, metal). Each method has its own advantages and drawbacks, which is why some companies offer a choice of powder and polymer for the material used to build the object.[26] Others sometimes use standard, off-the-shelf business paper as the build material to produce a durable prototype. The main considerations in choosing a machine are generally speed, costs of the 3D printer, of the printed prototype, choice and cost of the materials, and color capabilities.

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3D PRINTING

EFFECT OF INFORMATION TECHNOLOGY IN
OUR DAILY LIFE ACTIVITIES

History has witnessed that humanity went through several revolutions. The latest one is the revolution of information and communication technology. This revolution caused a rupture between everything that is old; what is considered new today is quickly turned into an old and obsolete trend tomorrow. Because of these evolutions, the demand for this technology has increased. Therefore, the latter has become the most important used resource compared to classical resources, which has led to the amplification of interest in new information and communication technologies by both companies and individuals.

At present, the world is witnessing a rapid evolution process in the need for information facilities in terms of quantity, quality and access to information, in order to make the best decision based on the different changes and dynamics of the enterprises environment. This demonstrates clearly the growing importance of information systems and their ability to satisfy the needs of enterprises information. This emphasizes the importance to develop these systems and to increase their effectiveness and efficiency. One of the key elements of the success of these systems is that they have become dependent on sophisticated technology that have greatly facilitated access to information and clearly reduced access costs.

The telecommunications sector has undergone a decisive transformation in a short period thanks to the technological developments that underpin it. It has become the infrastructure of what is known today as the knowledge economy which depends on the information and its delivery methods in the shortest time and at the lowest costs possible. Due to the tremendous development witnessed by this sector and to the extent it has contributed in all sectors, especially in light of the use of satellite, mobile phone and the Internet, this has put the companies in front of a new challenge which is the acquisition of information and communication technology.

No one can doubt that information technology is a fundamental and innovative revolution that has touched human life considerably in the last century. Indeed, far from being an effervescent phenomenon, or a passing trend, information and communication technology has just been exploited in all aspects of life. No domain has remained immune to this policy, which facilitates tasks for both the company and the staff.

IMPACT OF IT IN DAILY LIFE

Usually when we talk about information technology, it comes to people's mind that "information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data. Typically, IT is used in the context of enterprise operations as opposed to personal or entertainment technologies. The commercial use of IT encompasses both computer technology and telephony."
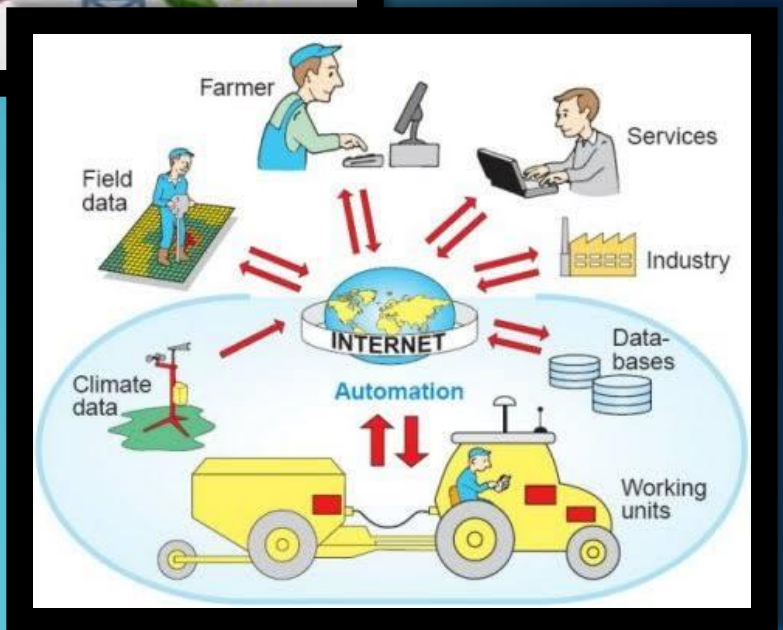
Today's world is considered as a small village thanks to information technology. The process of communication and transmission of information has become so fast that it has spread other the world widely, and it has greatly affected human life and brought about a radical change. The world now depends entirely on technology, knowing that this technology carries a significant enough risk to destroy society. Which leads us to wonder exactly what the new technologies of information and communication consist of? What are their effects on the daily lives of individuals and what impacts do they have on the different areas of life: economic, political, and social?

IMPACT OF IT IN DAILY LIFE

EFFECTS OF INFORMATION TECHNOLOGY IN OUR DAILY ACTIVITIES

1. Effects on education

Information technology has made the education process more effective and productive. It has increased the well-being of the students. Developed methods of education have made this process easier, such as the replacement of books with tablets and laptops. Moreover, the emergence of e-learning platforms that allows students to learn from their homes. These platforms can be an effective alternative for people who are out of school, or who have difficulties keeping up with their teachers in class. These platforms gives students the chance to review the courses with simpler and more concrete explanations at every moment, and this reinforces the educational process and leads to better results in school for most of the students.

2. Effects on the health system

In the field of medicine, medical devices have known a remarkable development. They have become more efficient. IT has entered these devices and turned them into digital devices that facilitate their programming and handling. Thanks to IT sectors like the artificial intelligence (AI) the world has witnessed distance surgeries thanks to robots, the implementation of artificial members as artificial legs, hands and even artificial cardio-aortic valves.

"Information technology is of particular importance to health care delivery. Developments of computerized patient records will enhance the efficiency, effectiveness, and distribution of health care. As managed care programs develop, population-based information will be of increasing importance to health care providers and to the public health community. The capacity to transmit this information through telecommunication linkages, including telemedicine, will revolutionize the accessibility of health care to underserved areas, including both rural and urban populations. These developments will raise substantial concerns regarding confidentiality and privacy because information on health may be very relevant to employment and insurability. Efficient, effective, reliable information systems could in fact, enhance the human quality of patient/doctor interactions by focusing on clinical decision-making and patient preferences rather than routine data collection. In this regard, information technology might in fact, enhance the quality of that interaction"[5].

The development of the field of medicine is important for humanity. It is the basis for living a healthy life away from disease and pain.

IMPACTS OF INFORMATION TECHNOLOGIES

1. The political impact of (IT)

Technology holds the role of power. Information technologies play a decisive role in the political landscape of countries. They have become widely used in electoral campaigns to influence public opinion and especially to involve young people in the political life.

Politicians use technology in many ways to influence the growth of different individuals in their respective spheres. The likes of Twitter, Facebook, and YouTube are powerful communication media platforms that can easily raise the ratings of politicians. Technology is a defining factor in most political races. Through technology, politicians are able to access funds, gain political support, and spend less on campaigning and pushing their candidacy.Housley claims that "technology appeals to a specific demographic: the affluent, the educated, and the young". Moreover, "while a YouTube video may not sway the Grandparents in the crowd, the youngest voters are listening. Does ty a matter of time before technology plays a critical role in elections".

3. The social impact of (IT)

It can be said that the social impact of information technology has two sides. It cannot be one hundred percent negative nor hundred percent positive. It is a two-sided weapon.

Sociologists likened the impact of information technology on society to transforming the world from vast continents separating people and relatives, to a very small village encompassing the entire world's population, which is called globalization. Before information technology communication between people required days even months to reached each other. Thanks to information technology, communication between people in different parts of the globe has become an easy and fast process, via different ways: instant messaging, phone calls or video calls[10].

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2. The economic impact of (IT)

Technological progress and organizational maturity have contributed to increased production, capital accumulation and the creation of intense competition among manufacturers. As a reflection of this competition, the R & D concept emerged as a strategy of innovation through the harmony of scientific ideas and their practical application by engineers and scientists making the R & D role into large sections with technical, legal and administrative skills in maintaining the industrial location and a reference to quality, productivity and cost. These developments have resulted in an industrial culture that derives its momentum from the advances of science and technology that mature and deepen as a natural result of research and development.

"Information Technology (IT) is an all-pervasive change, which is affecting the design of many existing products and services, as well as the mode of producing and marketing almost all of them. […] This point emerges every day stronger from sector studies in manufacturing or in services, as well as from general trends in R & D, patenting and innovation"

IMPACT OF IT IN DAILY LIFE

AGRICULTURE TECHNOLOGY

Modern-day farming and agriculture are no more a reminder of the laborious sweat-intensive field-work for farmers and slow growth patient process. With the advancement of agriculture trends 2021, the past decade has seen a thriving hike in agricultural yields, excellent examples of contemporary farming, and many more.

We will envision the latest technology trends in agriculture technology that have resulted in the welfare of farmers and global agriculture produce.

Food & Agriculture Organization Statistics

As per the **Food and Agriculture Organization (FAO)** report, the primary crop production has increased 50% in the last ten years. Parallelly, the world population will tentatively reach 9.3 billion by 2050, hence imbibing the demand for more food to feed the human population. On the charts of 'Rise in Hunger,' currently, there are 60 million more people than in 2014 who remain undernourished globally. This matter is a rousing affair for the agricultural industry. People are living an undernourished life, mainly in Asia and Africa. Economically, the share of Agriculture in the world GDP has gone up by 68%, but comparing it with the growing population has been a stable 4% share since 2000.

agriculture technology

FIVE DISRUPTIVE AGRICULTURE TECHNOLOGY TRENDS FOR 2021

(1) IoT in Agriculture
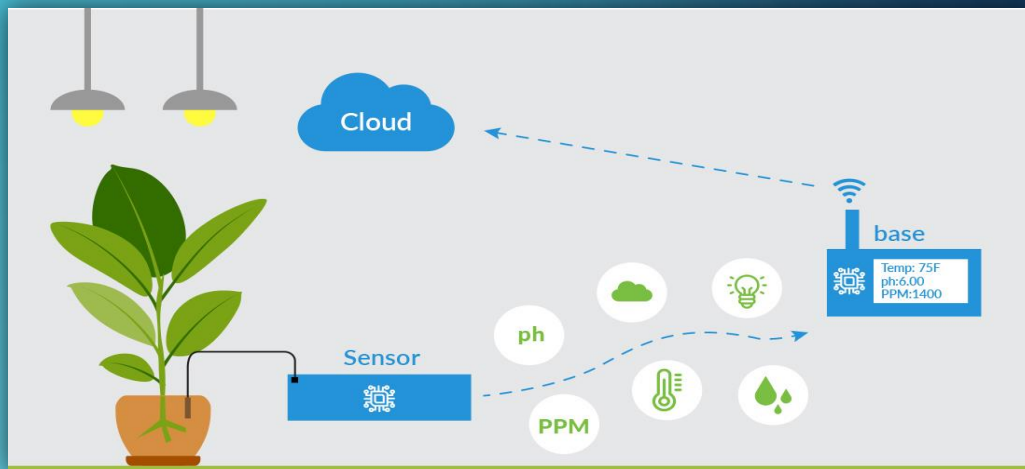
The use of the Internet of Things in intelligent farming is aided with various sensors implanted in the agricultural farm. The different sensors used are light, humidity, soil moisture, temperature, crop health Monitoring, Etc.

Some of the prime use-cases of IoT in Agriculture are:

- Data Collection by farm sensors like autonomous vehicles, wearables, button cameras, robotics, control systems, etc.
- Aerial and ground-based drones for irrigation, assessing crop health, spraying, monitoring & field analysis.
- Geofencing using wireless IoT sensors and livestock tracking to monitor cattle healthcare.
- Predictive analytics for rainfall, temperature, soil, humidity, etc.
- Innovative Greenhouse with the aid of IoT devices and monitors, which doesn't require human intervention.

(2) Geographic Information System (GIS) in Agriculture

GIS is a technology that represents any geographical entity in the spatial representation using hardware, software, and data. The hardware used in satellites, drones, GPS systems to locate data points and fetch information from them for analysis.

In the agricultural domain, farmers can use GIS to analyze complex spatial data like rainfall amount, topography, soil elevation, slope aspect, wind direction, flooding, erosion, etc., and so much more. Several satellites are already launched by the government or universal bodies, e.g., Landsat 8, where you need to pay a specific fee for accessing your geography data.

Some excellent use-cases of GIS in the agriculture industry trends 2021 are:

- Irrigated landscape mapping
- Crop health assessment
- Irrigation amendment analysis
- Land degradation assessment studies
- Erosion remediation
- Efficient drainage elevation models

GIS and its generous usage have led to its other names- satellite farming or precision agriculture for all the wonders that offer. Moreover, with the advancements in GPS, robotics, and unnamed aerial vehicles, various farming operations are now computerized.

(3) AI/ML & Data Science in Agriculture Technology

Artificial intelligence is the application of human intelligence via a machine body where instructions are fed into the machine, and hence you get clever work without effort. The entire lifecycle of agriculture involves preparing the soil, seed sowing, adding fertilizers, irrigation of water, protections from weed, harvesting, and storing. At every stage, growers or farmers need to rely on their instincts, calculations, and risks based on the right time and other factors. AI and ML can contribute devastatingly and benefit from their proven data analysis and predictions.

All the crucial agricultural data collected by IoT devices and ML algorithms are processed and channelized with data science. Farmers cannot use the raw data, and hence data science is changing farmers' lives in making vital decisions.

Real-time use cases of AI/ML and data science in agriculture are:

- Predicting yield and quality assessment
- Predictive analytics for crop sustainability
- Using ML to eliminate weed by recognizing species of plants/crops
- Detection of crop infections and diseases
- Intelligent harvesting & pricing decisions
- Prevention of wastage and meeting demands
- Autonomous robots for herding cattle

(4) Blockchain

Once the crops and produce are ready, farmers dive into the troubles of fair trading, selling, marketing, and proving the authenticity of their produce. Hire Blockchain developer helps farmers ensure the safety of their crops, preventing theft and fraud, efficiently managing the supply chain, and balancing the food ecosystem.

How blockchain works in agriculture
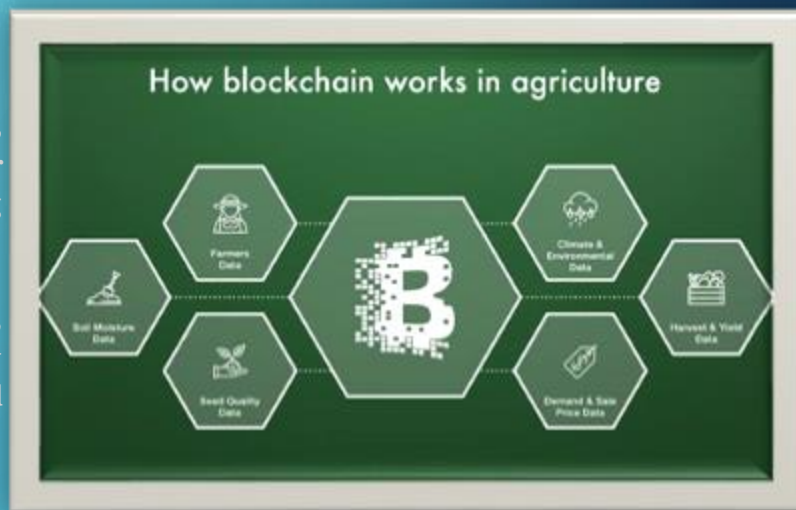
The blockchain technology enables the traceability of information in the food supply chain and thus helps improve food safety. It provides a secure way of storing and managing data, which facilitates the development and use of data-driven innovations for smart farming and smart index-based agriculture insurance.

The real-time use cases of Agriculture Blockchain technology are:

- Food Traceability
- Transparency in the food supply chain
- Agricultural insurance for farmers
- E-commerce for agro-trades
- Agricultural subsidies

(5) Automation

Robotics has evolved handsomely, and we aren't surprised when machines are doing farming jobs. It has acknowledged farm automation, or so-called smart-farming, by easing the workload on human resources

Thus, you can meet the international promise of meeting the rising population's demand by producing much-needed agro-produce with less human intervention and faster. Drones, custom tractors, watering motors, harvesters, and more modern-technology blessings for agriculture automation.led

Exclusive use-cases of Automation in Agriculture Technology are:

- Agrobot is a real-time example that harvests strawberries, accessible from a mobile platform, by meeting farmers' standards.
- Apple harvesting using vacuum by Abundant Robotics.
- Autonomous tractors that are programmed in advance to perform driverless control.
- Using computer vision for seeding and sprinkling pesticide where required.

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