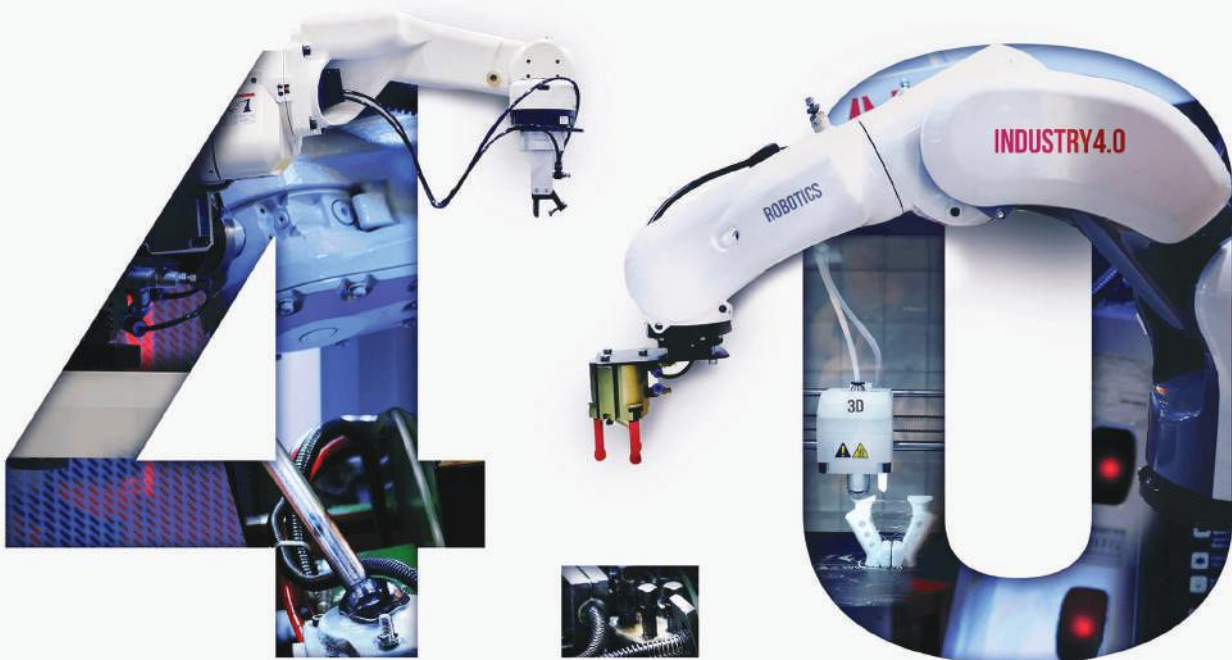


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Crypto-mining

by Arunchandra

The process of gaining cryptocurrencies by solving complex cryptographic equations with the help of high-performance computers is called crypto-mining. Solving the process comprises verifying data blocks and adding those records to the public ledger known as a blockchain.

Cryptocurrencies use the decentralized method of distribution, and for verification of transactions, it takes the help of cryptographic algorithms. Hence there is no central authority, nor is there a centralized ledger.

The crypto-miners are computer systems with high processing powers. Usually, it is a set of GPUs and a CPU connected to provide high processing power; this is a mining rig.

The crypto-mining had its impact on India too. As the crypto-currency rates oscillate, it brings up a huge profit if traded at the right time. The below figure shows the bitcoin prices in INR in the year 2021.



The crypto-miners act as nodes of the crypto network; these nodes help send, receive, create, store data to each node. In the case of a Bitcoin network, these nodes perform tasks together in two ways: solving complex math problems on the bitcoin network, thereby producing bitcoin. And the other way is by solving computational math problems; the bitcoin miners make the bitcoin payment most trustworthy and secure by verifying each transaction history.

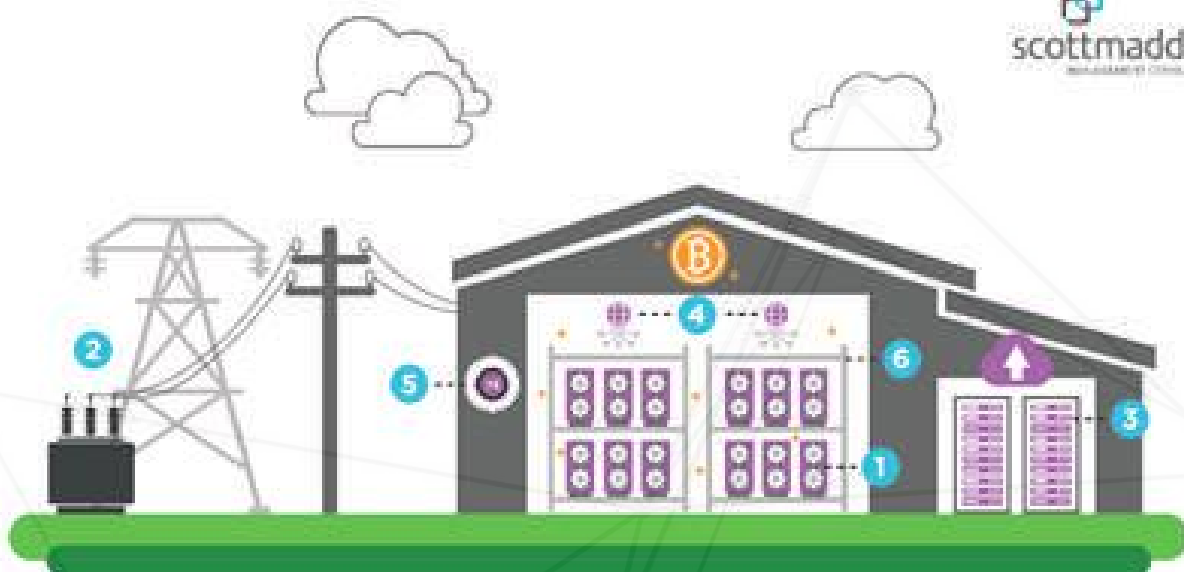
As this process of crypto-mining needs almost no human interference, here comes the question, is crypto-mining profitable?

The profit made on crypto-mining depends on various factors like availability and prices of the computer systems, cost of electricity, availability of internet services, and climatic conditions.

In a country where there are high electricity prices like Germany, there is no way that one can make a profit out of crypto-mining to minimize this hindrance; the miners are opting for renewable sources of energy (solar energy). The climatic conditions also play a significant role in determining the profit. The hot climatic conditions reduce the performance of a computer system, so it's economical to set up a mining rig at a place with moderate climatic conditions.



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The Future Implications of AR

by Sarvag Kalari

Discussions about Extended Reality (XR) usually start and end with Virtual Reality (VR), and often it's brought up in the context of entertainment exclusively. But there's another brainchild of XR, one which is still relatively underappreciated and yet holds the potential to take over the world and change how our industries run as a whole.

AR or Augmented Reality creates an interactive environment in a real-life setting instead of a virtual world, adding an extra layer of interactivity to our tech by seamlessly merging multiple realities into one. The implications of AR go past entertainment, so far past in fact that many believe it could potentially be the catalyst for a paradigm shift, contesting the current industrial, educational, and lifestyle norms. If implemented effectively, AR could provide solutions to many prevalent industry issues, adding a layer of convenience to enterprise and manufacturing strategies for businesses to come. So naturally, it plays a crucial role in the Industry 4.0 ecosystem, being integrable with IoT and Cloud systems with a broad spectrum of possible use cases paired with its neighboring technologies.

Currently, the most sought-after application is within the realm of repairs and operations. The end goal here being the complete incorporation of wearable AR devices that project live data of all running processes within production centers, providing a visual layer of real-time IoT data within these factories. This format of spatially registered information is the most contemporary solution to communication interfacing between humans and machines, providing massive efficiency boosts with logistical processes.

AR integrated product design and visualized as a real-life simu- flat two-dimensional digital workspaces virtual structures and totyping would frames to 3d digital experience of the Training facilities estab- neering, general repairs, cal procedures would have a Hyper-realistic virtual sce- a hands-on experience while required throughout training cur- analytical computation could be before, giving efficiency and por- places with teaching formats existing purely in the virtual



development means projects could be lation over mere interaction with screens. Teams could share where designers augment models into thin air, and pro- evolve from static wire- overlays that replicate the actual final product. lished for mechanical engi- management, or even medi- whole new dimension to work. narios could be crafted, providing minimizing physical resources riculums. In addition, data and visualized like never tability inside work- and platforms world.



Embracing a shift this colossal is a task many established commercial enterprises still reject. Still, there's unequivocal evidence that adapting and investing in AR could push a corporation to the cutting edge of efficient modern industry. This adaptation is seen in new-age companies already venturing into the fourth industrial revolution with proven positive transformation and consistency. A notable example would be GlobalFoundries, a company that has produced the world's first full-service semiconductor foundry by combining AI, ML, and AR—forming a holy grail of contemporary industrial standards describing it as "the new global standard for operational procedures."

Formulaic innovation is reaching its limit, and humanity is past small steps towards the future. The time to make technological leaps into a new age of industry is now. Among the many contemporary innovations, Augmented Reality has proven to be more than worthy of our time and a paradigm of tech that will stay on the leading edge of modern industry for many years to come.

DNA Data Storage Technology

by Aditya Havaladar

Since the data storage devices are limited to storage and have a limited life span while also being costly and consuming much energy, synthetic DNA can store a large amount of information and has less maintenance cost.

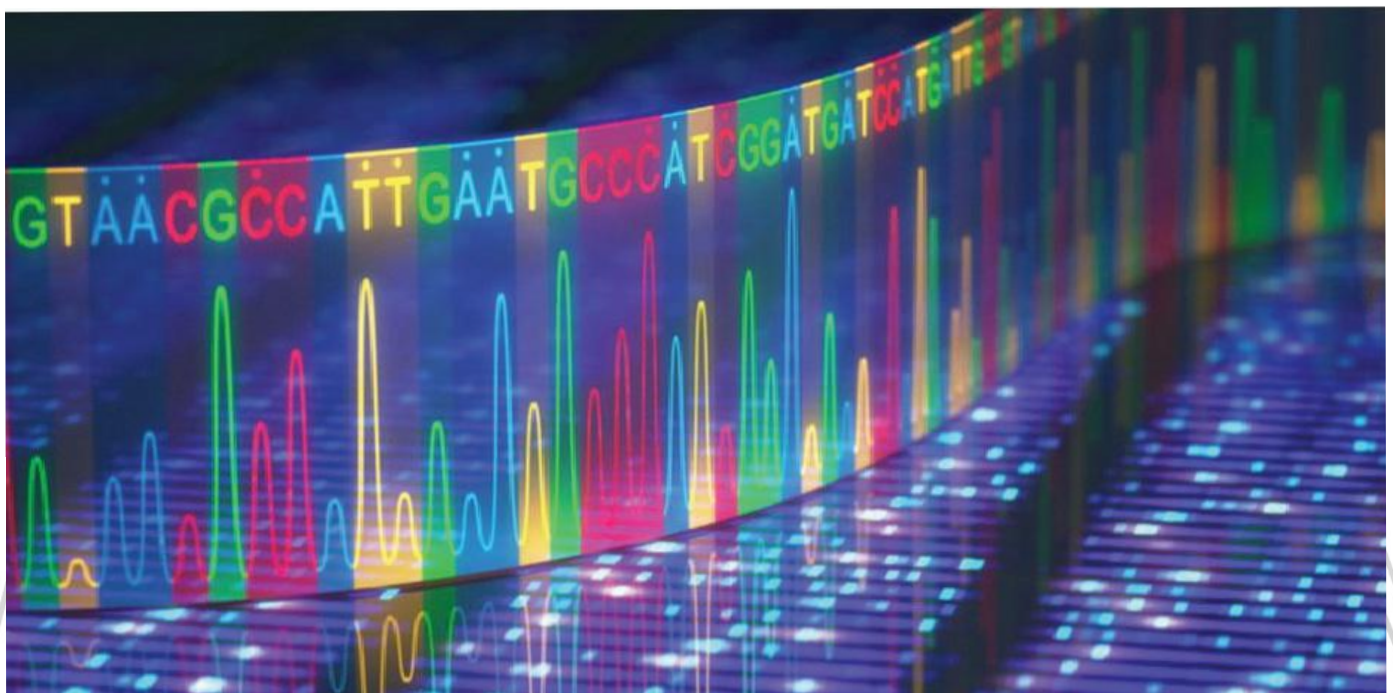
A DNA cell of a human can store 3 billion times from the 21st century. 1 gm of DNA can store 2500 million GB. Computers and organic cells have lot similarities in computer information is written in strings of binary digits 1010, but in Cell data is stored in 4 nucleotide bases expressed by A T C G that are Adenine, thymine, cytosine, guanine.

And are found in tiny molecules called DNA or deoxyribonucleic acid. Together these bases create a biological code that governs the cells. Richard Feynman released a paper in 1959 describing the possibilities for creating artificial objects similar to those in biology with related capabilities.

In 2012 a group of scientists led by George Church at Harvard university turned a 52,000 Wordbook into DNA strands produced in a laboratory to confirm that DNA can store data.

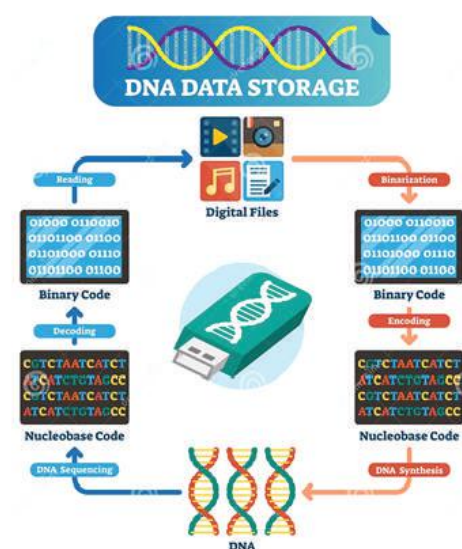
In 2017 Janaf Ehrlich and Dina Zielinski from the New York genome center came up to achieve significantly greater storage capacity.

The researchers operated with twist bioscience, a San Francisco-based biology company that has created a new synthesis platform by printing DNA on silicon chips.



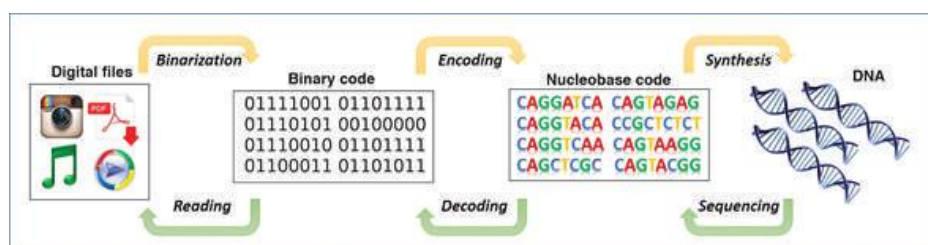
Nowadays, the science behind storing digital data in synthetic DNA has been solidly established from bits to molecules; from molecules to bits, the data quantity of DNA is remarkable. For example, the hard drive used in laptops can keep just 1 million GB of data in them.

HOW DOES DNA STORAGE WORK?



for DNA storage frozen in solution dried or encapsulated in a bead. Then, a targeted section of the DNA strand is decoded by a commercial sequencing machine initially formed for genome sequencing and translated back into the initial digital file. Error solving algorithms are used during the encode decode methods to record data as error-free as possible.

DNA AS DATA STORAGE MEDIUM?



As DNA is a highly stable molecule with a half-life of over 500 years, DNA can remain intact for a thousand years if stored in cold conditions.

when adopted broadly, it will not go the way of the floppy disk.

How to order one?

The cost of DNA synthesis is considerably dropped in the past decades and can be ordered on websites of organizations of twist bioscience and thermo new fisher scientific.

This DNA synthesis is too costly as it is based on organic chemistry methods and design for new cases and is susceptible to a high rate of errors.

Writing the code with DNA Synthesis and reading the code with DNA sequencing begins with a binary code data file translated into the four base pairings like a00, t01, c10, and g11. Then, these DNA molecules are synthesized letter by letter with enzyme catalyst or chemical reactions and indexed.

After the segments are written, they are deposited in a container regulating temperature and light to maintain regular stability options

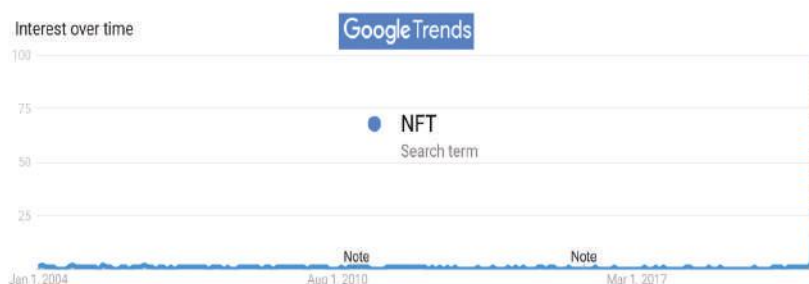
A 700,000 years old horse DNA held the permafrost was sequenced in 2013. The information quantity of DNA and its stability is much more significant than existing storage possibilities. The digital information within a warehouse-size data center could be saved in space roughly the size of a sugar cube and demands only a little energy to maintain, unlike other electronics. DNA technology will benefit humanity and never become obsolete;

Non Fungible Token

by Aparna Vemuganti

An Nft (Non-Fungible Token) is a data unit stored on a digital ledger called a blockchain. This states that the digital asset must be unique and cannot be further interchanged. There are many benefits of Nft's, such as photos, videos, audio, and other digital files. There is no restriction for the buyer of Nft to access any copy of the original file.

Generally, Nft's are tracked and traced on blockchains, providing the owner with proof of ownership. NFTs usually function like cryptographic tokens, but like cryptocurrencies such as bitcoin, Nft's are not interchangeable, or the values cannot be exchanged.



USES:

Ticketing:

Ticketing is found to be the most suggested use for Nft's. This is because it mainly happens between the fans and the artists.



Games:

NFTs are also used in gaming, which the users use instead of game developers.



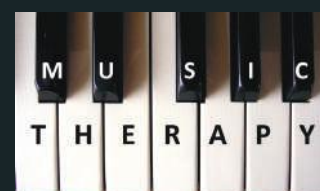
Sports:

A wide variety of NFTs is also used in sports, especially in 2019. For example, NBA player Spencer Dinwiddie tokenized his contract so that others could invest in it.



Music:

Blockchain technology has given an excellent chance for musicians to prove their talent and publish their work as nonfungible tokens. NFTs have provided opportunities for artists and also for all the touring musicians. The artists use especially NFTs during this covid pandemic.



Internet of Things

by Aditya Hegde

The Internet of Things (IoT) is a concept that, although recent, has been known for decades. Believe it or not, the idea of interconnecting daily appliances to each other over a digital network first originated in 1982, when students at Carnegie Mellon University developed a Coke machine that was remotely operable over the ARPANET (a forerunner to the modern internet). Since then, with technology progressing at an exponentially increasing pace, the first IoT device was created, being a toaster connected to the computer, followed by the wearable camera linked to the internet, invented in 1994, the formal introduction to the concept of the Internet of Things in 1999, the invention of the internet-enabled fridge in 2000, and Google's commencement of tests with self-driven cars in 2009, and the invention of the Google Glass in 2013.

The concept of remotely controllable appliances will garner more and more interest in the foreseeable future, already boasting a net market value of the Internet of Things is \$1.46 Trillion as of May 2021.

What exactly is the "Internet of Things"? A commoner knows nothing much beyond using a phone to control his toaster, and even most tech geeks tend not to progress further in terms of knowledge because they tend not to need any beyond knowing how to use these devices. It essentially is multiple physical objects, consisting of sensors, and software, connected by a network used to operate them.

Internet of things

IOT



These objects can exchange data with each other, such as thermal status, battery life, wear and tear, progress related to their functions, and many more. Their data can also be collected and analyzed for further improvement and, if necessary, change in terms of operation to increase efficiency. There are people against the progression of this idea, making the argument that not all devices need to be interconnected. Despite this, the increase in simplicity and efficiency is attracting more people every day. With the number of devices interconnected over the internet increasing rapidly, the development of the infrastructure of an entire smart city is not too far away. Looking at the devices themselves in more detail, we find that they rely on several branches of technology, wireless systems, sensors, automation, machine learning, and constant analytics, to ensure efficient and secure working. These devices, through the internet, exchange data with an application, consisting of an interface to accomplish processes with these devices, as per a user's requirement. Through machine learning and IoT platforms, these devices segregate collected data into two categories: Necessary data and Unnecessary data. These platforms use this data to make predictions and find problems, often before they occur, which allows for the automation of repeated, risky, or time-consuming tasks and increases their efficiency to provide a better experience for the user.

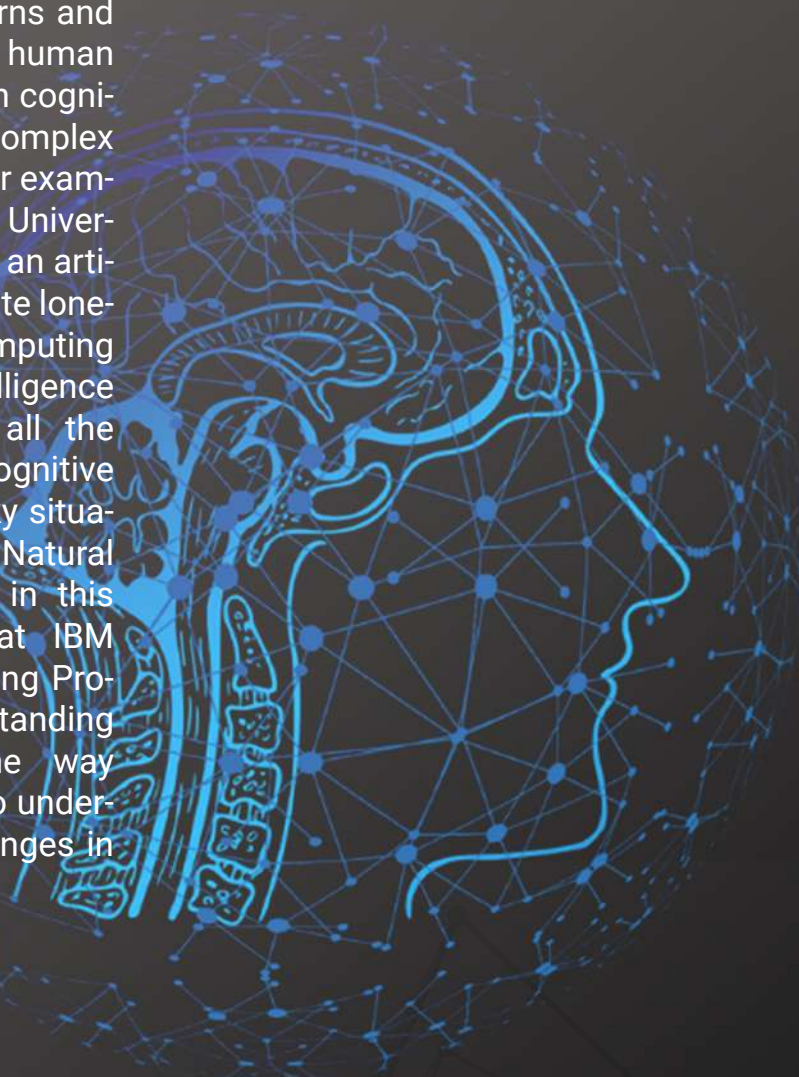
Some examples of this are lights that turn on and off at certain times of day in homes and offices, cars being able to send manufacturers information regarding faulty components to ease appointment bookings as well as stocks of the necessary parts, and mechanical arms in factories used to perform repeated tasks at a higher efficiency than humans. With these devices, as per a user's requirement. Through machine learning and IoT platforms, these devices segregate collected data into two categories: Necessary data and Unnecessary data. These platforms use this data to make predictions and find problems, often before they occur, which allows for the automation of repeated, risky, or time-consuming tasks and increases their efficiency to provide a better experience for the user. Some examples of this are lights that turn on and off at certain times of day in homes and offices, cars being able to send manufacturers information regarding faulty components to ease appointment bookings as well as stocks of the necessary parts, and mechanical arms in factories used to perform repeated tasks at a higher efficiency than humans.



Cognitive Computing

by Swathi Kiran P.

Cognitive computing is a technology platform that uses technology and algorithms to automatically extract concepts and relationships from data, understand their meaning, and learn independently from data patterns and prior experience; just like human brains, a computer system with cognitive technology can tackle complex decision-making processes. For example, recently, researchers at the University of California have invented an artificial intelligence tool to estimate loneliness in adults. Cognitive computing is nothing but Artificial Intelligence that watches our emotions all the time. Computers produce cognitive computing to assume the tricky situations of human problems. Natural Learning Processing is used in this artificial intelligence tool that IBM developed. This Natural Learning Processing has a state of understanding text and spoken words the way humans will understand. It also understands our mobility, sleep, changes in the expressions on our faces.



How Cognitive Computing Works?

Cognitive computing is a computerized model which assumes the thought process of human beings. It collects all your text data from many sources, which include structured and unstructured data. This collected data helps cognitive computing understand your problem and find a solution for your situation. Cognitive computing has a self-learning technology that uses data mining. This cognitive system is Interactive, Adaptive, Contextual. The cognitive system is flexible to get used to the environment by learning as the information changes. It gets interactive with humans and tries to solve their problems. It also understands the thought process of humans.

Cognitive computing and Artificial Intelligence are a bit similar but not the same. The difference is Cognitive computing has sentimental analysis where Artificial Intelligence can't do. The cognitive system has a similar thought process to humans, which can help humans find solutions to their complex problems. Artificial Intelligence finds patterns in big data to learn, reveal confidential information, or deliver solutions to complex problems. Cognitive computing has Augmented human capabilities. Artificial Intelligence is automating the process.

Cognitive Computing Product Examples

- Netflix might recommend you a movie based on your past preferences.
- Online shopping (like Amazon) recommends related products based on your earlier purchased product type.



Pulse Oximeter

by Jagadish Kothakota

Today we can take a breath easily from the panic caused by the deadliest virus, i.e., COVID-19. But when you look back, we all crossed a phase where people got tensed by seeing or listening to people die without proper coronavirus treatment and doctors afraid of the virus. Then, an old technology called spectrophotometry came to the aid of doctors in finding the regular parameters of a human body without any contact

Precisely it's been 101 years since the Spanish flu outbreak. After which an unknown virus spread in the place called Wuhan and rapidly spread over the globe. It is named COVID-19, which stands for Corona Virus Disease in the year 2019. After some research, the thing that came into the limelight was that this virus spread through contact, and doctors were afraid to treat people. As mentioned earlier, a device using the principle of spectrophotometry was used to find the basic parameters of the human body, like blood pressure and oxygen levels. This device is called a pulse oximeter. Doctors and other physicians used a pulse oximeter to find the BP levels and oxygen levels by staying at a distance, which is traditionally performed by touching a patient using a sphygmomanometer and other machines. Doctors placed the pulse oximeter in clip shape at the tip of the fingers and got the readings. As per the readings observed, physicians used to prescribe particular medicines depending upon the severity levels. As the coronavirus affects the lungs, an infected person's breathing and oxygen levels differ from a non-infected person. Therefore, the place where a finger is placed is



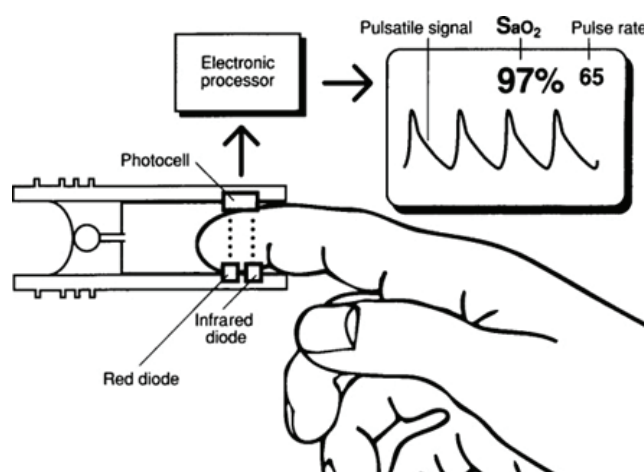
sanitized before every use—the common finger where the pulse oximeter is placed in the right middle finger.

We can observe a light passes through our fingertip. This is an infrared ray and a red light absorbed by oxygenated blood and deoxygenated blood, respectively. When these lights pass through our fingers, a particular frequency of light gets absorbed by the blood that flows through our bodies. The blood in Arteries absorbs infrared rays as it carries oxygenated blood from the heart to the body's organs, and Veins absorb red light as it has deoxygenated blood from different organs back to the heart. The oximeter mainly consists of transmitter/emitter and receiver sections and digital display and electronic processor, as well as this physical structure, holds a finger in them. The transmitter in which LED emits light and passes through the finger is placed in the holder. The receiver consisting of a photodiode receives the light from the finger, and these signals are sent to the electronic processor to process the Arithmetic operations and Logic operations involved in calculating the readings or parameters observed from the received light. Then these values are fed to the digital display through which we can understand easily. The prescribed and essential readings for oxygen levels and pulse rate are 95% and 72 beats /minute.

So as per the procedure, many people got familiar with the use of pulse oximeters. Some people have pulse oximeters to regularly check their oxygen levels to maintain their bodies and update themselves with pulse rate. Many people who chose home quarantine during coronavirus infection have used this pulse oximeter. Whenever they found that the oxygen levels were near 95%, they immediately moved their body into an open place for

fresh air. In case if it was less than 95%, home quarantined patients admitted themselves to the nearby hospital with the oxygen facility.

Thus this tiny and cute clip-shaped device with the principle of spectrophotometry played a significant role in curing coronavirus infection. Its function is pre-eminent such that we can't even imagine the covid treatment without this PULSE OXIMETER.



Artificial Intelligence

by Maatrika P.

Artificial intelligence is the simulation of human intelligence by machines. From asking Alexa/Siri to play your favorite song to predicting market changes, AI is everywhere. These are system software that makes your life easier. Web-connected refrigerators, air conditioners, smart-watches, robots used in high-end factories, and the best of all automated cars are all based on AI; it is among today's most influential emerging technologies, having multiple uses across industries. Whether in healthcare, factories, computers, or automation, artificial intelligence (AI) is consistently improving through automation and informed decision-making. Artificial intelligence has been causing havoc in the corporate sphere since its introduction, and with the latest breakthroughs in 2021, the implementations are looking stronger.

Oxford University has created new Artificial intelligence technology that can scan the faces of individual chimps in their naturalistic environments. This software aims to help researchers and animal activists save time and money by examining surveillance videos and observing their activities. The healthcare business is gaining attention to provide precise illness diagnosis, enhanced clinical judgment, and patient management. With revolutionary AI developments, more healthcare facilities are openly using telemedicine for round-the-clock patient care. As autonomous driving technology matured in 2020, the industry's significant businesses tried new self-driving cars and offered rob taxi services to the public in numerous locations.

The feasibility and commercialization of driverless cars will need completely automated driving, allowing rides without a human driver on deck.

Artificial intelligence can significantly enhance the efficiency of our businesses while also enriching the jobs that humans can accomplish. When AI takes over mundane or risky activities, it enables the human staff to focus on tasks that need imagination and compassion, among other skills. Moreover, people's happiness and work satisfaction may rise if they are doing something that they enjoy.

With AI affecting our traffic congestion concerns, not to mention the various ways it will boost on-the-job productivity, our society will gain countless hours of free time. In addition, humans will be free to spend their time in many ways now that uncomfortable commutes no longer bind them.

Artificial intelligence will improve our ability to detect criminal activities and solve crimes. Face id is becoming as widespread as fingerprint scanners. The employment of AI in the legal system also opens up many possibilities for figuring out how to make the technology work without invading people's privacy. Artificial intelligence will have a massive impact on your life unless you desire to live afar and never engage with the modern world. Although there will be numerous educational obstacles and threats as the technology expands into new applications, it is expected that artificial intelligence will have a beneficial rather than detrimental impact on society.

