KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE – 638107

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

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KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE.

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **DATE: 15.02.2021**

INVENTIONS THAT WILL SOON CHANGE THE WORLD

A pendant that turns speech into text

Senstone can be attached to clothes or hung on one's neck as a pendant. With just one click, the device starts transforming speech into text with 97% precision. It's the dream of all students: now they don't have to write down lecture notes! The pendant "understands" 12 languages.

A mat with a built-in alarm clock

Ruggie is for those who can't wake up with a regular alarm clock. To deactivate the alarm, we have to step on it with both feet for 3 seconds. This is enough time for our brain to cope with the horror of awakening and starting a new day.

A pancake printer

PancakeBot can bake a pancake in any shape, from a flower up to our favorite cartoon character. Kids can draw their future pancakes and then watch the device printing their breakfast.

Packaging that changes color if the product inside is expired

A company named Braskem collaborated with American and Brazilian scientists to create a type of plastic that can change its color depending on pH levels. It can be used to produce packaging for perishable foods. Soon we can see by ourselves how fresh the milk in a supermarket really is.

A windshield display

Carloudy exchanges navigation information with smartphone or any other Bluetooth device. The image is transmitted directly onto the windshield without distracting the driver. The device is controlled by voice commands, which allows a driver to keep their hands on the steering wheel.

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IT BULLETIN **DATE: 16.02.2021**

ARTIFICIAL INTELLIGENCE AND DEEP LEARNING

WHAT IS AI? Artificial intelligence (AI) is wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.

DEEP LEARNING: DL is re-branding of neural networks- a class of models inspired by biological neurons in our brain. DL has been driving force for lots of applications in AI like object recognition, speech, language translation, playing computer games and controlling self-driving cars.

Robotics: Technically speaking, Robotics is a separate branch of its own but it do has some overlap with AI. AI has made robot navigation in dynamic environment possible. How do you make sure that a self driving car goes from point A to point B without harming itself and anyone else in the least time? Advances in DL, RL probably have answers to such questions in Robotics.

Top 4 Uses of Artificial Intelligence

1. In the field of Medical Sciences
2. In the Field of Air Transport
3. In the field of Banking and Financial Institutions
4. In the Field of Gaming and Entertainment

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DRONES AND ARTIFICIAL INTELLIGENCE

"Actionable Data" is next to a powerful and reliable drone probably the most important driver of the drone industry. Drones often generate large amounts of data sometimes more than we can handle. Unmanned aerial vehicles only add value to the user if there are ways to process data quickly and without putting additional efforts into this process. The faster, the more accurate, and the easier the images can be evaluated, the better.

Combining drones and artificial intelligence seems to be the answer to the above-mentioned challenges. Nowadays, almost every company that deals with data processing, analytics or 'autonomous' flight control and claims the use of artificial intelligence, machine or deep learning. In general, AI describes the capability of machines that can perform sophisticated tasks which have characteristics of human intelligence and includes things like reasoning, problem-solving, planning, learning, and understanding and reading human languages. Currently, AI in relation to Machine Learning, Deep Learning, and Motion Planning are the hottest topics and will be in the focus of this publication.

When using Deep Learning over Machine Learning or Computer Vision?

While many companies have moved from Computer Vision to conventional Machine Learning approaches, it appears that the first steps are being taken with deep learning algorithms in the drone industry. Recent developments in the tech industry, namely GPUs (Graphic Processing Units), have it made it possible to exploiting DL through its price-to performance ratio as well required hardware infrastructure. Although much more computing power is available through GPUs, it still takes a reasonable amount of time to train DL algorithms, and mostly millions of images are needed to reliably perform a certain task with DL. To access a big data set of images and sufficient processing power, DL methods might be the preferable choice since it usually outscores conventional ML and CV methods, especially in image recognition.

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IT BULLETIN **DATE: 18.02.2021**

HOW CLOUD COMPUTING IS TRANSFORMING THE HEALTHCARE INDUSTRY

The democratization of healthcare data and its remote accessibility free up providers as well as patients and breaks down location barriers restricting access to healthcare. Here are the ways cloud consulting is impacting healthcare.

1. Lowering Of Costs - The basic premise of cloud computing is on-demand availability of computer resources like data storage and computing power. Hospitals and healthcare providers are freed from the need to purchase the hardware and servers outrightly. There are no up-front charges associated with cloud storage of data. You only pay for the resources you actually use which results in massive cost savings.

2. Ease Of Interoperability - Interoperability aims at establishing data integrations throughout the healthcare system, irrespective of the point of origin or storage. As a result of interoperability fueled by cloud adoption, patient data is readily available for distribution and gaining insights to facilitate healthcare planning and delivery.

3. Access To High Powered Analytics - Healthcare data, both structured as well as unstructured, is a huge asset. Relevant patient data from different sources can be collated and computed in the cloud. The application of Big Data analytics and artificial intelligence algorithms on the cloud-stored patient data can power up medical research. With the advanced computing power of the cloud, processing of large datasets becomes more feasible.

4. Patient's Ownership Of Data - Cloud computing democratizes data and gives patients control over their own health. It boosts patient participation in decisions pertaining to their own health and leads to informed decision making by acting as a tool for patient education and engagement.

5. Telemedicine Capabilities - Remote accessibility of data is possibly the biggest advantages that cloud storage of data offers. The combination of cloud computing with healthcare has the potential to improve a number of healthcare-related functions such as telemedicine, post-hospitalization care plans, and virtual medication adherence.

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IT BULLETIN **DATE: 19.02.2021**

TACTILE VIRTUAL REALITY

Touch gives us a deeper understanding of the things which cannot be fully experienced by sight or hearing. That is where ***Tactile Virtual Reality*** comes into play. It combines the use of several types of technologies including sensors, advanced optics, etc. bundled into a single device that provides the capability to overlay augmented digital content into our real-time space. With the advancement of Tactile/Haptic technology, the touch barrier can now be scaled.

Companies investing in Tactile VR: Oculus, Virtuix, Cisco.

There are **3** primary categories of **virtual reality** simulations used today: non-immersive, semi-immersive, and fully-immersive simulations.

An imaginary space that independently exist from the real world. The medium used to create this space is of course a simulation made of visual elements rendered with computer graphics. Relations and interactions between these elements are defined by rules set by the creator.

- '**VR Tactile**' is a **haptic** digital architectural environment that combines physical materiality with digital information to create a multi-sensory, interactive experience.
- **VR** headsets can cause severe **eye** strain among users. They strain their **eyes** in order to focus on a pixelated screen that uses a single refractive optic element. Headsets do not usually addresses the optic issues with near-to-eye devices, and they quickly become uncomfortable after a few minutes.
- **Augmented reality** (**AR**) adds digital elements to a live view often by using the camera on a smartphone.
- **Virtual reality** (**VR**) implies a complete immersion experience that shuts out the physical world.

The definition of **tactile** is touchable or sensed by the touch. An **example of tactile** is a book written in Braille. From gaming and education to consumer goods and industrial manufacturing, nearly every industry on the market can benefit from advances in VR technology.

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IT BULLETIN **DATE: 20.02.2021**

GOOGLE GLASS

Google has developed a wearable computer with an Optical Head Mounted Display (OHMD). Project Glass is a research and development program by Google to develop an augmented reality head- mounted display (HMD). It is a part of the Google X Lab. The Google X Lab works on futuristic technologies. The purpose of Project Glass products is the hands free displaying of information currently available for most smart phone users, and allowing interaction with the Internet through natural language voice commands. Its functionality and physical appearance has been compared to Steve Mann's Eye Tap, which was also referred to as "Glass". The operating system used in the glass will be Google's Android.

It also uses other technologies such as 4G, EyeTap, Smart Clothing, Smart Grid. Google Glass is a futuristic gadget that has seen in recent times. It uses Android a Linux - based operating system used for mobile devices for Google glass. It will prove as a useful technology for all kinds of people including handicapped/disabled.

BENEFITS

- Easy to wear and use.
- Google glass responsive and sensitive to presence of people.
- It provides fast access of maps, videos, chats, documents and much more.
- It is a new trend for fashion lovers within an innovative technology Being a spectacle based computer, it resides directly on your eyes so that you don’t need to keep it in your pouch or pocket.
- It is a useful technology for handicapped and disabled people.

CONCLUSION

Google glasses are wearable computers which use the familiar technologies that bring the sophistication and ease of communication and information access even for the physically challenged class of people who cannot use palmtops and mobiles.

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IT BULLETIN **DATE: 22.02.2021**

QUANTUM COMPUTING

Quantum computing is an area of study focused on the development of computer based technologies centered around the principles of quantum theory. Quantum theory explains the nature and behavior of energy and matter on the quantum (atomic and subatomic) level. Quantum computing uses a combination of bits to perform specific computational tasks. All at a much higher efficiency than their classical counterparts. Development of quantum computers mark a leap forward in computing capability, with massive performance gains for specific use cases. For example quantum computing excels at like simulations.

The quantum computer gains much of its processing power through the ability for bits to be in multiple states at one time. They can perform tasks using a combination of 1's, 0's and both a 1 and 0 simultaneously. Current research centers in quantum computing include MIT, IBM, Oxford University, and the Los Alamos National Laboratory. In addition, developers have begun gaining access to quantum computers through cloud services.

Quantum computing began with finding its essential elements. In 1981, Paul Benioff at Argonne National Labs came up with the idea of a computer that operated with quantum mechanical principles. It is generally accepted that David Deutsch of Oxford University provided the critical idea behind quantum computing research. In 1984, he began to wonder about the possibility of designing a computer that was based exclusively on quantum rules, publishing a breakthrough paper a few months later.

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ENTERTAINMENT BY SIGHT

Comcast Xfinity X1 Eye Control is a web-based remote control for computers, tablets and TVs is designed to help those with physical disabilities, by letting users control devices with their eyes. Using their own eye-gaze software or other assistive technology, users log in to Xfinity's free site and can surf, search and record just by looking at different buttons on the web page.

Xfinity X1 Customers Can Now Use Their Eyes to Change Channels and More Recently, Comcast launched a feature that gives people with physical disabilities, like spinal cord injuries or amyotrophic lateral sclerosis (ALS), the ability to navigate their television using only their eyes. Xfinity X1 eye control is a web-based remote for tablets and computers that pairs with an existing eye gaze system and allows 2 viewers to change the channel, set a recording, search for a show and more, all with a glance.

Explore the Black Experience on Xfinity on X1, Flex, and Xfinity Stream

The new Black Experience on Xfinity gives access to the ultimate in Black storytelling with a one-of-a-kind, industry-endorsed collection of stories that showcase the breadth of Black culture, included with Xfinity service.

Black Experience on Xfinity: what it is, how to watch, and more The Black Experience on Xfinity is a first-of-its-kind collection of Black films, TV shows, news, and more – curated by industry leaders, film critics, and top networks; and endorsed by the African American Film Critics Association.

With the Black Experience on Xfinity, customers can

- Experience a one-stop collection featuring Black films, TV shows, news, music videos, documentaries, etc., that celebrate Black identity, heritage, and culture.
- Enjoy stories that entertain, educate, and uplift; featuring Black actors, writers, producers, and directors.
- Watch at home on Xfinity X1 and Flex; and on-the-go with the Xfinity Stream app.
- Check out the all-new "Xfinity Originals" – exclusive content by new and up-and-coming Black content creators; available only to Xfinity customers.

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IT BULLETIN **DATE: 24.02.2021**

INDIAN TECHNOLOGY INNOVATIONS DEVELOPED DURING COVID-19 OUTBREAK

Technology innovations that deal with the crisis and bank on it As the Covid pandemic rages in India, entrepreneurs are putting in more technology innovations to deal with the crisis and bank on it. Here is the list of four technology innovations that sprung up during the coronavirus outbreak:

CoronaOven - The CoronaOven disinfects objects through a process called Germicidal Irradiation. There are three types of Ultra Violet rays UVA, UVB and UVC. UVC has the highest disinfectant capacity because of its shorter wavelength and ability of this wavelength to interact with the RNA and DNA of the cells and microbes.

A single cycle of the CoronaOven takes 4 minutes to entirely disinfect objects in a 360 action with no shadow areas. The CoronaOven is made of safety first materials. They protect the user from UVC light and ensure secure operations.

Vistar - AirOk manufactures air purifiers that use a patent filter technology called EGAPA (Efficient Granular Absorbent Particulate Arrester) to filter out major pollutants and gaseous substances. Vistar air purifiers have been innovated by a startup based in Delhi.

Dozee - Dozee is a device created by Turtle Shell Technologies that aims to help in access to better healthcare by providing accurate diagnosis of conditions. This device can help with a preliminary diagnosis of various illnesses which reduces the time spent in making decisions to visit hospitals and go through multiple tests. It is a smart contact-free health monitor that one can slip under their mattress. it keeps tracking the health condition of the individual through metrics like heart health, stress, sleep quality, among others. It gives a detailed analysis report on the Dozee apps that can be installed in smartphones.

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IT BULLETIN **DATE: 25.02.2021**

ONLINE AUCTION SYSTEM AND SEARCH ENGINE

Online auction system

In an online auction, buyers and sellers engage in transactional business, wherein buyers purchase items through price bidding. Here, the bids have a starting price and an ending time. Potential buyers who place the highest bidding price for an item are declared the winners and owners of particular items.

In this project, you will create a secure online auction system using the fraud detection method with binary classification. If a user wants to buy a product through an online auction, they must provide their identification details like PAN number, email address, license number, etc. The system will then screen the users, authenticate, and authorize them. Only authorized users can bid in the auction. The system will be designed to predict fraudulent users in the early stages, thereby eliminating the risk of online fraud and scams. This beginner-level computer science projects will help build a strong foundation for fundamental programming concepts.

Search engine

This search engine is developed using web annotation. It is one of the trending computer science projects where when users enter specific words or phrases in a search engine, it automatically fetches the most relevant pages that contain those keywords. Web annotation makes it possible. Web annotation helps to make an application user-friendly. Users can add, modify, and remove information from Web resources without altering the resource itself.

This project uses web annotation on pages and images. When the user enters words, names, or phrases in the system, it will fetch the information and pictures having the same annotation. Then the system displays a list of results that contain the image or content matching to the user input. For this search engine, you need to use an effective algorithm to generate a query result page/search result records based on users' queries.

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IT BULLETIN **DATE: 26.02.2021**

5G TECHNOLOGY

5G is the fifth generation of cellular networks, bringing new capabilities that will create opportunities for people, businesses and society. But what is 5G going to mean for us? 5G runs on the same radio frequencies that are currently being used for our smartphone on Wi-Fi networks and in satellite communications, but it enables technology to go a lot further. Beyond being able to download a full-length H movie to our phone in seconds (even from a crowded stadium), 5G is really about connecting things everywhere – reliably, without lag – so people can measure, understand and manage things in real time.

This has enormous potential and together, we will take it to the next level. In telecommunications, 5G is the fifth generation technology standard for broadband cellular networks, which cell began deploying worldwide in 2019, and is the planned successor to the 4G networks which provide connectivity to most current 5G networks are predicted to have more than 1.7 billion subscribers worldwide by 2025, according to the Association Like its predecessors, 5G networks are cellular networks, in which the service area is divided into small geographical areas called cells . All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell. The main advantage of the new networks is that they will have greater bandwidth, giving higher download ,eventually up to 10 gigabits per second (GB). Due to the increased bandwidth, it is expected the networks will not exclusively serve like existing cellular networks, but also be used as general internet service for laptops and desktop computers, competing with existing ISPs such as cable internet, and also will make possible new applications in internet of and machine to machine areas. 4G are not able to use the new networks, which require 5G enabled wireless devices.

ADVANTAGES OF 5G

- Increased Bandwidth for All Users.
- More Bandwidth Means Faster Speed.

DISAVANTAGES OF 5G

- An Increased Bandwidth will mean Less Coverage.
- The Radio Frequency May Become a Problem.

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IT BULLETIN **DATE: 01.03.2021**

DEEP LEARNING

Deep learning is an artificial intelligence (AI)function that imitates the workings of the human brain in processing data and creating patterns for use in decision making. Deep learning is a subset of machine learning in artificial intelligence that has networks capable of learning unsupervised from data that is unstructured or unlabeled, also known as deep neural learning or deep neural network. Deep learning, a form of machine learning, can be used to help detect fraud or money laundering, among other functions.

How Deep Learning Works

Deep learning has evolved hand-in-hand with the digital era, which has brought about an explosion of data in all forms and from every region of the world. This data, known simply as big data, is drawn from sources like social media, internet search engines, e-commerce platforms, and online cinemas, among others. This enormous amount of data is readily accessible and can be shared through fintech applications like cloud computing.

Deep Learning vs. Machine Learning

One of the most common AI techniques used for processing big data is machine learning, a self-adaptive algorithm that gets increasingly better analysis and patterns with experience or with newly added data.

Deep learning, a subset of machine learning, utilizes a hierarchical level of artificial neural networks to carry out the process of machine learning. The artificial neural networks are built like the human brain, with neuron nodes connected together like a web. While traditional programs build analysis with data in a linear way, the hierarchical function of deep learning systems enables machines to process data with a nonlinear approach. Electronics maker Panasonic has been working with universities and research centers to develop deep learning technologies related to computer vision.

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IT BULLETIN **DATE: 02.03.2021**

BIT COIN

Bitcoin was launched in 2009 and is regarded as the first cryptocurrency. It's a decentralized form of digital cash that eliminates the need for traditional intermediaries like banks and governments to make financial transactions. Bitcoin, on the other hand, is powered through a combination of peer-to-peer technology a network of individuals, software-driven cryptography, the science of passing secret information that can only be read by the sender and receiver.

How does Bitcoin work?

Each bitcoin (trading symbol "BTC," though "XBT" is also used) is a computer file stored in a digital wallet on a computer or smartphone. To understand how the cryptocurrency works, it helps to understand these terms and a little context:

- **Blockchain**: Bitcoin is powered by open-source code known as blockchain, which creates a shared public ledger. Each transaction is a "block" that is "chained" to the code, creating a permanent record of each transaction. Blockchain technology is at the heart of more than 6,000 cryptocurrencies that have followed in Bitcoin's wake.
- **Private and public keys**: A bitcoin wallet contains a public key and a private key, which work together to allow the owner to initiate and digitally sign transactions, providing proof of authorization.
- **Bitcoin miners:** Miners or members of the peer-to-peer platform independently confirm the transaction using high-speed computers, typically within 10 to 20 minutes. Miners are paid in bitcoin for their efforts.

Bitcoins can be stored in two kinds of digital wallets:

- **Hot wallet:** Digital currency is stored in the cloud on a trusted exchange or provider, and accessed through a computer browser, desktop or smartphone app.
- **Cold wallet:** An encrypted portable device much like a thumb drive that allows to download and carry bitcoins.

Four ways to get bitcoins are Cryptocurrency exchanges, Bitcoin ATMs, Peer-to-peer purchases and Bitcoin mining.

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IT BULLETIN **DATE: 03.03.2021**

UNIVERSAL SERIAL BUS (USB)

Universal Serial Bus (USB) is an input/output bus to transfer data at higher speeds than older serial and parallel interfaces. USB has several advantages over previous bus systems.

- First, it is a widely supported standard. This simplifies purchasing external devices. A USB device can plug into any USB port, whether on an Apple or PC.
- Second, a USB cabling system creates its own independent bus where up to 127 devices can be daisy-chained together and share a single port on the microcomputer.
- Third, USB devices are "hot swappable." A USB device can be disconnected and another device swapped (plugged) into the system without restarting the computer.
- Fourth, USB devices can be powered through the interface port rather than a separate power supply. This greatly reduces the number of power adapters (or "wall-warts" as they've been called) that clog up power strips.
- Finally, USB has faster data transfer. USB transmits data at speeds of 12 Mbps (megabits per second) compared to the RS-232C speeds of 115.2 Kbps (kilobits per second).

USB devices such as printers, scanners, zip drives, and keyboards benefit from faster transmission rates. The USB 2.0 standard introduced even faster transmission rates (480 Mbps) for devices that require higher rates of transmission such as MP3 players, removable hard drives, and DVDs. IEEE 1394 (named FireWire by Apple) is a high-speed serial interface standard with data transfer rates of 400 Mbps over cables up to 4.5 meters in length. It has its own bus system that can daisy chain up to 63 devices. Like USB, FireWire devices are hot swappable and power for these devices is drawn from the FireWire port.

As the processing speed of CPUs increases, computer manufacturers continue to seek ways to increase the interface speeds between the user and the system board. USB 3.0 and Thunderbolt are the newest interfaces for connecting peripheral devices to the system board. USB 3.0 can deliver up to 4.8 Gbps and remain backward compatible to the USB 2.0 standard. High-bandwidth devices such as camcorders, webcams, and Blu-ray burners, for example, will experience better performance using the USB 3.0 interface.

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IT BULLETIN **DATE: 04.03.2021**

INVENTIONS AND DISCOVERIES LIST IN SCIENCE AND TECHNOLOGY

An incredible advancement has been made in Science and Technology over the past 20 years. Some may find the future of technology unsettling and for some it is exciting. Let's have a look at some of the quirky facts about technology that might surprise us.

New Ink discovered by scientists

Council of Scientific and Industrial Research and National Physical Laboratory discovered a new ink to combat the problem of fake printing of currency notes and passports. It has a security feature that protects from duplicity.

- The new ink is developed based on fluorescence and phosphorescence phenomena.
- It comes with a single excitable dual emissive luminescent pigment.
- With this ink, the color of the pigment changes once the notes are printed.
- Developed Ink shows white color in ambient light and when exposed to UV light turns into red color. If the UV source is switched off it appears into green color.

Discovery of Paper Sensor

Scientists of IIT Guwahati developed a simple paper kit to test the freshness of the milk. You can know whether pasteurization is done well or not.

- It comes with a Smartphone app that ensures milk is consumed before it turns sour.
- Milk enzyme ALP is an indicator of the quality of the milk. ALP indicates the presence of microbes that are active even after pasteurization.
- Researchers used an ordinary filter paper impregnated with chemical probes that bind with ALP.
- Whenever ALP comes in contact with the probe, the white paper is turned colored.These Color changes are captured with a smartphone camera and the images are processed to obtain corresponding color values.
- Further, these values are compared with standard values stored on the phone. The paper sensor not just detects the presence of ALP, but also the amount of it in the milk.

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IT BULLETIN **DATE: 05.03.2021**

ARTIFICIAL INTELLIGENCE

A robust ***Artificial Intelligence*** implementation will facilitate the performance, scalability, and reliability while delivering the complete return on investments. But AI projects often face certain issues which makes them a challenge for most organizations. But there are new solution.

- Artificial Intelligence Engineering offers to make AI a part of the mainstream DevOps process rather than a set of specialized and isolated projects. This solves issues with maintainability, scalability and governance.
- Tiny AI aims to create algorithms to shrink existing deep-learning models without losing their capabilities, to pack more computational power into tighter physical spaces, and on far less energy.

This revolutionary technology is all set to bring about another revolution and hence, is on our list of trending technologies.

Huawei keeps investing in the computing industry with a strategy that focuses on four key areas.

• **Architecture innovation:** Huawei invests intensively in basic research and has launched the Da Vinci architecture, an innovative processor architecture designed to unlock robust, affordable computing power.

• **Investment in all-scenario processors:** The processor families include the Kunpeng processors for general computing, Ascend processors for AI, Kirin processors for smart devices, and Honghu processors for smart screens.

• **A clear business sphere:** Huawei will not sell its processors directly. Instead, Huawei will provide them to customers in the form of cloud services, and to partners in the form of components, prioritizing support for integrated solutions.

• **An open ecosystem:** In the next five years, Huawei will invest USD1.5 billion in the developer program, supporting five million developers and enabling partners worldwide to develop the next-generation intelligent applications and solutions.

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IT BULLETIN **DATE: 08.03.2021**

BARRIERS TO ADOPTION OF CLOUD COMPUTING IN HEALTHCARE

1. Security Concerns

The biggest setback to cloud adoption in healthcare is the possible security risk associated with it. Patient data is inherently sensitive in nature and cloud-hosted healthcare data needs to be safeguarded against external threats.

Encryption of data, use of security keys for access and using blockchain for securing data are some of the ways healthcare organizations can ensure the security of sensitive patient data stored in the cloud.

2. Compliance To Security Norms

Healthcare data and related applications need to comply with a number of data regulation laws like HIPAA, HITECH, and GDPR. This extends to cloud-hosted data as well. Ensuring compliance of the cloud-hosted data is something that healthcare providers need to look out for when moving over to the cloud.

3. System Downtimes

While the cloud offers more reliability, occasional downtimes are a reality. Having contingency planning done beforehand and preparedness for a possible failure lets to overcome any downtime if it occurs. Designing for failure is advocated as a best practice while building cloud applications.

Cloud computing still has a long way to go in the healthcare sector. It's combination with rapidly evolving technologies like Big Data analytics, artificial intelligence and internet of medical things improves efficiencies and opens up multiple avenues of streamlining healthcare delivery. It increases resource availability, boosts interoperability while lowering the costs.

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SPATIAL COMPUTING

Spatial computing uses the 3D space around us as a canvas for a user interface. Spatial computing is broadly synonymous with extended reality (XR) – itself an umbrella term for virtual, augmented, and mixed reality. However, the term spatial computing highlights the way in which, in XR, the 3D space around you is the canvas for a user interface.

WHY DOES SPATIAL COMPUTING MATTER?

The human brain has evolved to deal with a three-dimensional physical environment, not 2D screens. Even the language we use to describe thought is built around physical metaphor. Spatial computing taps into this deep, embodied knowledge.

In spatial computing, digital content of any sort (stories, data visualisations, mathematical concepts, impossibly large or small things such as galaxies or molecular structures) can be explored in ways that align with human cognitive capabilities. A new naturalism, true to your physical expectations, but taking you beyond the limitations of human perception and physical capability.

Our spatial computing design concept Stems is like windows in a desktop OS, but designed specifically for interaction in VR and AR. The three core areas that need to be solved to get us to this point are

- Technology that enables us to perceive 3D digital content (such as AR/VR headsets).
- Technology that allows us to interact naturally with 3D digital content (such as voice control, eye tracking, hand/body tracking and haptics).
- The principles of effective 3D UX design.

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ROBOTICS PROCESS AUTOMATION

RPA is changing the corporate landscape by implementing machine learning modules that emulate human behavior. RPA service providers help you develop these modules allow repetitive tasks to become reliable, automated functions that drastically increase overall productivity but also *decrease* the overall operational cost.

Benefits of Robotic Process Automation (RPA)

Extensive Cognizance

AI work in concert with one another while you focus on broader, higher level process flow allowing you to keep a pulse on a wider variety of tasks

Reduced Operational Risk

Operational risks are drastically reduced by allowing AI to accomplish high volume actions with 100% accuracy and eliminating the added risk of human error.

Employee Experience

RPA allows stronger focus on higher value work by allowing AI to complete repetitive, mundane tasks

Highly Cost-effective

Dramatically increased productivity combined with very little start up cost provides a highly scalable and cost-effective work environment

100% Customizable

Robotic Process Automation software monitors and captures data the same way a human user would interact with a software, website, or an application. Machine learning allows for a broad range of automated tasks to fit our needs!

Highly Productive

AI never sleeps high volume tasks can be accomplished ’round the clock with a higher degree of accuracy.

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WHAT IS SPINNAKER?

Spinnaker is a multi-cloud continuous delivery platform for releasing software changes. It is designed to increase release velocity and reduce the risk associated with updating applications. Spinnaker is used in production by thousands of organizations around the world to automate their software delivery process, and used by developers, testers, SREs to deploy hundreds of changes a day.

Spinnaker Features

Multicloud deployment P- Use Spinnaker to deploy applications (containers, VM, or functions) to the public cloud (AWS, GCP, Azure) or private cloud (like Openshift).

Automated pipelines - Automate our release with a flexible pipeline builder in Spinnaker to automate the CI/CD workflow and deliver multi-service composite applications into target environments without writing any scripts.

Pipeline-as-code - Use existing Spinnaker pipeline JSON files to recreate and configure application delivery workflows.

Spinnaker Deployment strategies - Deploy applications with ready-to-use built-in safe deployment strategies in Spinnaker. Spinnaker natively supports blue/green, canary, rolling update, and lets you define your custom strategy. Spinnaker also provides the ability to roll back bad deployments with one click or even automatically.

Automated Canary Analysis - Perform automated canary analysis in Spinnaker pipeline by collecting metrics from monitoring tools.

Security - Can Store sensitive information using Spinnaker integration with 3rd party secret management tools like Hashicorp Vault.

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SPEECH RECOGNITION

Speech recognition or speech-to-text, is the ability for a machine or program to identify words spoken aloud and convert them into readable text. Speech recognition incorporates different fields of research in computer science, linguistics and computer engineering. Many modern devices or text-focused programs may have speech recognition functions in them to allow for easier or hands-free use of a device.

HOW IT WORKS?

Speech recognition works using algorithms through acoustic and language modeling. Acoustic modeling represents the relationship between linguistic units of speech and audio signals; language modeling matches sounds with word sequences to help distinguish between words that sound similar.

APPLICATIONS:

The most frequent applications of speech recognition within the enterprise include the use of speech recognition in mobile devices. A smartphone user could use the speech recognition function to respond to a text without having to look down at their phone. Speech recognition on iPhones, for example, is tied to other functions, like the keyboard and Siri. If a user adds a secondary language to their keyboard, they can then use the speech recognition functionality in the secondary language.

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WHAT IS DIGITAL MULTIMEDIA BROADCASTING? (WITH PICTURES)

Digital Multimedia Broadcasting (DMB) is a method of bringing multimedia images, radio, Internet, and television to portable devices through digital radio transmissions. It can be transmitted through both **satellite** (DMB-S) and terrestrial (DMB-T) methods. The **transmission** is received by a hand-set that could be installed in cell phones, laptops, navigation systems, or digital cameras. Its use is limited, as the United States and several other countries, as of 2006, have not adopted it.

Digital Multimedia Broadcasting, both satellite and terrestrial transmissions, was adopted by South Korea in 2005. It is capable of running on III (VHF) and L (**UHF**) **radio frequency** bands. Terrestrial transmissions make use of some of the most sophisticated video and audio coding available to provide the best quality images. Satellite transmission is capable of covering an entire country and is already being used by TU Media, a component of the South Korean communication company SK Telecom, to provide over 12 video and 20 audio channels to subscribers on the go. DMB-T services provide seven video, 13 audio, and eight data channels.

Much of the technological components necessary for **Digital Media** Broadcasting and Digital Video Broadcasting transmissions, however, are similar. There are four formats in which it is available: Satellite (DVB-S), Terrestrial (DVB-T), Cable (DVB-C), and Handheld (DVB-H).

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EDGE COMPUTING

The edge is a network architectural model that brings technology resources, including compute and related infrastructure, closer to the end user or to where the data is generated. It's a decentralized extension of cellular networks where data is processed and stored at the edge, with only key information transmitted to centralized data networks like the cloud.

Edge computing doesn't replace the cloud; it simply puts the parts of the applications that need to be closer to the endpoints where they belong. It's a type of hybrid cloud, in which all data doesn't have to shuttle back and forth between far-away servers and user devices.

- An increasing need for low latency and high reliability
- The rapid expansion of the IoTAn increasingly mobile and distributed workforce.
- Bandwidth and connectivity limitations.
- The high cost of data transit and storage.
- Evolving data privacy requirements.

Edge computing arose to address a number of cloud-related challenges, including:

- By reducing the distance data has to travel, decreasing the number of hops it has to make across network equipment and consolidating information, edge computing can reduce latency, speed up processing and preserve bandwidth on the customer's existing network.
- Computing at the edge enables localization of data, too, for organizations that require data localization for security or privacy reasons and it can support business continuity by enabling regional offices or sites to stay up and running when operations are disrupted at the primary site.
- Edge computing has been steadily growing in popularity over the last few years as the performance benefits and efficiency of last-mile processing become increasingly clear.
- On its own, edge computing enables faster, localized processing. Combine it with 5G and have the architecture for a next-gen wireless network that could empower operations essentially in real time.
- 5G, the fifth generation of cellular mobile communications, is expected to approach single-digit latency and provide data transfer rates many times faster than the blink of an eye, massive bandwidth, and greater connectivity and reliability.

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GOOGLE CLOUD PLATFORM (GCP)

Google Cloud Platform is a suite of public cloud computing services offered by Google. The platform includes a range of hosted services for compute, storage and application development that run on Google hardware. Google Cloud Platform services can be accessed by software developers, cloud administrators and other enterprise IT professionals over the public internet or through a dedicated network connection.

Overview of Google Cloud Platform offerings

Google Cloud Platform offers services for compute, storage, networking, big data, machine learning and the internet of things (IoT), as well as cloud management, security and developer tools. The core cloud computing products in Google Cloud Platform include:

- Google Compute Engine, which is an infrastructure-as-a-service (IaaS) offering that provides users with virtual machine instances for workload hosting.
- Google App Engine, which is a platform-as-a-service (PaaS) offering that gives software developers access to Google's scalable hosting.
- Google Cloud Storage, which is a cloud storage platform designed to store large, unstructured data sets. Google also offers database storage options, including Cloud Datastore for NoSQL nonrelational storage, Cloud SQL for MySQL fully relational storage and Google's native Cloud Bigtable database.
- Google Container Engine, which is a management and orchestration system for Docker containers that runs within Google's public cloud. Google Container Engine is based on the Google Kubernetes container orchestration engine.

Google Cloud Platform offers application development and integration services. For example, Google Cloud Pub/Sub is a managed and real-time messaging service that allows messages to be exchanged between applications. In addition, Google Cloud Endpoints allows developers to create services based on RESTful APIs, and then make those services accessible to Apple iOS, Android and JavaScript clients.

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BLOCKCHAIN

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain. Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger. The decentralised database managed by multiple participants is known as Distributed Ledger Technology (DLT).

Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash. This means if one block in one chain was changed, it would be immediately apparent it had been tampered with. If hackers wanted to corrupt a blockchain system, they would have to change every block in the chain, across all of the distributed versions of the chain.

Blockchains such as Bitcoin and Ethereum are constantly and continually growing as blocks are being added to the chain, which significantly adds to the security of the ledger.

Why is there so much hype around blockchain technology?

There have been many attempts to create digital money in the past, but they have always failed. The prevailing issue is trust. If someone creates a new currency called the X dollar, how can we trust that they won't give themselves a million X dollars, or steal our X dollars for themselves?

Bitcoin was designed to solve this problem by using a specific type of database called a blockchain. Most normal databases, such as an SQL database, have someone in charge who can change the entries (e.g. giving themselves a million X dollars). Blockchain is different because nobody is incharge; it's run by the people who use it. Bitcoins can't be faked, hacked or double spent – so people that own this money can trust that it has some value.

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AUGMENTED REALITY

Augmented Reality (AR) is the technology that superimposes an image onto a user's view of the real world and enhances it with sound, touch, and even smell. It is a combination of the real scene viewed by the user and a virtual scene generated by computer.

The real-world applications of Augmented Reality : Defense

It helps in improving the situational awareness of the soldiers using AR technology. The tech is named as Tactical Augmented Reality (TAR). This tech has an eyepiece that assists soldiers on the battlefield to precisely locate their positions in addition to the location of others.

Impact of this technology

- TAR will one day replace night vision goggles, as this technology can help soldiers in the dark.
- It will replace the handheld GPS that soldiers carry today to locate their positions.
- The eyepiece is wirelessly connected to a thermal site on the soldiers' rifle or carbine. When the soldier is pointing the weapon, the image of the target, plus other details, such as the distance to the target can be seen through the eyepiece
- In Healthcare Traditionally handheld ultrasound scanners are used in reconstruction surgery for locating blood vessels, and bones. However, AR technology has the potential to replace ultrasound scanners as it will help in locating the blood vessels very accurately and in a shorter period.
- In Pharmaceuticals Augmented Reality tools can help scientists to picture the structure of complex molecules. Drug developers usually work with static models. The AR will help the developers to step inside the molecule and see how it moves and responds to different stimuli and situations. This will reduce errors and reduce the years-long drug development cycle.
- AR will benefit logistics industries at multiple levels of their operations like Optimizing warehouse operations, Optimizing transportation, Last-mile delivery and Enhanced value-added services.

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WHAT IS ROBOTICS?

Robotics is the intersection of science, engineering and technology that produces machines, called robots, that substitute for (or replicate) human actions. Pop culture has always been fascinated with robots.

Robotics, design construction and use of machines (robots) to perform tasks done traditionally by human beings. Robots are widely used in such industries as automobile manufacture to perform simple repetitive tasks, and in industries where work must be performed in environments hazardous to humans. Many aspects of robotics involve artificial intelligence; robots may be equipped with the equivalent of human senses such as vision, touch, and the ability to sense temperature. Some are even capable of simple decision making, and current robotics research is geared toward devising robots with a degree of self-sufficiency that will permit mobility and decision-making in an unstructured environment. Today's industrial robots do not resemble human beings; a robot in human form is called an android.

Robotics applications demonstrating new tech, markets :

1. In the operating room. Surgeons have always needed steady hands, as even the slightest of movements could cause them.

2. Law enforcement and emergency response. First responders, incident-response teams, and law enforcement officers.

3.Welding with robots. Like surgeons, welders must be incredibly accurate with their movements.

4. On the farm. Agriculture has always been subject to the vagaries of weather, soil conditions, pests, etc…

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3D BIOPRINTING

3D bioprinting is the printing of solid, three-dimensional objects from a digital file with an additive process utilizing different materials like liquid metals, polymers, ceramics, epoxy resin, or living cells.

How it's Used in Health Care

Bioprinting living human tissue using stem cell bioink has the potential to reduce the shortage of organs for life-saving transplants. This is a work in progress: The company Organovo made a human liver model out of 3D bioprinted liver tissues, which are being used for drug testing and development. Additionally, 3D-printed drugs can be tailored to specific patient needs, such as the FDA-approved Sprintam.

3D Printing Market Projection

The global 3D bioprinting market is projected to reach $1.8 billion by 2027. There's good reason for this growth. 3D bioprinting further the study and research of the molecular basis of diseases via testing models manufactured with 3D-printed human tissue cells.

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AI APPS

DataBot – DataBot is an AI-powered virtual assistant, and it's available on Windows 10, Android, and iOS. It's also available on Xbox One, iPad, iPod, Android tablets, and Windows phones.This app answers our questions in its voice, and it addresses the topics that matter to you. DataBot has services integrated within it that provide you with images, information, and multimedia presentations based on the topic of your interest. It uses Google searches, Wikipedia, RSS channels, etc. to provide you with information.

We can customize DataBot according to our preference of language, voice, etc. DataBot can speak and understand English, Italian, Spanish, French, German, and Portuguese. Using DataBot, information can be shared using SMS, email, and social media.

Hound - Hound is an AI-powered voice assistant app, and it's available both on Android and iOS. You can search for information using your natural voice, and then you can follow-up to refine the results. Hound can be used hands-free.

It can give you accurate results quickly, and it can make a phone call or send a text message for you. You can get news, weather information, find a hotel nearby, navigate to an address, call an Uber, check flight status, and more!

The app uses its proprietary Speech-to-Meaning and Deep Meaning Understanding technologies. Hound has an impressive array of customers, e.g., Mercedes-Benz, Honda, Motorola, and Hyundai.

Youper - An AI-powered emotional health assistant app, Youper is available both on Android and iOS. This app can help users take control of their emotional health as they can have quick conversations with it. Youper can guide users through personalized meditations.

Users can understand themselves better and track their mood with the help of Youper. Youper uses AI to personalize various techniques.

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ARTIFICIAL INTELLIGENCE CATEGORIES

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

- The goals of artificial intelligence include learning, reasoning, and perception.
- AI is being used across different industries including finance and healthcare.
- Weak AI tends to be simple and single-task oriented, while strong AI carries on tasks that are more complex and human-like.

Applications of Artificial Intelligence

The applications for artificial intelligence are endless. The technology can be applied to many different sectors and industries. AI is being tested and used in the healthcare industry for dosing drugs and different treatment in patients, and for surgical procedures in the operating room. Other examples include computers that play chess and self-driving cars. Each of these machines must weigh the consequences of any action they take, as each action will impact the end result. In chess, the end result is winning the game. For self-driving cars, the computer system must account for all external data and compute it to act in a way that prevents a collision.

Categorization of Artificial Intelligence

- Artificial intelligence can be divided into two different categories: weak and strong. **Weak artificial intelligence** embodies a system designed to carry out one particular job. Weak AI systems include video games such as the chess example from above and personal assistants such as Amazon's Alexa and Apple's Siri.
- **Strong artificial intelligence** systems are systems that carry on the tasks considered to be human-like. These tend to be more complex and complicated systems. They are programmed to handle situations in which they may be required to problem solve without having a person intervene. These kinds of systems can be found in applications like self-driving cars or in hospital operating rooms.

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