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

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT Bulletin

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KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 25.06.2018**

IIT – M TO TEST 5G TECH FOR REMOTE MONITORING

By automatically opening the venetian blinds of our windows to keeping tabs on electricity meters and tracking our babies from a remote location, 5G- the next generation wire-less technology can turn our humble dwelling into a smart home in the next couple of years. A tiny low-cost device developed by Indian researches on this technology is expected to make automation and affordable smart devices in Indian households.

Researchers at the Indian Institute of Technology, Hyderabad have developed a narrow band IOT (Internet of Things) device that is capable of transmitting data to a smart phone when connected to sensors or a GPS module for remote monitoring and management of systems.

The device, which functions as a modem, will be one of the many technologies developed and tested at the test bed going to be set up at the Indian Institute of Technology, Madras. The Centre had announced in the Union budget that it would set up the 5G test bed involving a team from five IIT's and other R&D institutions. Prof. Kiran Kuchi, who developed the device, said it can transmit data through a base station to a smart phone similar to cellular communication.

These are different from smart phones. They are radio communication modules that will be extremely low-cost devices and revolutionize sensor communication. Unlike the devices in the market that work on WiFi of Bluetooth technology that function only for short distances, the IOT devices are designed to operate at long distance.

Submitted By
ABDUL MAJITH.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 26.06.2018**

GOOGLE CLIPS

Google Clips is a miniature clip-on camera device developed by Google. It was announced during a Google event on 4 October, 2017. It was released for sale on January 27, 2018.

With a flashing LED that indicates it's recording, Google Clips automatically captures video clips at moments and its machine learning algorithms are determined to be interesting or relevant. It has a built-in 16 GB Storage and can record clips for up to 3 hours.

HOW DOES IT WORK?

When we're hanging out with our kids or pets and they spontaneously do something interesting or cute that we want to capture and preserve. But by the time we've gotten our phone out and its camera opened, the moment has passed and we've missed our opportunity to capture it.

Google is trying to solve this problem with its new Clips camera. This device uses artificial intelligence to automatically capture important moments in our life. It's for all of the in-between moments we might miss when our phone or camera isn't in our hand. It is meant to capture our toddler's silly dance or our cat getting lost in an Amazon box without requiring you to take the picture. The other issue Google is trying to solve with Clips is letting us spend more time interacting with our kids directly, without having a phone or camera separating us, while still getting some photos.

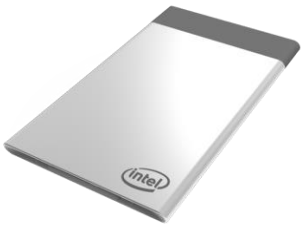
Submitted By
AISWARYA.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 27.06.2018**

INTEL'S CREDIT CARD-SIZED COMPUTER



While some laptop and desktop computers are designed to be customized and upgraded, Intel is thinking about how to upgrade the various Internet-connected home appliances and robots we may own in the future. Intel's Compute Card, which is about the size of a credit card, is a mini-computer designed to be easily inserted into smart devices.

The idea is to make upgrading gadgets like smart refrigerators, interactive retail kiosks and connected security cameras as easy as swapping out one component. This prevents the need to buy the entirely new system once new standards in connectivity or faster processors are released. The computer includes essentially all of the same aspects of a standard-sized computer, including a processor, memory, storage, and wireless tech.

Submitted By
AJITH KUMAR.L
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 28.06.2018**

VERNACULAR APPS

Vernacular describes everyday language, including slang, that's used by the people. It can also say specific groups have a **vernacular**, meaning the unique way people in a certain region or profession speak.

The hinterlands of India make for the fastest-growing global smart phone market. The first wave of new users has reluctantly adjusted to the foreign biases in their devices' interface.

However, they are beginning to expect their devices to adjust to their desires and the ecosystem will evolve to satisfy them. Underlying technologies that enable vernacular content such as speech-to-text, language-translation, and automated content generation are maturing.

Unlike in the past, when companies paid lip service to regional languages by changing a few menu items to Hindi, it is expected to see truly vernacular versions of several popular Indian apps in 2018. Their entire interfaces will be in Hindi, Bengali, etc. More interestingly, several apps being designed Hindi-first or Tamil-only where the product itself is targeted for a particular community.

Submitted By
AKASH KUMAR.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 29.06.2018**

DIGITAL CREDIT

Digital credit is disbursed and recovered rapidly, often in 30 days or less, and generally with loan amounts smaller than conventional **credit** or micro-lending. CGAP built a **digital credit** financial model to investigate the basic financial dynamics of loan portfolios made up of short-term, small loans.

Lack of easily accessible credit is one of the biggest impediments to entrepreneurship in India. The young adult wanting to open a bike repair shop or start a clothing label is limited by capital. Banks continue to rely on antiquated mechanisms like credit ratings and salaries.

2018 is expected to be the year to see new credit offerings doing well, in particular, credit tied to online purchases and contract work. Digital lending will rely primarily on digital trails of data to rate credit seekers, and use digital mechanisms to issue and recover loans. The efficiencies of these mechanisms will allow issuance of credit of lower denominations and for shorter periods.

Submitted By
ANUPRIYA.G
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 02.07.2018**

DIGITAL MARKETING

Using **digital marketing**, an enormous audience can be reached in a way that is both cost-effective and measurable. It can save money and reach more customers for less money than traditional **marketing** methods. Get to know the audience and allow them to know personally which can help to create brand loyalty.

A **digital marketing** manager is responsible for developing, implementing and managing **marketing** campaigns that promote a company and its products and/or services. He or she plays a major role in enhancing brand awareness within the **digital** space as well as driving website traffic and acquiring leads/customers.

Digital marketing is data driven and targeted brand promotion through technology. While the umbrella term, “Digital Marketing,” can include mobile apps, podcasts, and other forms of digital media, the internet is the center of all tools and channels at a digital marketer’s disposal.

Digital marketing is exceedingly organized, highly targeted, and delivers measurable results in real time. There is no guesswork involved. Strategies are tested continually in order see what’s working and what isn’t. It is able to measure results and implement strategy adjustments immediately. This is the way of digital marketing when a highly skilled digital marketing agency supporting a brand.

Submitted By
ARAVIND.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 03.07.2018**

5G COULD INTERFERE WITH WEATHER SATELLITES, SCIENTISTS WARN

5G will **use** spectrum in the existing LTE **frequency** range (600 MHz to 6 GHz) and also in millimeter wave bands (24–86 GHz).5G networks are already here, and more are coming. This advanced form of wireless connection could possibly reaching speeds 100 times faster, support 100 times more devices, and feature five times lower latency than today's 4G networks.

Early versions of 5G are rolling out at a small scale with parts of Chicago and Minneapolis playing guinea pigs with mixed results, but there's been an unexpected hitch: some scientists are worried that 5G networks could interfere with weather satellites used for crucial Earth observations.

The closeness of a natural frequency to that of the 5G network could spell massive difficulties for Earth-orbiting satellites. For example, satellites like the European MetOp probes monitor energy radiating off the Earth with the goal of assessing humidity in the atmosphere. Using the 23.8-gigahertz frequency, where water vapor in the atmosphere gives off a feeble signal, these probes give researchers access to data 24/7 and the ability to look through clouds.

RF Radiation dissipates with distance. In other words, a low powered exposure right next to someone, is more **dangerous** than a more powerful exposure a long ways away. Also the longer the exposure time is, the more **dangerous** it is. **5G** will be the worst of both worlds.

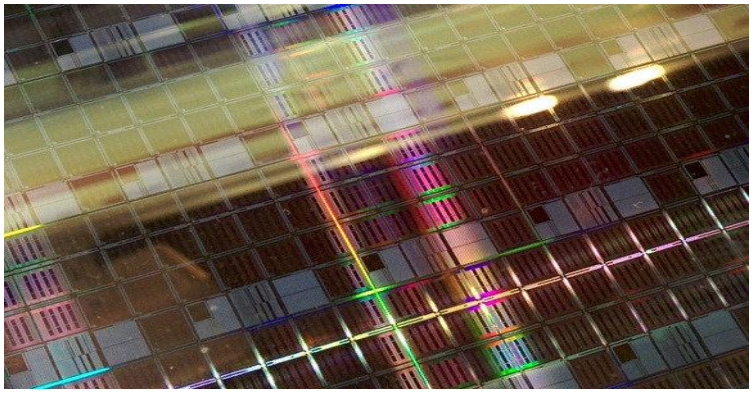
Submitted By
ARUN KUMAR.R
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 04.07.2018**

AMD RATCHETS UP CHIP BATTLE WITH INTEL



Advanced Micro Devices Inc. today debuted two new chips, one for the enterprise and another targeting consumers, that will each one-up the competition in their respective markets.

The company made the announcements at the Computex computing trade conference in Taipei. The event had earlier seen the introduction of new chips from Nvidia Corp. and Intel Corp., which will no doubt keep an eye on AMD's latest entries into the market.

The first product the company previewed is an enterprise-grade graphics processing unit touted as the first in the industry to feature a 7-nanometer transistor architecture. It represents a major improvement over AMD's previous, 14-nanometer GPU.

The smaller the circuits on a chip are, the more of them can be incorporated into the die, which in turn increases performance. Smaller transistors also have the added benefit of requiring less electricity. All this is reflected clearly in the limited information that AMD has shared about the GPU.

The chip is 35 percent faster than its predecessor and up to two times more power efficient. Plus, it comes with a hefty 32 gigabytes of high-bandwidth memory. The GPU will offer a potentially compelling alternative to Nvidia's market-leading graphics accelerators for enterprises working on artificial intelligence projects.

Submitted By
ARUN KUMAR.M
II B.Sc. (CT)

VIRTUAL REALITY TECHNOLOGY TRANSFORMING CARDIOVASCULAR MEDICINE

Rapid advancements in the field of virtual reality are leading to new developments in cardiovascular treatment and improved outcomes for patients, according to a review paper. Extended reality applications in cardiac care include education and training, pre-procedural planning, visualization during a procedure and rehabilitation in post-stroke patients.

Virtual reality provides complete control over the wearer's visual and auditory experience as they interact within a completely synthetic environment, while augmented reality allows the wearer to see their native environment while placing 2D or 3D images within it. Merged reality and mixed reality allow for interaction with digital objects while preserving a sense of presence within the true physical environment. These technologies make up the full spectrum of extended reality, which is transforming the practice of cardiovascular medicine.

Advances in this technology allow patients and family members to better understand their cardiac conditions, helping them to make more informed decisions surrounding their medical care. Medical students and trainees can better visualize cardiac abnormalities with virtual reality, which allows trainees to simulate operating environments and multiple physicians to interact while viewing the same educational material in a natural environment. Additionally, 3D workstations may assist physicians in assessing the heart in surgical situations where it may be difficult to see.

Submitted By
BARANIDHARAN.U
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

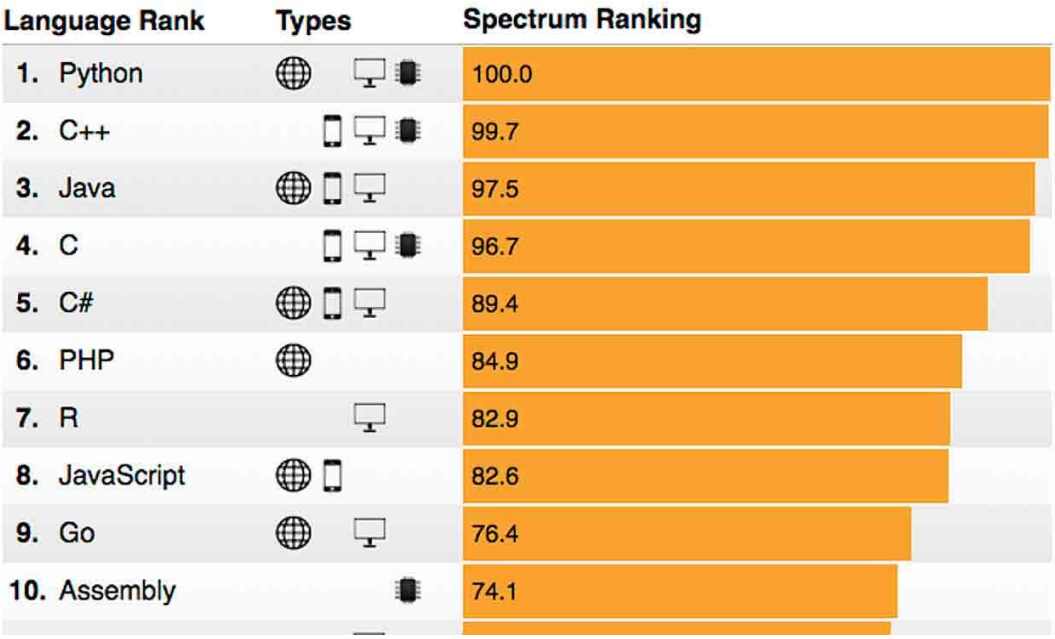
DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 06.07.2018**

TOP PROGRAMMING LANGUAGES OF 2018

Survey respondents were asked to rate the importance of different technologies on a scale from very interesting to not interesting at all. Within the languages section, it became very clear that engagement with Java (especially Java 9!) was a top priority for the readers.

By combining the first two categories *(*Interesting *and* Very interesting*)* this is what we see:



Software development is a dynamic field. New and in-demand programming languages, frameworks and technologies can emerge, rise to fame, and then fade away in the course of a few years. Developers need to constantly be learning new skills to stay relevant.

Submitted By
DEEPAK.P.V
II B.Sc. (CT)

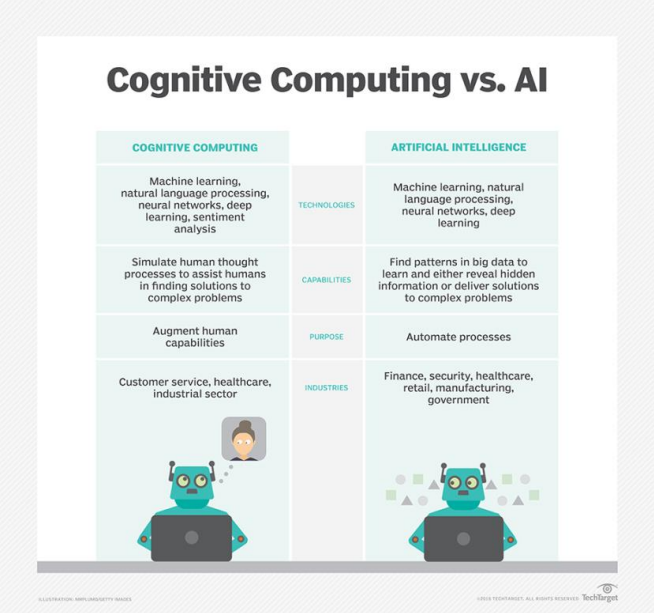
KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 07.07.2018**

COGNITIVE TECHNOLOGY

Cognitive technology is a field of computer science that mimics functions of the human brain through various **means**, including natural language processing, data mining and pattern recognition. **Cognitive computing** describes **technologies** that are based on the scientific principles behind artificial intelligence and signal processing, encompassing machine self-learning, human-**computer** interaction, natural language processing, data mining and more. A **cognitive system** is a one that performs the **cognitive** work of knowing, understanding, planning, deciding, problem solving, analyzing, synthesizing, assessing, and judging as they are fully integrated with perceiving and acting.



Cognitive computing is a subfield of **AI** and refers to **computing** that focuses on reasoning and understanding at a higher level. **Cognitive computing** finds application in areas that require to improve decisions, reduce costs, and optimize outcomes by leveraging natural language and evidence based learning. **Cognitive Computing** and Augmented Intelligence Is Changing The Data-Driven World. **Cognitive** systems are systems that have the ability to analyze, interpret, reason and learn, thus augmenting human intelligence, and they are able to do so without constant human involvement.

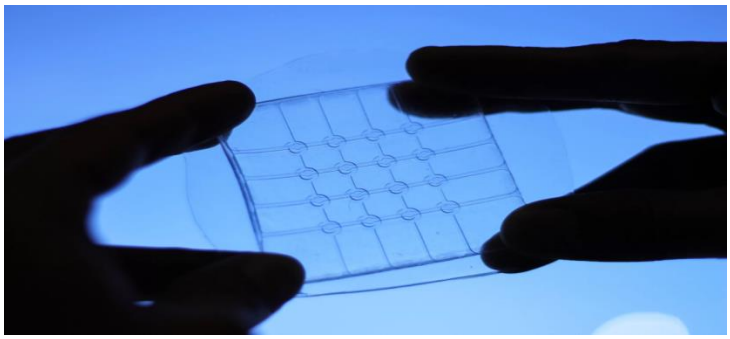
Submitted By
DEEPAK.S.M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 09.07.2018**

TRANSPARENT TOUCHPAD WORKS EVEN WHEN IT'S BEND AND STRETCHED



Researchers have developed a new, flexible touchpad that can tell the difference between a touch and a stretch. Moreover, the device is also transparent which suggests that it could get combined with a flexible display to create a flexible touch screen.

The new device is made with a hydrogel which is structurally similar to the materials from which soft contact lenses are made. But people have developed these extremely tough gels to replace cartilage and some of these can stretch by a factor of 20 or more. By adding salt to the water-laden hydrogel, electrically charged ions can flow within the hydrogel and generate an electric field around it. When a finger comes near the hydrogel, it interacts with the electric field in a way that electrodes attached to the hydrogel can detect. These signals are readily distinguishable from those generated when the hydrogel is flexed.

The scientists embedded the hydrogel in silicone rubber. They created a square transparent touchpad about 1.2 inches (3 centimeters) wide, with 16 buttons that are each about 0.2 inches (5 millimeters) wide. The array retained its sensing abilities even when it was bent or stretched, and it could withstand such common environmental contaminants as coffee spills, according to the study. The transparent pad could also detect multiple fingers simultaneously, which is necessary for a typical zoom function on a smart phone. It opens up the opportunity to make wearable devices or some sort of robotic skin or putting it under a carpet to detect someone elderly falling.

Submitted By
DEVA DHARSINI.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 10.07.2018**

LIFE EXPECTANCY OF A USB FLASH DRIVE

USB flash drives are great to use for storing digital files and are replacing CDs & DVDs as the preferred storage media of choice.

The advantages of flash drives are that they are portable, durable, and have incredible storage capacity (ranges from 64MB to 256GB as of 2010). Furthermore, they are able to retain the memory even after the power is turned off. But does the memory last forever though? Should you use them to store important documents and files? How long do they last?

If we simply write data to a USB flash drive and put it away in a safe place for 10 years, it will work again and all the data will still be there. But if we continue to use it over and over again, it will definitely wear out eventually.

USB FLASH DRIVES HAVE FINITE NUMBER OF WRITE/ERASE CYCLES

The life expectancy of a USB Flash Drive can be measured by the number of write or erase cycles. USB flash drives can withstand between 10,000 to 100,000 write/erase cycles, depending on the memory technology used.

When the limit is reached, some portion of the memory may not function properly, leading to lost of data and corruption. Of course, the flash drive's life can also end prematurely if you abuse it or subject it to extreme environmental conditions. Additionally, if low quality memory components are used, the flash drives can fail at a much earlier time.

Submitted By
DHARANI .M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 11.07.2018**

GUARDING THE FIREWALL: ENSURING CYBER SECURITY FOR SMALL BUSINESSES

The India Risk Survey 2017 report ranks 'Information & Cyber Insecurity' as the biggest risk facing Indian companies. Indian organizations, both public and private, had witnessed over 27,000 incidents of security threat, from January 2017 till June 2017 alone.

Phishing, scanning/probing, website intrusions and defacements, virus/malicious code, ransomware, Denial of Service attacks, and data breaches are some ways in which hackers attack business websites, which can cause operational disruptions and potentially steal sensitive information. Small and medium businesses (SMBs), unfortunately, have been seeing rising incidences of cybercrime. In fact, 70 percent of cyber attacks occur at organizations with lesser than 100 employees.

Submitted By
DINESH.E
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 12.07.2018**

REMIXED SUPPLY CHAINS

A supply chain is a network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different activities, people, entities, information, and resources. The supply chain also represents the steps it takes to get the product or service from its original state to the customer.

Logistics refers specifically to the part of the supply chain that deals with the planning and control of the movement and storage of goods and services from their point of origin to their final destination. Logistics management begins with the raw materials and ends with the delivery of the final product.

Traditional traders have effective supply-chain systems for distributing goods, handling inventory, offering credit, and liquidating unsold goods across small towns. The e-commerce industry has built parallel supply chain systems that work efficiently for metros and large cities. This year will see a remixing of these two supply-chain systems, especially as technology-enabled players try to penetrate broader Indian markets.

Online bulk-selling, e-distributors, warehousing and logistics-as-a-service, and e-commerce players using kirana stores and housewives as resellers will become part of the landscape.

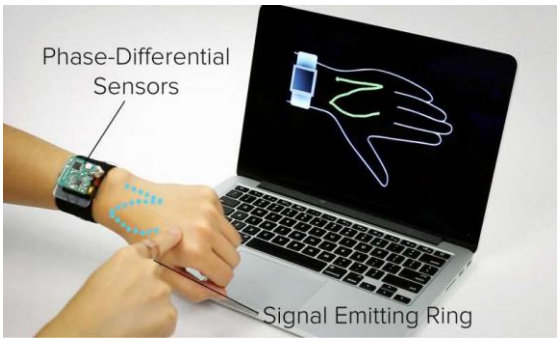
Submitted By
DINESH PRIYAN.K
II B.Sc. (CT)

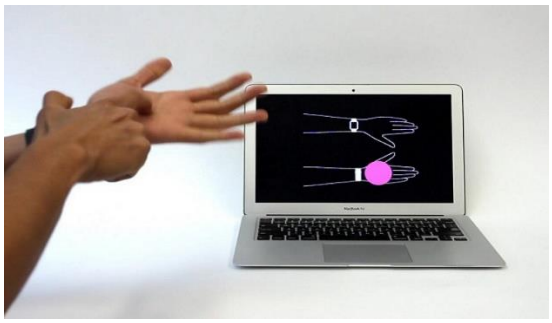
KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 13.07.2018**

ARM INTO A TOUCHPAD





A new wearable technology developed at Carnegie Mellon University suggests turning the entire lower arm into a touchpad called Skin Track.

Previous "skin to screen" approaches have employed flexible overlays, interactive textiles and projector/camera combinations that can be cumbersome. Skin Track, by contrast, requires only that the user wear a special ring, which propagates a low-energy, high-frequency signal through the skin when the finger touches or nears the skin surface.

The new system allows for continuous touch tracking on the hands and arms. It can also detect touches at discrete locations on the skin enabling functionality similar to buttons or slider controls called SkinTrack and developed by the Human-Computer Interaction Institute's Future Interfaces Group, the new system allows for continuous touch tracking on the hands and arms. It also can detect touches at discrete locations on the skin, enabling functionality similar to buttons or slider controls.

Submitted By
DIVYALAKSHMI .S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 16.07.2018**

GOOGLE VOICE CALLING!!!

Google's voice-calling "Duplex" - which lets Artificial Intelligence (AI) mimic a human voice to make appointments and book tables through phone calls - may soon enter call centres assisting humans with customer queries. According to a report in The Information late on Thursday, an unnamed insurance company has shown interest in "Duplex" which could "handle simple and repetitive customer calls" before taking help from a human if the conversation gets complicated.

Google, however, said in a statement that the company is not testing "Duplex" with any enterprise clients. They are currently focused on consumer use cases for the 'Duplex' technology. 'Duplex' is designed to operate in very specific use cases, and currently focused on testing with restaurant reservations, hair salon booking and holiday hours with a limited set of trusted testers.

At its annual developer conference in May, Google CEO Sundar Pichai introduced "Duplex" and demonstrated how the AI system could book an appointment at a salon and a table at a restaurant. In the demo, the Google Assistant sounded like a human. It used Google DeepMind's new "WaveNet" audio-generation technique and other advances in Natural Language processing (NLP) to replicate human speech patterns.

Tech critics raised questions on the morality of the technology, saying it was developed without proper oversight or regulation. Microsoft has showcased a similar technology it has been testing in China.

Submitted By
GOKUL ANAND.E
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 17.07.2018**

ENTERPRISE SECURITY: WHEN NEW TECHNOLOGIES BRING NEW THREATS

The digital revolution took over the world a few years ago and only now all begun adjusting to its dynamics. In the event of digital solutions like cloud, analytics and now artificial intelligence enabling fast tracking of processes, that can no longer ignore the potential repercussions, if improperly deployed.

A notable observation is the inadequateness of the existing security paradigm, in protecting applications and data against malicious attacks. With this emerging reality, it has become necessary for businesses to re-evaluate their security approach and identify gaps responsible for exposing sensitive data.

In today's expanding threat landscape, there are a number of areas which organizations should focus on that are crucial for an organization to ensure security and sustenance.

Submitted By
GOKUL.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 18.07.2018**

GOOGLE LENS IS NOW AVAILABLE TO EVERYONE ON ANDROID

Google unveiled that its Lens feature would become available to all Android and iOS users through the Google Photos app, following an exclusivity period of a few months for Pixels. Now the integration is finally rolling out with an update to Photos in the Play Store.

With Lens, a contact can be created from a photo of a business card or get more information about a famous landmark that have been captured. That's because Lens understands what we're looking at, and will try to make the most of that. It will soon have improved support for recognizing common animals and plants, so it will be able to tell different dog breeds apart, for example.

Submitted By

GOKULKRISHNAN.R

II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 19.07.2018**

MORE THAN 50 PERCENT OF SMARTPHONES NOT PASSWORD PROTECTED: KASPERSKY LAB

Over 50 percent of smartphone users do not use passwords or anti-theft solutions, leaving their devices and the increasing amount of precious data on them accessible to anyone, says a survey. Many people today rely on their mobile devices to access the Internet and carry out online activities such as online banking, emails and social media activities, all of which involves a huge quantity of sensitive data.

The survey by Russia-based cybersecurity company Kaspersky Lab showed that less than 48 percent of people password-protect their mobile devices and just 14 % of people encrypt their files and folders to avoid unauthorized access.

All love our connected devices because they give us access to vital information, from anywhere at any time. They are valuable items that criminals naturally want to get their hands on, and their job is made easier by the fact that every other pickpocketed phone is not password protected. Further, the survey showed that less than half (41 per cent) of people make backups of their data and only 22 percent use anti-theft features on their mobile devices.

If these devices fall into the wrong hands, all of this data from personal accounts, including photos, messages and even financial details could become accessible to someone else, the study said. There are a few really simple things that everyone can do to secure their devices and the data they hold. By applying password protection and using a dedicated security solution, including anti-theft protection, can protect personal information, photos and online accounts from both loss and malicious usage.

Submitted By
GOPINATH .N
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 20.07.2018**

NASSCOM

National Association of Software and Services Companies (NASSCOM) is positioning itself as an Ecosystem partner to startups, multinational companies and engineering service providers, not just software exporters.

It has been six months of the year, how is the IT industry growing? There is a massive transformation that is happening in the industry. While there are opportunities, there are also challenges. There is going to be new way of looking at numbers. Now looking at past projections and comparing growth numbers. Look at digital revenue, it has grown from 14% to 20%. It is expected to cross 38% by 2025 that is a very healthy sign.

The first caveat when talk about Nasscom, is more than IT services companies. It represents startups, consumer internet companies, captives, the R&D companies and the growth of all these stakeholders. The magic of NASSCOM, is that it find companies that compete fiercely and collaborate seamlessly for the betterment of the industry. People truly have an industry first agenda and not a company first agenda when they come to a NASSCOM discussion.

There are a different mantra at NASSCOM, it is Nation first and industry second. When there are multiple viewpoints, they give different views. If everybody agrees, then there's a problem. Sometimes both viewpoints are put forward and at times recommendations are put forward that is believed the best for India. It is about nation first. So far, we have not faced a situation where we have not been able to find a solution.

The IT services industry is much more resilient than people give it credit for. The reality is we have lived through so many phases, if it go through the phases of Y2K, enterprise ERP, and infrastructure; it is quite relevant in the context of the customer service. Upskilling or the future skill programme is one of the flagship efforts of Nasscom. How to skill 2 million people of the 4 million and then the rest of 2 million? It continues to be relevant as an industry and as a country. For some pieces of the work, 90% of it happens in India and the fundamental of the global delivery model is not going to change.

Submitted By
HANEESH .L
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE
DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 21.07.2018**

SEVEN WAYS TO DETECT RANSOMWARE BEYOND ANTIVIRUS

Ransomware is a creative malware that infects systems and locks down data, preventing users from accessing it until a ransom is paid. It can affect individuals and businesses alike, but can become a critical threat for enterprises dealing with huge amounts of data.

Once infected with it data is more or less lost, unless backups are available. In these types of threats, it is better to focus on prevention and detection mechanisms before it is too late. Due to the evolving threat situation in the Ransomware space, it is ineffective to have a signature oriented approach to detection.

The new breed of security products need to be multi-pronged and should be able to look at multiple dimensions to protect an organization or individuals from such attacks. Here are some pointers to these dimensions that need to look at to protect from such attacks.

- **Secure Network Shares**
- **Regular Analytics on Service Usage**
- **Detect Internal C&C Accounts**
- **Actively Detect Rogue Browser**
- **Applying Threat**
- **Scan for Indicators of Compromise**
- **Detect Drive by Downloads**

Submitted By
HARI PREETHI.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 23.07.2018**

TECH MAHINDRA TO IMPART BLOCKCHAIN TRAINING

Tech Mahindra Ltd will set up a Blockchain centre within its research & development arm 'Makers Lab' at its Hyderabad facility in order to facilitate co-innovation in the space, developing enterprise grade solutions for customers across industries globally.

The company has launched the Tech Mahindra BlockGeeks programme in its Hyderabad campus to facilitate competency in the field of Blockchain Technology. In its first phase, the company will up-skill a batch of 20 eligible candidates to make them Blockchain-ready and will gradually roll out the programme globally.

Under the TechM BlockGeeks, eligible candidates will undergo comprehensive training in the lab post which they will be required to set up code, create smart contract and build solutions, thereby gaining technical proficiency in Blockchain technology. They are targeting around 3000 blockgeeks to be trained by FY19.

The Makers Lab is a research & development hub for co-innovation of solutions and services of the future with customers, partner companies, research institutions, universities, and start-ups.

The development work carried out in the Makers Lab is focused on next gen technologies such as Artificial Intelligence (AI), Machine Learning, Robotics, Internet of Things (IoT), Augmented Reality/ Virtual Reality, 5G Network of the future. Tech Mahindra has Makers Labs across four locations in India at Pune, Chennai, Hyderabad and Bengaluru, besides labs in the US, the UK and Germany.

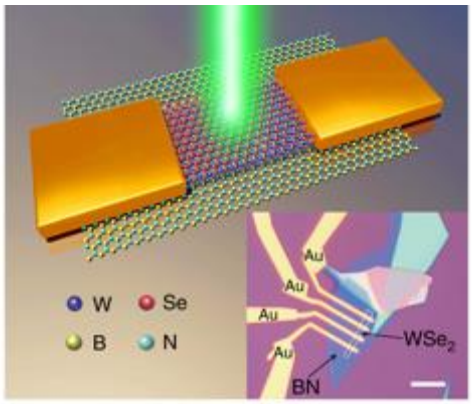
Submitted By
HARIHARAN.M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 24.07.2018**

TWO-DIMENSIONAL MULTIBIT OPTOELECTRONIC MEMORY WITH BROADBAND SPECTRUM DISTINCTION



Optoelectronic memory plays a vital role in modern semiconductor industry. The fast emerging requirements for device miniaturization and structural flexibility have diverted research interest to two-dimensional thin layered materials. Here, a multibit nonvolatile optoelectronic memory based on a heterostructure of monolayer tungsten diselenide and few-layer hexagonal boron nitride are reported. The tungsten diselenide/boron nitride memory exhibits a memory switching ratio approximately 1.1×10^6, which ensures over 128 (7 bit) distinct storage states.

The memory demonstrates robustness with retention time over 4.5×10^4 s. Moreover, the ability of broadband spectrum distinction enables its application in filter-free color image sensor. This concept is further validated through the realization of integrated tungsten diselenide/boron nitride pixel matrix which captured a specific image recording the three primary colors (red, green, and blue). The heterostructure architecture is also applicable to other two-dimensional materials, which is confirmed by the realization of black phosphorus/boron nitride optoelectronic memory.

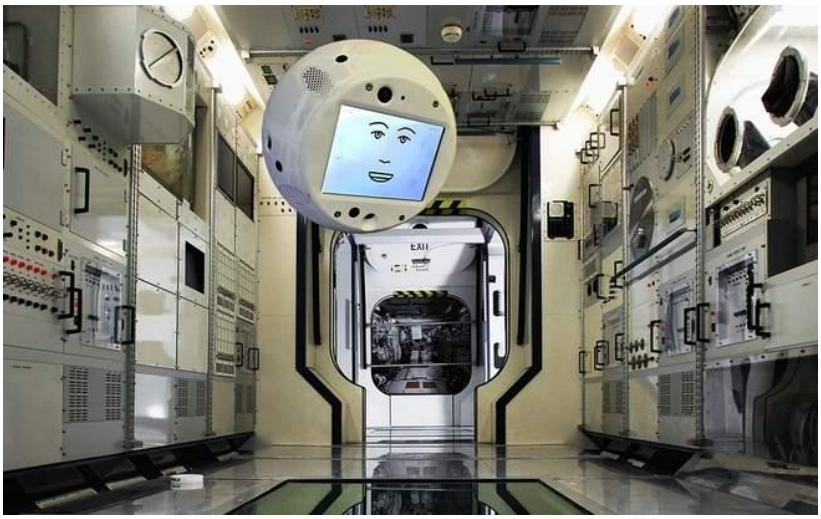
Submitted By
HARISH.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 25.07.2018**

CIMON (CREW INTERACTIVE MOBILE COMPANION) BY AIRBUS & IBM



Floating Ai Astronaut Assistant

CIMON is a mobile and autonomous assistance system designed to aid astronauts with everyday tasks on the ISS. This will be the first form of Artificial Intelligence (AI) on an ISS mission. (Airbus) Share. Meet **CIMON**, a 'Floating' Space Assistant for Astronauts On Earth, CIMON weighs 11 pounds and is a bit bigger than a basketball. In low-Earth orbit, the robot, powered by IBM's Watson natural-language artificial intelligence, is designed to act like a space-bound personal assistant.

It's similar to Siri or Alexa, but equipped with knowledge that can help astronauts make repairs to the ISS, run the many experiments sent into space, or even talk the crew through basic medical procedures. It headed to the ISS this summer as a free-floating assistant, able to fly around the station on command with the help of 14 specialized fans. In mid-November, German astronaut Alexander Gerst successfully walked the floating assistant through its first camera-toting, voice-activated, rubix-cube-solving paces.

Submitted By
ISWARYA.V
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 26.07.2018**

5G PROLIFERATIONS WILL HELP ADVANCE OTHER TECHNOLOGY

Companies have made large strides toward rolling out small cell antennas throughout the country and many smartphone users can expect access by the second quarter of 2019.

5G technology is about 20 times faster than our current 4G experience and most smartphone users will start to access 5G by the second quarter of this year.

5G has the potential to join a very exclusive club the handful of technologies throughout history that transform industries across every sector of the economyredefining work, elevating living standards, and having a profound and sustained impact on our global economic growth.

Verizon launched the world's first 5G network in October in certain parts of Houston, Sacramento, Los Angeles and Indianapolis. Much of the wide band for 5G is already done across the country; installation of 5G network equipment will be the next step.

Look for 5G service to appear at high traffic locations like stadiums and airports before it becomes more widely available in cities across the nation.

Submitted By
JAYA SHREE.D
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 27.07.2018**

WHAT'S INSIDE WOOKIEE

The Wookie platform repository contains the core, supporting components and a test library. Wookiee can be used as both a library and a service. A main class called HarnessService is provided along with out-of-the-box conveniences. HarnessService is executed to use the framework as a service. Example projects are provided, along with Maven archetypes for developing components or a service.

The library includes:

- A command manager to execute commands.
- A component manager to load component .jar files and managers.
- A service manager to load user services, where an application's primary business logic resides.
- Basic logging for components and services.
- Utility libraries for common functions in code.
- A health provider, providing a framework for health in services and components.

Components in Wookiee provide pluggable core functionality. These components are dynamically loaded into the framework, letting developers load only the components they want. A component is defined by a class object; the component trait is found in the wookie-core project. The framework will start any component found in a location defined by the component class-key in the harness configuration file.

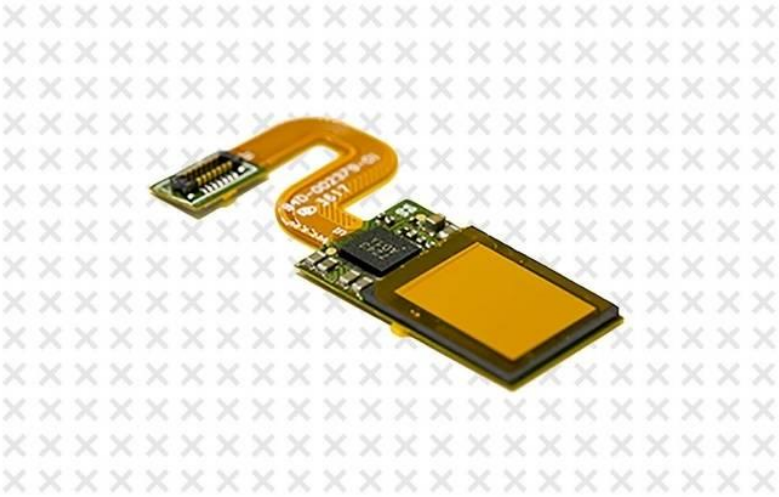
Submitted By
JEEVA.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 30.07.2018**

A FINGERPRINT SENSOR INSIDE A SCREEN



Phone bezels those black borders encircling the display are dying off. The loss leaves no room on the device's face for a fingerprint reader, unless it lives inside the screen itself. The optical sensor on the Synaptics Clear ID scanner, which debuted overseas on the Vivo X21 this past fall, resides below a handset's OLED screen. Sitting beneath coated glass makes the sensor better able to handle conditions that tend to befuddle biometrics, such as wet or dirty fingers. Scanning is also swift: It takes just 7 milliseconds, compared to the more than 100 milliseconds facial readers need.

Submitted By
KAJANISH .B.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 31.07.2018**

PHISHING ATTACKS ARE EVOLVING

The amount of time people spent online has steadily increased with most U.S. adults using their mobile devices for roughly three and a half hours daily in 2018. People are using mobile for everything from browsing the web to paying for products at stores.

In parallel, phishing attacks continue to be a major problem, and users continue falling for them as they become more sophisticated and harder to track. With scaling back on connectivity being a non-option, the cybersecurity and IT industry will have to focus on education and prevention.

Companies like HoxHunt, for instance, are emphasizing a security approach based on education and preparation by gamifying the process of training users. Individuals receive simulated attacks and are scored on how well they detect and report these incidents. This model is more useful when it comes to phishing, as software alone can't filter out many of these attacks.

Submitted By
KANNAN.V
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

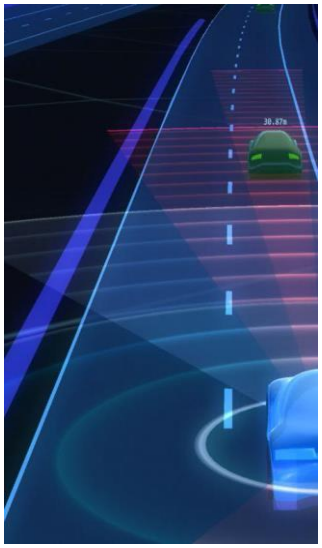
DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 01.08.2018**

ASSISTED TRANSPORTATION

Assisted transportation also refers to a program transporting older persons to and from community facilities and resources for purposes of acquiring services. **Transportation technology** refers to tools and machines used to solve problems or improve conditions in respect to the movement of people and goods. Also infrastructure is **transportation technology**, including roads, rail tracks, bridges, tunnels, parking areas, ports and airports, and so forth. The success in the automated driving system has been known to be successful in situations like rural road settings.

Rural road settings would be a setting in which there is lower amounts of traffic and lower differentiation between driving abilities and types of drivers. "The greatest challenge in the development of automated functions is still inner-city traffic, where an extremely wide range of road users must be considered from all directions." Many automakers such as Ford and Volvo have announced plans to offer fully automated cars in the future. Extensive research and development is being put into automated driving systems, but the biggest problem automakers cannot control is how drivers will use system. Drivers are stressed to stay attentive and safety warnings are implemented to alert the driver when corrective action is needed Tesla Motor's has one recorded incident that resulted in a fatality involving the automated driving system in the Tesla Model S.[14] The accident report reveals the accident was a result of the driver being inattentive and the autopilot system not recognizing the obstruction ahead.



Submitted By
LOGESWAR.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 02.08.2018**

GLOBAL VIRTUAL REALITY MARKET SIZE 2018

The Global Virtual Reality Market was valued at USD 3.13 billion in 2017 and is expected to reach USD 49.7 billion by 2023, at a CAGR of 58.54% over the forecast period (2018-2023).

Virtual reality blurs the line between digital and physical worlds, thereby generating a sense of being present in the virtual environment for the consumer. Several multinational corporations such as Sony and HTC are venturing into this market space. The launch of commercial virtual reality headsets is expected to accelerate the growth of the market.

Technological advancements in VR are expected to generate a plethora of VR solutions with diverse capabilities, which allow consumers to experience utmost immersion. Making the VR experience more real serves as a key driver towards market adoption and penetration. Most of the available solutions in the market are limited to head tracking, paving the way for great opportunities in the development of newer technologies that increase the user's sense of presence and immersion.

Submitted By
MOHAMMED ADHIL.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 06.08.2018**

NEW TECHNOLOGY FREES UP MORE COMPUTER MEMORY

A research team has developed a new technique that could increase the memory capacity of computers and mobile electronics, freeing them up to perform more tasks and run faster.

Researchers from the Massachusetts Institute of Technology (MIT) have devised a new method called Zippads to compress data structures called objects across the memory hierarchy, reducing memory usage while improving performance and efficiency.

The new technique builds on a previously developed programed dubbed Hotpads that stores entire objects into tightly packed hierarchical levels called pads that reside entirely on efficient, on-chip, directly addressed memories without requiring a memory search. Programs are able to directly reference the location of all objects across the hierarchy of pads.

Newly allocated and recently references objects will stay in the faster pad and when the level fills, the system runs an eviction process to kick down older objects to slower levels, while recycling the objects that are no longer useful.

Zippads leverages the Hotpads architecture to compress objects. Objects that start the faster level are uncompressed but become compressed as they are evicted to the slower levels. Pointers in all objects across levels then point to the compressed objects, making them easy to recall back and store more compactly.

Submitted By
MONIESH KUMAAR.C.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 07.08.2018**

IOT VISITORS AT CES 2018 SHOWED HUGE INCREASES IN SMART HOME, AUTOMOTIVE, WEARABLES, HEALTHCARE

Attendees from key IoT markets at CES 2018 showed dramatic increases over the previous year, according to the IoT M2M Council, a trade group that organizes a pavilion and conference at CES covering infrastructure for the nascent technology sector known as the Internet of Things.

The show's latest audit indicates that CES visitors interested in automotive and wearables increased by more than 40% over 2017, while visitors interested in healthcare increased a whopping 71%. Even attendees interested in the smart home/appliance/energy sector, thought to be a relatively mature market for CES, increased by 28%.

The automotive and smart home sectors drew more than 20,000 attendees, while wearables and healthcare drew over 17,000 and 12,000, respectively. These numbers are from the official audit of the Consumer Technology Association, which owns and produces the show, and they are very surprising in a good way. CES has always been a major B2B event for those manufacturing and selling consumer products, and overall attendance was relatively flat, but now it's clear that it has become a major IoT event in its own right."

The IMC will again organize its IoT Infrastructure Pavilion & Conference for CES 2019, and has already surpassed the exhibition space at the 2018 event. The IMC's conference program will cover topics in connectivity, hardware, and software for IoT applications. The IoT Infrastructure Pavilion & Conference will again be centered on the Westgate Hotel, directly adjacent to the Smart Cities and Driver-less Car demonstration areas, giving IoT visitors a destination at the sprawling exhibition.

Submitted By
MUKILAN.V.N
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 08.08.2018**

DATA STORAGE USING LASER LIGHT

There can be entered an age required to meet the demands of 100s of terabyte (1000 gigabytes) or even petabyte (one million gigabytes) storage. One of the most promising techniques of achieving this is optical data storage and then the data is also rewritable.

This technology based on nanocrystals with light-emitting properties that can be efficiently switched on and off in patterns that represent digital information. The researchers used lasers to alter the electronic states, and therefore the fluorescence properties, of the crystals.

Their research shows that these fluorescent nanocrystals could represent a promising alternative to traditional magnetic (hard drive disk) and solid-state (solid state drive) data storage or blu-ray discs. They demonstrated rewritable data storage in crystals that are 100s of times smaller than that visible with the human eye.

This 'multilevel data storage' storing several bits on a single crystal opens the way for much higher storage densities. The technology also allows for very low-power lasers to be used, increasing its energy efficiency and being more practical for consumer applications. The low energy requirement also makes this system ideal for optical data storage on integrated electronic circuits.

It is possible to extend this data storage platform to 3D technologies in which the nanocrystals would be embedded into a glass or polymer, making use of the glass-processing capabilities. 3D optical data storage could potentially allow for up to petabyte level data storage in small data cubes. To put that in perspective, it is believed that the human brain can store about 2.5 petabytes. This new technology could be a viable solution to the great challenge of overcoming the bottleneck in data storage.

Submitted By
NANDHINI.A
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 09.08.2018**

TECHNIQUE TO BOOST CAPACITY OF COMPUTER STORAGE A THOUSAND-FOLD

Scientists have created the most dense, solid-state memory in history that could soon exceed the capabilities of current hard drives by 1,000 times. New technique leads to the densest solid-state memory ever created.

PhD student in Department of Physics and lead author on the new research said that, all 45 million songs on iTunes can be stored on the surface of one quarter, this wasn't even something we thought possible before five years.

The scientists used the same technology they developed to manufacture atomic-scale circuits, which allows for quickly removing or replacing single hydrogen atoms. The technology enables the memory to be rewritable, meaning it could lead to far more efficient types of solid-state drives for computers.

Ready for real-world use:

Previous discoveries of atomic-scale computer storage were stable only at extremely low temperatures, but the new memory works at real-world temperatures and can withstand normal use. But this technology, "Our memory is stable well above room temperature and precise down to the atom."

More memory, less space:

The nanotip technology that allows scientists to manipulate single atoms on a silicon chip a technology has now reached a tipping point. Scientists encoded the entire alphabet at a density of 138 terabytes per square inch, roughly equivalent to writing 350,000 letters across a grain of rice.

Submitted By
PAVITHRA.M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 10.08.2018**

AI-BASED FRAMEWORK CREATES REALISTIC TEXTURES IN THE VIRTUAL WORLD

Many designers for the virtual world find it challenging to design efficiently believable complex textures or patterns on a large scale. Indeed, so-called "texture synthesis," the design of accurate textures such as water ripples in a river, concrete walls, or patterns of leaves, remains a difficult task for artists. A plethora of non-stationary textures in the "real world" could be re-created in gaming or virtual worlds, but the existing techniques are tedious and time-consuming.

To address this challenge, a global team of computer scientists has developed a unique artificial intelligence-based technique that trains a network to learn to expand small textures into larger ones. The researchers' data-driven method leverages an AI technique called generative adversarial networks (GANs) to train computers to expand textures from a sample patch into larger instances that best resemble the original sample.

The basic goal of example-based texture synthesis is to generate a texture, usually larger in size than the input, that closely captures the visual characteristics of the sample input yet not entirely identical to it and maintains a realistic appearance. Examples of non-stationary textures include textures with large-scale irregular structures, or ones that exhibit spatial variance in certain attributes such as color, local orientation, and local scale. The researchers tested their method on such complex examples as peacock feathers and tree trunk ripples, which are seemingly endless in their repetitive patterns.

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Submitted By
POOVARASAN.M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 11.08.2018**

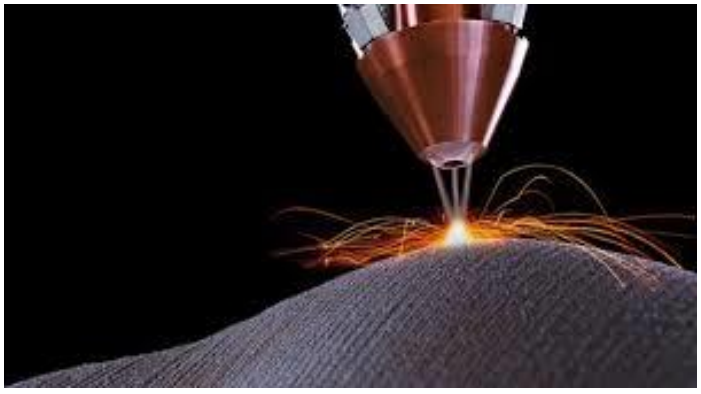
3D METAL PRINTING

Metal 3D Printing is a laser-based **technology** that uses powdered **metals**. Similar to Laser Sintering, a high-powered laser selectively binds together particles on the powder bed while the machine distributes even layers of metallic powder.

3D plastic printing has been used over the last few years, and the ease it has brought to design and prototyping. Advances in the technology mean that instant metal fabrication is quickly becoming a reality, which clearly opens a new world of possibilities.

The ability to create large, intricate metal structures on demand could revolutionize manufacturing.3D metal printing gives manufacturers the ability to make a single or small number of metal parts much more cheaply than using existing mass-production techniques.

Instead of keeping a large inventory of parts, the company can simply print a part when the customer needs it. Additionally, it can make complex shapes not possible with any other method. That can mean lighter or higher performance parts.



Submitted By
PRAVEEN .M
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 13.08.2018**

5 GREAT SURPRISES AT CES 2018

2018 could be the year the CES returns to its past glory as the CES is expected to throw up many surprises this year. Here are the 5 biggest surprises that were at CES 2018.

Smart Cars - Though they aren't yet regarded as consumer items, cars could be on show at the 2018 CES as they continue to get smarter and are equipped with electric motors—this could well be the justification cars need for participating in the event. Some of the car tech that could be on display at the 2018 CES includes smart-charging devices, cheaper LIDAR sensors, and new driver safety AI systems—all that is required to produce cheaper, faster and more-intelligent self-driving cars.

New Smart Home Devices - Amazon and Google have been trying for years to sync Assistant and Alexa work with many different home appliances. Technology that integrates with the aforementioned-voice assistants can be seen at the 2018 CES. Soon, the front door can be opened just by speaking. Also, other tech could be on display at the 2018 CES includes smart bathroom facilities, connected crockpots and transparent fridges.

Augmented Reality - Thanks to the popularity of Alexa, voice-activated assistants were the show-stopper at last year's CES. However, virtual reality (VR) wasn't too far behind in the race for the top spot with the VR press conference hosted by Intel and VR powered roller coaster rides offered by Samsun being the highlights.

Robots - 2017 was the year AI voice assistant became common in homes. Additionally, robots continue to be get smarter. With this knowledge, it wouldn't be wrong to say that 2018 could be the year robots go mainstream. From toys to manufacturing plants, robots are everywhere and the appearance of AI chips in consumer-grade products is helping increase the acceptability of robots.

Wearables - A broad category, wearables at the 2018 CES can include a range of things including AR glasses, brain headbands and GPS watches. A possibility at the CES 2018 is the exhibition of health/ fitness wearables.

Submitted By
RAJAVEL.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 14.08.2018**

CRYPTO-ANCHORS AND BLOCKCHAINS TO FIGHT COUNTERFEITER

Nobody likes knockoffs – blockchain and crypto-anchors will help to crack down on counterfeiting as well as ensure security in the food supply chain

With $600 billion a year lost to the global economy through fraud and counterfeiting, blockchain offers the potential to ensure the provenance of everything from food to diamonds and life-saving medicines.

In a global economy, goods pass through many different sets of hands between their point of production and the end consumer. This leaves them open to tampering and theft problems which blockchain technology could help to eliminate.

In order to work, however, there needs to be a tamper-proof link between the physical products and the digital records on the blockchain. This is where crypto-anchors come in microscopic codes or identifiers which can serve as “digital fingerprints” to ensure security at every stage of the journey.

The challenge here is that the blockchain can record all the transactions but somewhere we’ve to link the transactions to the actual physical object itself – so that you know the banana that got scanned is the actual banana that got to you.

What crypto anchors do is they basically embed tiny codes, like microscopic QR codes, in a way that makes it so that if we tried to replace it with a similar one, we could tell it had been tampered with. When we put those codes onto the blockchain, the supply chain is then protected.

Submitted By
RENUKA.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 16.08.2018**

AI-POWERED ROBOT MICROSCOPES WILL HELP CLEAN UP THE WORLD'S WATER SUPPLIES

Water shortage is a problem that could affect up to a quarter of the world's population by 2025. The behavior of microscopic plankton can give vital clues on everything from chemical pollution levels to temperature change.

Autonomous, robotic cameras developed by IBM and powered by AI have the potential to monitor this behavior in more detail than has been possible before. Data from the cameras can be analyzed to give real-time insights into factors affecting water quality and life in our lakes and oceans.

With internet of things (IoT) we are about putting sensors everywhere and this is an example of just how far we can take this, when we combine it with AI.

We know people are going to have all kinds of problems with clean water in the future, and we know there are micro-organisms in water, that if we can get them to tell us what's happening that would be a really great way to understand any potential problems.

Making the devices as low-powered as possible is essential, in order to be able to deploy them at scale. To this end, they don't contain lenses or focus mechanisms or other complicated mechanical parts, but simply track shadows and movements through light sensors.

Submitted By
ROSHINI.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 17.08.2018**

LATTICE CRYPTOGRAPHY WILL DISCOURAGE EVEN QUANTUM-POWERED HACKERS

Complex algebraic structures called lattices will become a valuable tool in the age of quantum computers. With more and more sensitive data being collected and stored online, security measures will need to keep pace with the growing capability of hackers, as virtually unlimited amounts of computing power become cheaper and more available.

Until now ever-more complex cryptography – from 64-bit encryption to 128 bit and 256 bit has been the standard response to the increasing amount of CPU power available to hackers. As quantum computing becomes mainstream, this will no longer be enough.

The reality is there's constantly a battle on with cybersecurity, we need to make sure we continue to have cryptography and encryption that can keep the bad guys out, and all of that relies on the fact that the maths is so hard to do that trying to solve it with a computer takes an unreasonable amount of time.

We have to make sure that as computers get faster, we can continue to keep ahead of them. In particular, this is a concern with the quantum computers that are coming up.

Lattice cryptography involves encoding data within high-dimensional algebraic structures which even theoretical million - qubit quantum computers will find tough to crack. It also opens up the possibility of Fully Homomorphic Encryption (FHE), which will enable computers to operate on data while it is still in an encrypted state – eliminating the security flaw inherent in existing systems whereby data has to be decrypted (and thus made vulnerable to hackers) in order to be processed. This could, for example, mean credit reference systems which can make credit scoring decisions without personal data ever being exposed.

Submitted By
SAKTHIVEL .A
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 18.08.2018**

DIGIT-MASKING LOCK

Digital masking is that familiar practice of hiding the **password** characters – as entered by the user – behind bullets (●), asterisks (*), or similar camouflaging characters. Conventional locks can leave secret codes exposed to spying locker mates

So the Magnification Combination Padlock puts the numbers behind a clear, curved lens. Askance, the slope of the polycarbonate warps the dial so that snoopers can't spy your digits. Straight on, it magnifies the font underneath from the equivalent of a 20-point typeface to a 28-pointermaking the numbers easier to see through the post-workout sweat haze.

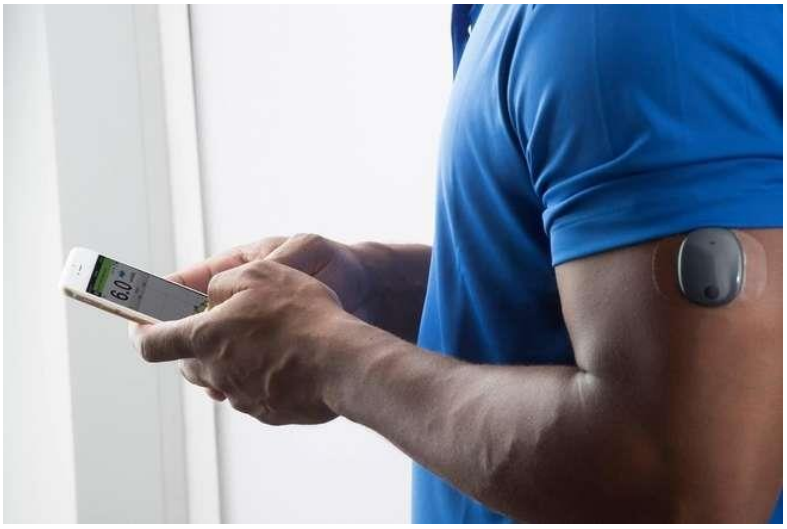
Submitted By
SATISHKUMAR.N
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 20.08.2018**

THE BLOOD-SUGAR MONITOR



Many people with diabetes prick a finger several times a day to measure their blood-sugar (glucose) levels. They need the information to determine how much insulin to take to prevent levels from rising too high. Aside from being painful and annoying, finger sticks don't track sugar between tests a concern because chronically high levels can lead to heart disease, blindness, and kidney failure.

Some existing devices avoid the bloodletting and measure glucose continuously for a week. But the Eversense Continuous Glucose Monitoring System does it for far longer: a full 90 days. The sensing component, which is about the size of a grain of rice, sits directly under the skin. It measures glucose every five minutes and sends the readings to a nearby mobile device for reference and storage.

Submitted By
SELVABHARATHI.A
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 21.08.2018**

A PATH TO PASSWORD-FREE LOGINS

A **password** is a string of characters used to verify the identity of a user during the authentication process. **Passwords** are typically used in conjuncture with a username; they are designed to be known only to the user and allow that user to gain access to a device, application or website.

Savvy web surfers can already skip typing verification codes to log into secure sites if they use a USB dongle like a Yubikey or a fingerprint scanner in place of the digits. But not all browsers, sites, and apps recognize and trust those identifiers. A new standard called WebAuthn helps them get along. Already active in browsers like Firefox and Chrome and sites like Dropbox and Twitter, the protocol could soon allow sites to replace both passwords and two-factor authentication codes with faces, fingerprints, or voices.

Submitted By
SELVIKA.J
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 23.08.2018**

VEIN IDENTIFICATION

Finger vein recognition is a process wherein a person's finger vein patterns are used as a basis for biometric authentication. Images are taken of one's finger vein patterns and then verified through pattern-recognition techniques. It has recently gained attention and favor owing to its high authentication accuracy, so much so that it has received wide acceptance as a security measure in banks.

This latest technology invention is a bio metric identification and security device known as Palm Secure.It works by identifying the vein pattern in the palms of our hands.

Similar to our fingerprints, vein patterns are unique to each individual. The purported advantages of this technology is that it is less expensive, easier to manage, and is more reliable than traditional methods of identification.

Submitted By
SINDUJA.T
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 24.08.2018**

GOOGLE HOME

Google Home is a brand of smart speakers developed by **Google**. **Google Home** devices also have integrated support for **home** automation, letting users control smart **home** appliances with their voice. The short answer is yes. **Google Home** is **always listening** which may be a surprise, but that's how the device works. These ambient recordings only upload to **Google's** cloud servers when the wake word is said.

The idea of a smart home is now a reality, and the Google Home is the latest entry into the voice-controlled assistant category. As it is from Google, The Google Home benefits from Google's extensive artificial intelligence experience. It allows the homeowner to play music, set timers, calculate conversions while cooking and control other smart home products. The cool thing being all this can be done with the sound of our voice.

Submitted By
SRINAATH.N
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 27.08.2018**

NO-CHECKOUT SHOPPING

Amazon Go is a new kind of store with **no checkout** required. It created the world's most advanced **shopping** technology so that we never have to wait in line. With our Just Walk Out **Shopping** experience, simply use the **Amazon** Go app to enter the store, take the products wanted, and go! **No** lines, **no checkout**.

Amazon Go convenience stores have no cashiers or finicky do-it-yourself checkout stations. At the entrance, customers scan a QR code in the Amazon Go app. Then they pick up what they want, walk out, and receive a digital receipt. That's it. As shoppers wander the aisles, hundreds of cameras and sensors feed an artificial intelligence that tracks each person and product, building customers' carts as they peruse.

Six stores stocking meals and snacks opened this year in Seattle, San Francisco, and Chicago. More companies, including Zippin and Dutch retailer Ahold Delhaize, are tinkering with similar grab-and-go schemes.

Submitted By
STALIN PRABHU.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 28.08.2018**

A REVOLUTIONARY ROBOTIC ARM

Automate processes with the **revolutionary robotic arm** Panda. The Panda, an innovative **robotic arm** that is ideal for automating production lines or assembly processes. The Panda is not just a**robot**, but a cobot. A collaborative **robot** that works together with people.

The German-based robotics firm Franka Emika is changing that with the Panda, an $11,000 (roughly) easy-to-program robotic arm designed for small businesses. Able to move in seven axes and designed with a smart sense of "touch," the Panda can help conduct science experiments, build circuit boards or pretest equipment.

Two Panda arms can even work together to build a third. And while the Panda isn't designed for personal use, something similar could eventually offer a helping hand at home, chopping food in the kitchen or assisting the elderly with difficult tasks.

Submitted By
SUDHARSHAN.T.K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 29.08.2018**

MACHINE LEARNING USED FOR HELPING FARMERS SELECT OPTIMAL PRODUCTS SUITED FOR THEIR OPERATION

For years, farmers have been selecting products for their operation through the best advice available seed guides, local agronomists, seed dealers, etc. The advancements in artificial intelligence technologies have presented opportunities to explore a different approach.

Washington University in St. Louis in partnership with The Climate Corporation, a subsidiary of Bayer, is working to explore unique new technologies to advance the science behind hybrid selection and placement.

Roman Garnett, assistant professor of Computer Science & Engineering in the School of Engineering & Applied Science, has received a $97,771 grant from The Climate Corporation to apply active machine learning to help determine which hybrids have the probability of achieving maximum yield potential in every environment.

The goal of the project is to determine if climate scientists can streamline the development and planting of new products each year. Active machine learning identifies the data most useful toward the end goal. Instead of using existing data, active machine learning "learns along the way".

Garnett is on a research team that is using big data to accelerate breeding and the commercial release of sorghum crops that can be used as a renewable energy source. Garnett is developing algorithms that make the most effective use of statistical estimates of the final biomass of the crops from sensor data as early in the growing season as possible to speed the breeding process.

Submitted By
SUSHMITHA BAI.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 30.08.2018**

GETTING YOUR TV TO UNDERSTAND YOU BETTER

New research out of the University of Waterloo has found a way to improve the voice query understanding capabilities of home entertainment platforms. The research, in collaboration with the University of Maryland and Comcast Applied AI Research Lab, uses artificial intelligence (AI) technology to achieve the most natural speech-based interactions with TVs to date.

In tackling the complex problem of understanding voice queries, the researchers had the idea to take advantage of the latest AI technology a technique known as hierarchical recurrent neural networks to better model context and improve the system's accuracy.

In January 2018, the researchers' new neural network model was deployed in production to answer queries from real live users. Unlike the previous system, which was confused by approximately eight per cent of queries, the new model handles most of the very complicated queries appropriately, greatly enhancing user experience.

If a viewer asks for 'Chicago Fire,' which refers to both a drama series and a soccer team, the system is able to decipher what we really want. What's special about this approach is that we take advantage of context such as previously watched shows and favourite channels to personalize results, thereby increasing accuracy.The researchers have started work on developing an even richer model. The intuition is that by analyzing queries from multiple perspectives, the system can better understand what the viewer is saying.

Submitted By
SUVETHA.S
II B.Sc. (CT)

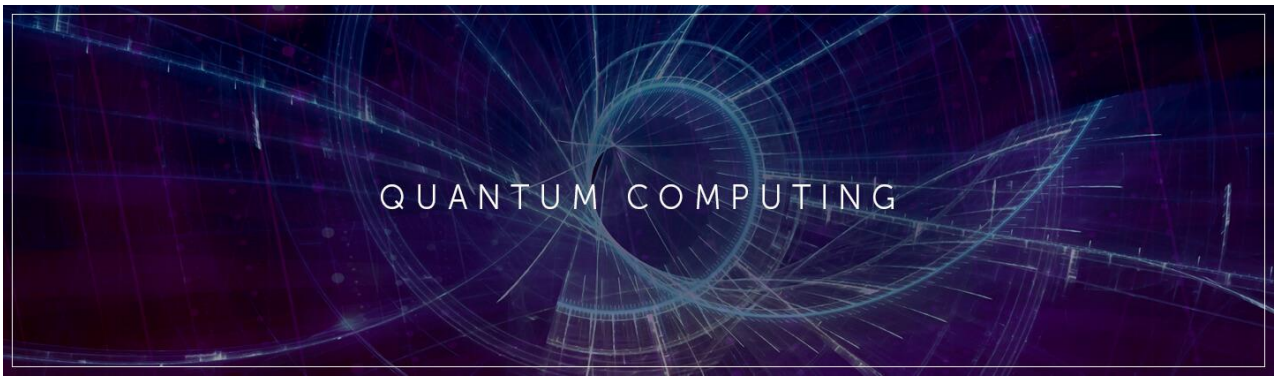
KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 31.08.2018**

QUANTUM COMPUTING

Quantum computing is computing using quantum-mechanical phenomena, such as superposition and entanglement. A quantum computer is a device that performs quantum computing. Such a computer is different from binary digital electronic computers based on transistors. Whereas common digital computing requires that the data be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1), quantum computation uses quantum bits or qubits, which can be in superpositions of states. A quantum Turing machine is a theoretical model of such a computer, and is also known as the universal quantum computer. The field of quantum computing was initiated by the work of Paul Benioff and Yuri Manin in 1980, Richard Feynman in 1982, and David Deutsch in 1985.



As of 2018, the development of actual quantum computers is still in its infancy, but experiments have been carried out in which quantum computational operations were executed on a very small number of quantum bits. Both practical and theoretical research continues, and many national governments and military agencies are funding quantum computing research in additional effort to develop quantum computers for civilian, business, trade, environmental and national security purposes, such as cryptanalysis. A small 20-qubit quantum computer exists and is available for experiments via the IBM Quantum Experience project. D-Wave Systems have been developing their own version of a quantum computer that uses annealing.

Submitted By
TAMILARASI .K
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 03.09.2018**

GOPRO HERO 7 HANDS-ON: THE ACTION CAMERA BUILT FOR PROS

The Osmo **Action** has a 12-megapixel **camera** capable of 4K 60 fps video at 100 Mbps or 240 fps video at 1080. It will not be disappointed with the stabilization. Last fall, the **GoPro Hero 7** Black introduced some of the best stabilization **action cameras** had seen, and the Osmo **Action's** RockSteady feature is up to par.

Tech improvements these days are usually measured in millimeters instead of milestones. With smart phones it is expected a slightly better resolution, maybe some USB-C charging, and added waterproofing is nice, but nothing truly transformative. The same can be said for action cameras, the 2018 Hero, Hero6 Black, Hero5 Black, Session, and so on are all small improvements, but the Hero 7 Black is something much, much bigger.

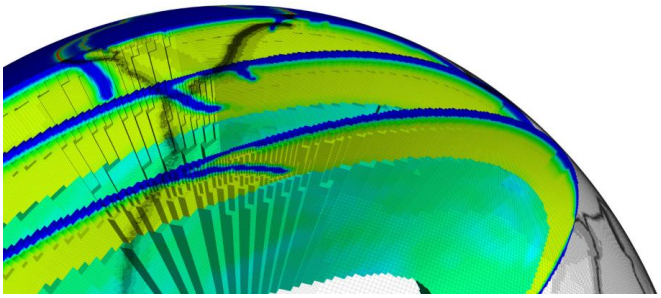
Submitted By
TAMILHARIHARAN .A
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date: 04.09.2018**

NEW TEXAS SUPERCOMPUTER TO PUSH THE FRONTIERS OF SCIENCE



The National Science Foundation (NSF) announced that it has awarded $60 million to the Texas Advanced Computing Center (TACC) at The University of Texas at Austin for the acquisition and deployment of a new supercomputer that will be the fastest at any U.S. university and among the most powerful in the world.

The new system, known as Frontera (Spanish for "frontier"), will begin operations in 2019. It will allow the nation's academic researchers to make important discoveries in all fields of science, from astrophysics to zoology, and further establishes The University of Texas at Austin's leadership in advanced computing.

Frontera is the latest in a string of successful awards and deployments by TACC with support from NSF. Since 2006, TACC has built and operated three supercomputers that debuted in the Top 10 most powerful systems in the world: Ranger (2008), Stampede1 (2012) and Stampede2 (2017). Three other systems debuted in the Top 25.

Frontera would be the fifth most powerful system in the world, the third fastest in the U.S. and the largest at any university. For comparison, Frontera will be about twice as powerful as Stampede2 (currently the fastest university supercomputer) and 70 times as fast as Ranger, which operated until 2013. To match what Frontera will compute in just one second, a person would have to perform one calculation every second for about a billion years.

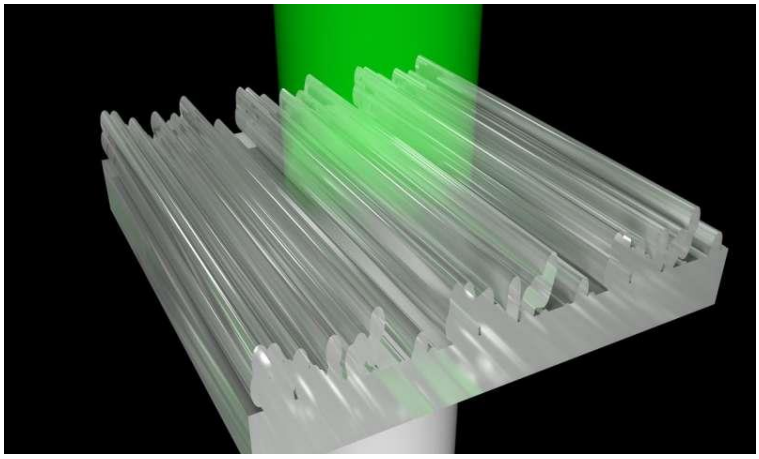
Submitted By
VASANTHAKUMAR.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 05.09.2018**

COLOR EFFECTS FROM TRANSPARENT 3-D PRINTED NANOSTRUCTURES



Most of the objects we see are colored by pigments, but usage of pigments has disadvantages such as colors can fade, industrial pigments are often toxic, and certain color effects are impossible to achieve. The natural world, however, also exhibits structural coloration, where the microstructure of an object causes various colors to appear. Peacock feathers, for instance, are pigmented brown, but because of long hollows within the feathers reflect the gorgeous, iridescent blues and greens we see and admire.

Recent advances in technology have made it practical to fabricate the kind of nanostructures that result in structural coloration, and computer scientists from the Institute of Science and Technology Austria (IST Austria) and the King Abdullah University of Science and Technology (KAUST) have now created a computational tool that automatically creates 3-D-print templates for nanostructures that correspond to user-defined colors. Their work demonstrates the great potential for structural coloring in industry, and opens up possibilities for non-experts to create their own designs. This project will be presented at this year's top computer graphics conference, SIGGRAPH 2018, by first author and IST Austria postdoc Thomas Auzinger.

Submitted By
VIGNESH.R
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 06.09.2018**

SCIENTISTS IMPROVE DEEP LEARNING METHOD FOR NEURAL NETWORKS

Researchers from the Institute of Cyber Intelligence Systems at the National Research Nuclear University MEPhI (Russia) have recently developed a new learning model for the restricted Boltzmann machine (a neural network), which optimizes the processes of semantic encoding, visualization and data recognition. The results of this research are published in the journal Optical Memory and Neural Networks.

Now, deep neural networks with different architectures, such as convolutional, recurrent and autoencoder networks, are becoming an increasingly popular area of research. A number of high-tech companies, including Microsoft and Google, are using deep neural networks to design intelligent systems.

In deep learning systems, the processes of feature selection and configuration are automated, which means that the networks can choose between the most effective algorithms for hierarchal feature extraction on their own. Deep learning is characterized by learning with the help of large samples using a single optimization algorithm.

The neural networks' ability to learn on their own is one of their most intriguing properties. Just like biological systems, neural networks can model themselves, seeking to develop the best possible model of behavior.This deep learning method might be very useful for training search engines' neural networks, as it will improve the speed of searching for relevant images.

Submitted By
VIGNESH.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 07.09.2018**

TALKING TO AN ANDROID: MEET ERICA

ERICA is an android created by Hiroshi Ishiguro of Osaka University and ATR, specifically designed for natural conversation through incorporation of human-like facial expressions and gestures. The research team demonstrated the updates during a symposium at the National Museum of Emerging Science in Tokyo.

The team also focused on developing a system for "attentive listening." This is when a listener asks elaborating questions, or repeats the last word of the speaker's sentence, allowing for more engaging dialogue. Deploying a series of distance sensors, facial recognition cameras and microphone arrays, the team began collecting data on parameters necessary for a fluid dialog between ERICA and a human subject.

Responses were generated through machine learning using a counseling dialogue corpus, resulting in dramatically improved dialog engagement. Testing in five-minute sessions with a human subject, ERICA demonstrated significantly more dynamic speaking skill, including the use of backchanneling, partial repeats, and statement assessments.

Submitted By
VIGNESHVARAN.V
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 10.09.2018**

ARTIFICIAL INTELLIGENCE EQUAL TO EXPERTS IN DETECTING EYE DISEASES

An artificial intelligence (AI) system, which can recommend the correct referral decision for more than 50 eye diseases, as accurately as experts has been developed by Moorfields Eye Hospital NHS Foundation Trust, DeepMind Health and UCL.

The breakthrough research, published online by *Nature Medicine*, describes how machine-learning technology has been successfully trained on thousands of historic de-personalised eye scans to identify features of eye disease and recommend how patients should be referred for care.

Researchers hope the technology could one day transform the way professionals carry out eye tests, allowing them to spot conditions earlier and prioritise patients with the most serious eye diseases before irreversible damage sets in.

The AI technology developing is designed to prioritise patients who need to be seen and treated urgently by a doctor or eye care professional. If diagnose and treat eye conditions early, it gives us the best chance of saving people's sight. With further research it could lead to greater consistency and quality of care for patients with eye problems in the future.

Using two types of neural network – mathematical systems for identifying patterns in images or data – the AI system quickly learnt to identify ten features of eye disease from highly complex optical coherence tomography (OCT) scans. The system was then able to recommend a referral decision based on the most urgent conditions detected.

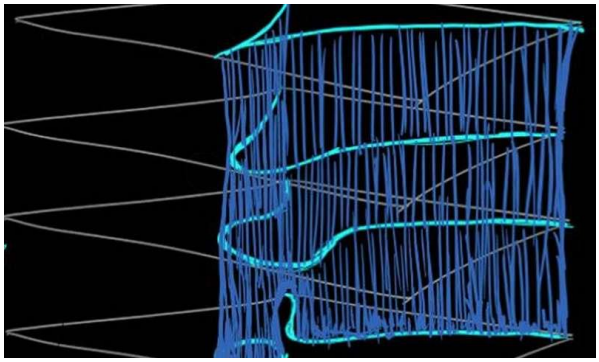
Submitted By
VISHNUVARDHAN.A
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 11.09.2018**

RESEARCHER DEVELOPS ALGORITHM TO IMPROVE INFORMATION SECURITY TOOLS



Cryptography is a science of data encryption providing its confidentiality and integrity. After cryptographic transformations (the basis of encryption algorithms) are applied, only users that possess a relevant key can have access to the initial text.

Transformations based on elliptical curves have been widely used for data protection recently. These transformations are in high demand due to the fact that modern technologies aim at the reduction of memory and computational power consumption.

Mobile devices, blockchain technologies, and the Internet of things require new safety measures, raising the demand for new cryptographic transformation algorithms with lower computational power consumption.

The new algorithm is based on window non-adjacent form of scalar representation that is classified as an algorithm with a precomputation step. Precomputations are single-time calculations that are performed before the main part of the work, and their results are saved in the memory. The main advantage of algorithms with precomputations is the division of calculation into two parts: the precomputations themselves followed by the new calculations reusing their results. Therefore, the computational complexity of consecutive scalar multiplication operations is reduced.

The new algorithm may be used on blockchain platforms for digital signing of transactions and authentication, as well as on the Internet of things for the authentication of its devices, in session keys development protocols for the encryption of transferred data, and to secure the integrity of transmitted information.

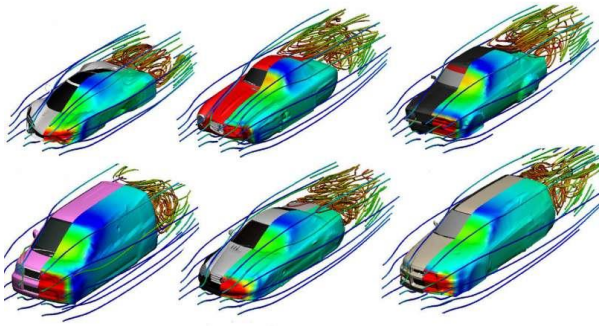
Submitted By
YOGARAJ.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 12.09.2018**

NEW INTERACTIVE MACHINE LEARNING TOOL MAKES CAR DESIGNS MORE AERODYNAMIC



When engineers or designers want to test the aerodynamic properties of the newly designed shape of a car, airplane, or other object, they would normally model the flow of air around the object by having a computer solve a complex set of equations—a procedure that usually takes hours, or even an entire day. Nobuyuki Umetani from Autodesk research (now at the University of Tokyo) and Bernd Bickel from the Institute of Science and Technology Austria (IST Austria) have now significantly sped up this process, making streamlines and parameters available in real time.

Machine learning can make extremely time-consuming methods a lot faster. Before, the computation of the aerodynamic properties of cars usually took a day. So far, it has been extremely challenging to apply machine learning to the problem of modeling flow fields around objects because of the restrictive requirements of the method. For machine learning, both the input and the output data need to be structured consistently. This structuring of information works well for 2-D images, where a picture can be easily represented by a regular arrangement of pixels. But if a 3-D object is represented by units that define its shape, such as a mesh of triangles, the arrangement of these units might change if the shape changes. Two objects that look very similar to a person might therefore appear very different to a computer, as they are represented by a different mesh, and the machine would therefore be unable to transfer the information about the one to the other.

The researchers also proved in their study that the machine learning method achieves an impressive accuracy, a prerequisite for engineering.

Submitted By
YUVA PRADESH.S
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 14.09.2018**

THE AIR FORCE WILL TREAT COMPUTER CODING LIKE A FOREIGN LANGUAGE

Capt. Mike Kanaan woke up at 3 A.M. with an idea. The 29-year-old U.S. Air Force intelligence officer had been mulling a familiar challenge, the problem of finding coders and computer-savvy airmen, who are in high demand and short supply all across the Pentagon. His wee-hour solution: Treat computer coding skills like the service does any other mission-critical foreign language.

The Air Force prides itself on its global reach, and so the service fosters and rewards foreign language skills. The Air Force measures linguistic aptitude with tests to determine an airmen's existing fluency, or his or her capacity to learn another language. Those who pass are open to duty assignments that require another language—and get extra pay as well.

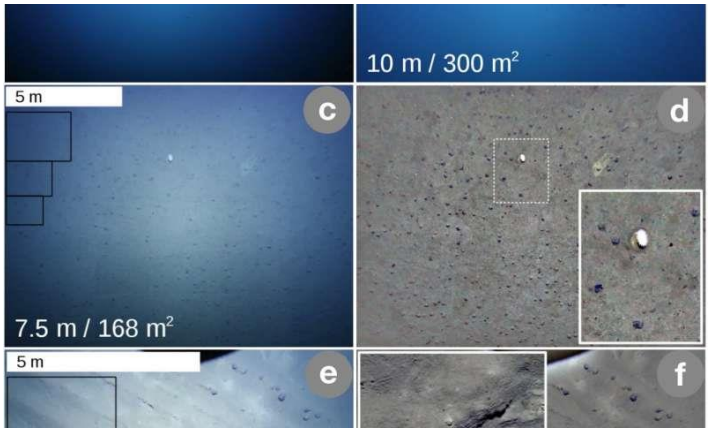
Submitted By
YUVARAJ.T
II B.Sc. (CT)

KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS), ERODE

DEPARTMENT OF COMPUTER TECHNOLOGY AND INFORMATION TECHNOLOGY

IT BULLETIN **Date : 15.09.2018**

UNDERSTANDING DEEP-SEA IMAGES WITH ARTIFICIAL INTELLIGENCE



The evaluation of very large amounts of data is becoming increasingly relevant in ocean research. Diving robots or autonomous underwater vehicles that carry out measurements independently in the deep sea can now record large quantities of high-resolution images. To evaluate these images scientifically in a sustainable manner, a number of prerequisites have to be fulfilled in data acquisition, curation and data management.

The ABYSS autonomous underwater vehicle was equipped with a new digital camera system to study the ecosystem around manganese nodules in the Pacific Ocean. With the data collected in this way, the workflow was designed and tested for the first time. The results have now been published in the international journal Scientific Data.

The procedure is divided into three steps: Data acquisition, data curation and data management, in each of which defined intermediate steps should be completed. All these processes are now automated.

Submitted By
YUVARAJA.R
II B.Sc. (CT)