

Shell Newsletter

Department of
Computer Science & Engineering



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Volume 6

Issue 1

December 2020

Vision and Mission of the Institute

Vision

- To be one of the premier institutes of Engineering and Management Education in the country

Mission

- To provide Engineering and Management Education that meets the needs of human resources in the country
- To develop leadership qualities, team spirit and concern for the environment in students

Objectives

- To achieve educational goals as stated in the vision through the mission statements which depicts the distinctive characteristics of the Institution
- To make the teaching-learning process an enjoyable pursuit for the students and teachers

Vision and Mission of the Department

Vision

- To be a premier department for education in Computer Science and Engineering in the state of Karnataka, molding students into professional engineers

Mission

- To provide teaching/ learning facilities in Computer Science and Engineering better than prescribed by University for easy adaptation to industry and higher learning
- Provide a platform for self-learning to meet the challenges of changing technology and inculcate team spirit and leadership qualities to succeed in a professional career
- Comprehend the societal needs and environmental concerns in the field of Computer Science

Dedicated to



Mangala Mani, The first 'Polar woman of ISRO'

who is ISRO's first woman scientist, a part of team that went on an expedition in November 2016 to Bharati, which is India's research station at Antarctica. She spent 403 days in Antarctica. In the

midst of ground-breaking research, she found time to bake, stitch, and even celebrate special festivals! She says, "Women are venturing into every field. Women just need to be willing, ready and take that opportunity when it comes. With the knowledge explosion, sky is not the limit, there is much more beyond."

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From Editor's Desk

Dear Readers

It is indeed a great pleasure to introduce Volume 6, Issue 1 of 'SHELL', the newsletter of our Department of Computer Science. It will take you down the lanes of the latest innovations and technological advancements happening around the world. It is a platform that exhibits the skills and innovative ideas of our students and faculties. It is a mixture of technical articles with some interesting blogs and a couple of tricky crossword puzzles.

Even in the midst of the pandemic, we all have found ways to carry on with distancing. Although virtually, yet the world seems to be connected throughout with a hope of getting back to normalcy soon.

I had an incredible experience with the team SHELL. I am happy to see immense enthusiasm in the members of our college towards contributing to this magazine, even in times of pandemic and things being all virtual. It is the inclination to share knowledge, concern and special insight with people of common interest that have made this newsletter evidently readable.

I would like to take this opportunity to thank our Department of CSE on behalf of my team. I thank the tireless endeavours set forth by the team in making this newsletter an informative success. I invite you to immerse yourself into the unfolding current Science and Technology.

Fatema Malu Bhai Wala
VII CSE 'B'

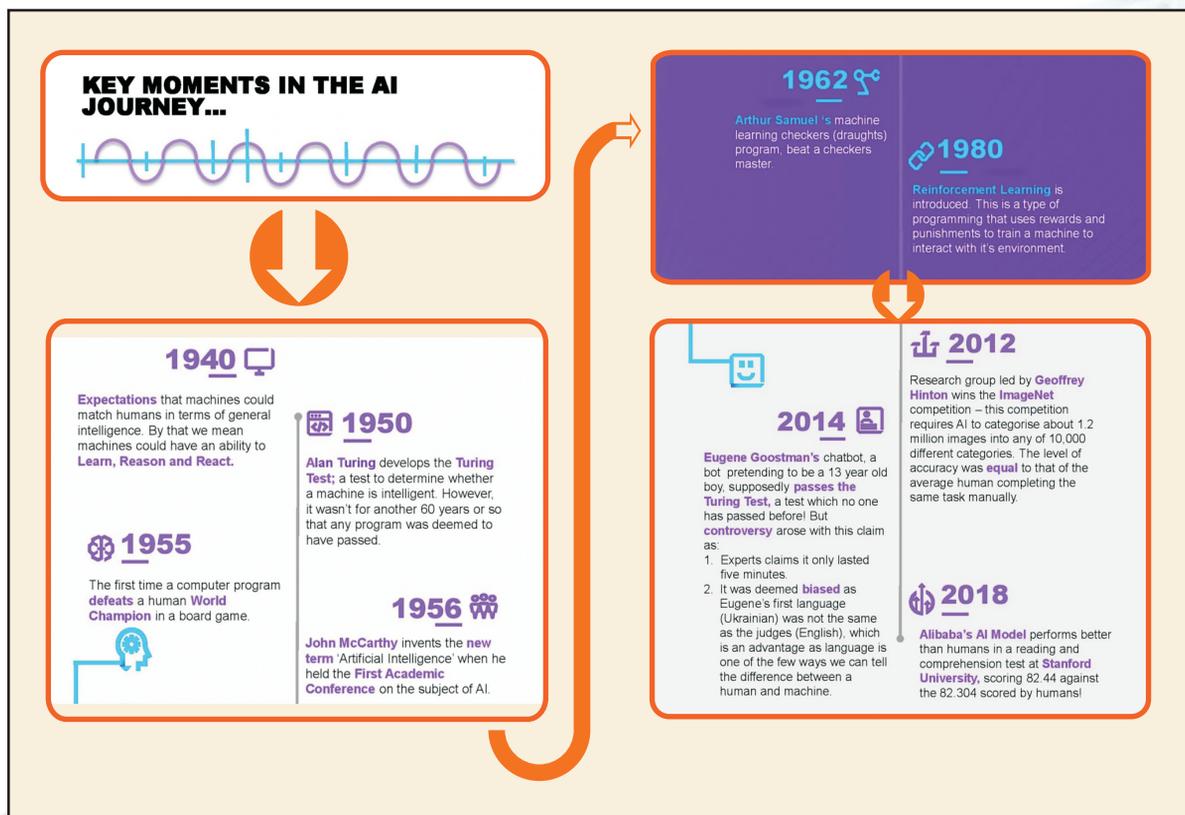
Department Profile

The Department of Computer Science and Engineering, that started in the year 2001, is known for imparting quality education and carrying out cutting edge research. The Department offers UG Computer Science Engineering Program, PG Computer Science Engineering Program, and Research Facilities for M.Sc. (Engg.) and Ph.D. courses are also offered. The Department also has a well-equipped Research and Development Centre, affiliated to Visvesvaraya Technological University.

The Department has associations with professional bodies like CSI, IEEE, ISTE, IET, The Student Branch of Institution of Engineers, and Indian Society for Technical Education. The major areas of specialization of the faculty include Image Processing, Computer Vision, Pattern Recognition, Data Mining, Wireless Sensor Networks, and Network Security. The Department has attracted some of the brightest students and faculties into its portal. Faculties are involved in Campus Connect Program of Infosys. Many faculties of the Department have chaired a number of National and International Conferences, they are also facilitating as reviewers of reputed National and International Journals.

The Department regularly organizes Faculty Development Programmes (FDPs), workshops, expert lectures, and industrial visits for students as well as faculties so that they are kept abreast of recent trends. The students are placed in leading IT companies, offering attractive pay packages. They also pursue higher studies in reputed universities across the globe.

In addition to academics, the Department is striving to upgrade students' skills with programmes like Skill Development Programme, Innovative Project Laboratory, T5, TW5, WP5 and Engineering Exploration Laboratory (EEL) Programmes.



Computational Intelligence

Computational Intelligence (CI) is the study of adaptive mechanisms to enable or facilitate intelligence behavior in complex and uncertain environments. The main objective of CI is to realize a new approach for analyzing and creating flexible information processing of humans such as sensing, understanding, learning, recognizing, and thinking. It plays a major role in developing successful intelligent systems, including games and cognitive developmental systems. Some of the most successful AI systems are based on CI. In this view AI is a part of CI focused on problems related to higher cognitive functions, while the rest of the CI community works on problems related to perception and control, or lower cognitive functions.

At present, CI is just like a bag of tricks. Its main feature is adaptability, spanning the fields of machine learning and computational neuroscience. Traditional Model Struggle has a lot to cope with complexity, noise, and the existence of a changing environment, while CI offers solutions to complicated problems as well as reverse problems.

It is an umbrella for three core technologies, Neural Networks, Fuzzy Systems, and Evolutionary Computation. CI also comprises biologically inspired technologies such as the intellect of swarm as a part of evolutionary computation and encompassing wider areas such as image processing, data collection, and natural language processing. From the application point of view, CI has been adopted for supporting Ambient Intelligence, Artificial Intelligence, Cognitive Approaches, Web Intelligence, Knowledge Mining, Cybernetic, and Cyber-Physical Systems.

The prediction of the future has fascinated human beings since its early existence. Recently, genetic algorithms have been developed by binary coding to analyze high-speed trading research using price data of stocks on the microscopic level. This problem is certainly new and is unexplored from computational intelligence techniques. After applying CI and testing the algorithms, the reported result shows that the system can improve the accuracy for price movement forecasting, thus encouraging research in this direction.

So, computational intelligence is spread all around us. It is even in the forms that we use daily but wouldn't know of its existence in that form. We just have to be creative enough to explore.

Vidhi Sinha
III CSE B

DevOps

“DevOps is not a goal, but a never-ending process of continual improvement” - Jex Humble.

DevOps is a set of practices that combines software development and IT operations. It aims to shorten the systems development life cycle and provide continuous delivery with high software quality. DevOps is complementary with agile software development; several DevOps aspects came from agile methodology.

Highly regulated financial services firms are turning to DevOps in droves, as they look to be more responsive to changing customer demands while keeping their compliance teams happy.

Owing to recent COVID pandemic, our remote work environment is accelerating the move to the cloud for many organisations. While the first wave of cloud adoption focused more around production level enterprise deployments infrastructure, we are now seeing more workloads. As a result, DevOps is increasingly being moved out of internal IT shops and into the cloud where it has become more available for developers and some serious product developments are taking place. This move to cloud and increase in DevOps adoption enables remote teams to continue collaborating and completing projects at high speed, with flexibility needed in today's competitive world.

DevOps encourages a continued culture of transparency and experimentations around organisations and empowers teams to better pinpoint inefficiencies and shift processes at an accelerated rate. In recent times, we had seen many organisations embracing DevOps Practices at all the levels as indicated by Tom Iverson.

DevOps will mature in some key ways during the year ahead:

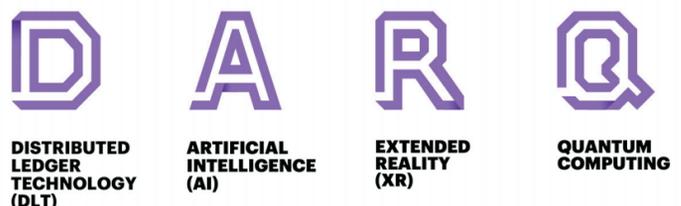
1. DevOps maturity will fuel continued interest in cloud centric tools.
2. IT leaders will revisit DevOps success metrics.
3. Tighter relationship between DevOps and security.
4. IT leaders play a crucial role in empowering a healthy DevOps culture.

In order to sum up DevOps, as said by John Allspaw is what some people are calling the renewed cross interest in development and operations collaboration.

Preksha P Shetty
III CSE 'B'

DNA of DARQ: An Asset for Hiring and Training

In order to survive in the digital era, we need to adopt a new set of emerging technologies. These new technologies will be an essential catalyst for change in a world where every



industry already has a plethora of digital tools. The key set of new tech is DARQ: Distributed Ledger Technology (DLT), Artificial Intelligence (AI), Extended Reality (XR), and Quantum Computing.

Individual DARQ technologies are already making a difference across industries today. AI plays a critical role in optimizing processes and influencing strategic decision-making. XR, an immersive technology that creates new ways for people to experience and engage with the world around them. Distributed ledgers are perhaps best known in the context of cryptocurrencies, but they are expanding networks and capabilities by eliminating the need for trusted third parties. Quantum computing, the DARQ technology that

remains the most experimental, will usher in novel ways to approach and solve difficult computational problems.

DLT: Blockchain

The next step in democratizing education, the technology will allow hiring professionals a one-stop-shop to verify academic credentials and more. Blockchain will be a skills wallet, owned and managed by workers and students that stores detailed credentials as they move through their lifelong learning journey. Blockchain allows candidates to provide their credentials, academic degrees and continued upskilling in a single source for employers. For employers, single-source access to all relevant skills data will streamline hiring and boost its effectiveness.

AI: Extremely Essential

AI is giving HR teams a competitive advantage in the war for talent. It is also helping companies attract Gen Z candidates as they are looking for companies with a tech-first approach to AI.

AI is automating interviewing, scheduling, sending e-mails, preparing offers, and onboarding. It's also leveraging to evaluate skills through pre-hire assessments and virtual job-specific simulations.

AI is extremely valuable in predicting candidate success. AI can analyze data much more thoroughly and powerfully than the traditional statistical techniques and is often demonstrably superior to predict success on the job. It's the intersection of human and machine that leads to ultimate efficiency and learning.

R: Virtual Reality in Hiring

Many organizations are looking into Virtual Reality (VR) or Augmented Reality (AR) to provide candidates with a real-life experience of the position and the organization. VR headsets at career fairs give potential candidates, a new recruitment experience.

Q: Quantum Computing

DARQ technology is expected to solve complex computational problems. Its power comes from pairing different technologies.

DARQ is the key that will open unimagined new pathways into the future.

Fatema Malu Bhai Wala
VII CSE 'B'

Overclocking, A Performance Hack

The speed and efficiency of computing has drastically changed over generations and today we have handheld devices that overpower cutting-edge PCs released a few short years ago. This fact enthused Intellects to dig deep into technology and find some of its secret dials that were hidden from the end user which controlled the system's behavior. Overclocking is one such dial that these enthusiasts stumbled upon.

Enthusiasts concentrated on tuning clock speeds in targeted devices of the computer to drive them in an excited state to yield an overall bump up in performance. This process of increasing a computer's performance got the nomenclature as Overclocking.

Overclocking generally refers to increasing CPU performance, but it's also applicable to graphic controllers and RAM. The CPU compiles all its tasks with the help of a clock signal. The clock signal has a characteristic frequency. This frequency plays a vital role in deciding the operational speed of the CPU. The CPU has a unit called clock multiplier, which sets its frequency of operation. Overclocking is achieved by setting this multiplier of the CPU to a higher state thereby exiting the CPU's operation.

Manufacturers do not support overclocking. The frequency of a CPU is set by its manufacturer to operate under certain limits to ensure that the CPU stays cool and functional in a given computer design. Increasing this frequency requires more voltage to be given to the CPU for stable operation.

An ill-estimated overclock can excite Dynamic Frequency Scaling (generally called 'thermal throttling' where the CPU throttles down below its base frequency to help dissipate the heat out of the system) and render a system unstable. It can also cause damage to the motherboard and other peripherals of the computer.

Some specific series of CPUs are designed with unlocked multipliers and motherboards with overclocking features enabled which are retailed by the same manufacturers at a premium. Sensible overclocking techniques help the system boost its performance and increase its longevity. This is more beneficial to professionals as it helps them speed up their work and maintain pace for a long time.

Realizing an optimal way to negotiate Overclocking's shortcomings and reap benefits of its advantages is very essential. If such a way is realized, Overclocking is indeed a performance hack for computers.

Prajwal Rajegowda
III CSE 'B'

5th Generation Cellular Networks

In this rapid changing and unpredictable world, what people want is more speed, flexibility, and accessibility. Year 2020 has been a year full of unpredictable situations, where the internet was our best companion ...right? COVID-19 has made one thing crystal clear: Society has felt that the Internet has become a basic necessity. During the pandemic, the Internet has been critical for buying groceries, working, educating children, getting medical care, accessing news and entertainment. Well, today everyone is talking about 5G.

What is 5G?

5G is the fifth generation of cellular networks, bringing new capabilities that will create opportunities for people, businesses, and society. 5G, which began deployment in 2019, can deliver enhanced broadband for cell phones, super-fast and reliable communication, and machine-to-machine communication.

How does it work?

5G runs on the same radio frequencies that are currently being used for your Smartphone, on Wi-Fi networks, and in satellite communications, but it enables technology to go a lot further.

Ericsson is at the forefront of the 5G. Ericsson Radio System allows operators to launch the new technology and grow 5G coverage fast – no matter the scale and complexity – and Ericsson Spectrum Sharing allows for accelerated 5G rollouts using existing hardware.

How is 5G better than 4G?

5G is a unified, more capable air interface. It has been designed with an extended capacity to enable next-generation user experiences, empower new deployment models, and deliver new services.

With high speeds, superior reliability, and negligible latency, 5G will expand the mobile ecosystem into new realms. It has an impact on every industry, making safer transportation, remote healthcare, precious agriculture, digitized logistics, and more.

Is there any impact of 5G on the Environment?

The speed, capacity, and connectivity of 5G will provide many opportunities to protect and preserve the environment. 5G Technology with IoT will be able to increase energy efficiency, as it will reduce energy use because devices will be able to power up and shut down automatically when not needed, reduce greenhouse gas emissions and enable more use of renewable energy. It can help reduce air and water pollution, minimize water and food waste, and protect wildlife. It can also expand our understanding, and hence improve decision-making about the weather, agriculture, pests, industry, waste reduction, and much more.

How can you use it?

In order to enjoy the benefits of 5G, customers should have 5G enabled devices. Samsung, Apple, LG, Motorola, OnePlus, Huawei, and other companies have released 5G phones. It is of course to be connected to a network that offers a 5G connection.

What are the Cons of 5G?

Adoption of 5G will be slow Worldwide, because of the incompetent technological support in most parts of the World. As per Industry trade Group GSMA, by 2025, around half of mobile connections will be 5G rest will be 3G or 4G. There are concerns among regulators and others about the security of 5G. Cost is another issue.

Shreeja Shukla
V CSE 'B'

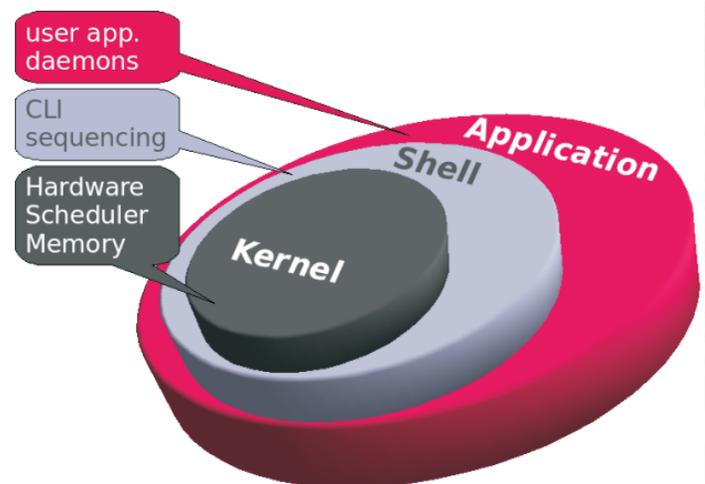
What is Shell?

The thing to remember about computers is that: 'They mirror the intelligence we inculcate in them.' All they do is follow a set of instructions that are input by the user again and again. It is only when this set of instructions are complex; the computer is identified to be intelligent. Even to boot up they need some instructions. (The POST - Power on Self-Test - to check if the input devices are working) All these programs (set of instructions) are controlled by a piece of software called the Kernel. The CPU can only perform operations. A Kernel is the core program that manages the CPU's resources, the memory, and the device drivers and is responsible for managing all the other processes. Every multitasking operating system uses a kernel. Windows uses a kernel (NT Kernel), iOS uses a kernel (Darwin Kernel), Android uses a kernel (Linux Kernel), etc.

The core part of an operating system is a Kernel. Shell is a software that provides an interface for an operating system's user to access the services of the Kernel. In laymen terms, Shell is a program that takes your commands from your keyboard and gives them to the operating system to perform. It is used to translate program in assembly language to machine

language in Unix Based operating system. On a Mac or Linux machine, we can access a shell through a program called Terminal. However, on Windows, we'll need to download a separate program to access the shell.

Shell is a command line interpreter. It presents a command line interface (Ex. Terminal) which allows us to control computers, using commands entered with a keyboard instead of controlling through graphical user interfaces (GUIs) with a mouse/keyboard combination. Command line interface is a text-based interface that is used to operate software and operating systems. It allows the user to respond to visual prompts by typing single commands into the interface and getting a reply. It is quite different from the graphical user interface that is presently being used in the latest operating systems, which uses graphical options that enable the user to interact with the operating system and applications.



Shreyas K
III CSE 'B'

Quantum Commutating

“The future is now; the future is here.”

As we all know that Time, Tide and Technology waits for NONE! Scientists are already developing the next generation of computing called Quantum Computing.

The race is on to build the World's first meaningful Quantum Computer- one that can deliver the technology's long-promised ability to help scientists do things like develop miraculous new materials, encrypt data with the near perfect security, make complex advancements in the fields of health, make accurate predictions on the Earth's climate change and many more.

The basic definition of Quantum Computing goes like: Quantum computing is the use of quantum phenomena such as superposition and entanglement to perform computation. Computers that perform Quantum Computing are called Quantum Computers. Quantum mechanics, a branch of Physics is used to make the calculations of a regular computer, more rapidly than what it already does.

In a regular computer, different kinds of information such as numbers, text, images etc. are stored in a series of 0's and 1's which is referred to as a bit of information.

Whereas in a Quantum Computer, a series of qubits are used instead of bits. Each qubit can not only be set to either a 0 or a 1 but can also be set to 1 and 0 at the same time. And this is where the Physics comes in handy. A phenomenon called superposition comes into picture which allows the qubit to be in both states at the same time. Which makes the probability of the qubit to be in any one of the states to be exactly 50%. Another major counterintuitive phenomenon in Quantum Computing is Entanglement. A pair or group of particles is entangled when the quantum state of each particle cannot be described independently of the quantum state of the other particle.

But it also has disadvantages: If an advanced quantum computer was created, all the security of the current Internet of Things would collapse like a house of cards. Quantum computers will be able to do whatever anybody wants in a corporation. The personal information of billions of Internet users can be taken into their own bags. The government database can be hacked. Undue control can be imposed on the banking system. The state defence system can be turned off if desired. Considering these aspects, many do not even hesitate to call it a 'terrible' computer.

Sahana S
V CSE 'B'

Preventing the Next Pandemic using AI

An artificial-intelligence company called BlueDot, which used machine learning to monitor outbreaks of infectious diseases around the world, alerted clients including various governments, hospitals, and businesses-of an unusual leap in pneumonia cases in Wuhan, China, was officially named Covid-19 by the World Health Organization.

When it comes to detecting outbreaks, machines can be trained to process vast amounts of data in the same way that a human expert would. But machines do this round the clock with incredible speed, making the process more scalable and efficient.

Prediction

Companies like BlueDot and Metabiota use a range of Natural Language Processing (NLP) algorithms to monitor news and official health-care reports in different languages around the world, targeting high-priority diseases. Their predictive tools can also draw on air-travel data to assess the risk of infection in people in the transit hubs, either on arrival or departure.

Stratified, a data analytics company based in Charlotte, is developing an AI tool that scans posts on sites like Facebook and Twitter and cross-references them with descriptions of diseases taken from verified sources such as the National Institutes of Health.

Early Diagnosis

Along with predicting the course of an epidemic, AI can also help identify people who have been infected.

Most scientists use deep learning algorithms to accurately detect COVID-19 from CT scan reports, while some have developed a system that uses AI cloud-based software for early diagnosis.

Google's 'Verily' is in the process of developing a temperature patch that transmits data to a phone app, alerting its users of higher body temperatures.

Treatment

Data is essential for AI to help develop treatments for the disease. One technique for identifying possible drug candidates is to use generative design algorithms, which produce a vast number of potential results and then sift through them to highlight those that are worth looking at more closely.

SRI International collaborates on such an AI tool, which uses deep learning to generate many novel drug candidates that scientists can then assess for efficacy.

Unsupervised learning algorithms can be implemented to simulate all possible evolution paths. Potential vaccines can be added to the mix to see if the viruses mutate to develop resistance.

Although the COVID-19 pandemic has been an unexpected turn in our lives, it has taught us how to efficiently use booming technologies like AI to prepare ourselves for such drastic situations in the future.

Aishwarya B
VII CSE 'A'

Introduction to Cyber Crimes

Cybercrime is a criminal activity that involves a computer, networked device or a network. While most cybercrimes are carried out in order to generate profit for the cybercriminals, some cybercrimes are carried out against computers or devices. Cybercrime can include many different types of profit-driven criminal activity, including ransomware attacks, email and internet fraud etc, Cybercriminals target an individual's private information, as well as corporate.

The cybercrime is divided into three categories:

1. Computing device is the target (gain network access)
2. Computer is used as a weapon (access personal details)
3. Computer is used as an accessory to a crime (using a computer to store illegally obtained data)

TYPES OF CYBER CRIME

1. **Cyber Extortion:** A crime involving an attack or threat of an attack coupled with a demand for money to stop the attack, in which the attacker gains access to an organization's systems and encrypts its documents and files anything of potential value making the data inaccessible.
2. **Identity Theft:** An attack where an individual accesses a computer to glean a user's personal information, which they then use to steal that person's identity or access their valuable accounts, such as banking and credit cards. Personal health information is a frequent target.
3. **Credit Card Fraud:** An attack where hackers infiltrate retailers' systems to get the credit card and/or banking information of customers. Stolen payment cards are sold in bulk on dark net markets, where hacking groups that have stolen mass quantities of credit cards profit by selling to lower-level cybercriminals.
4. **Software Piracy:** An attack that involves the unlawful copying, distribution and use of software programs with the intention of commercial or personal use. Trademark violations, copyright infringements and patent violations are often associated with this type of cybercrime.

REAL WORLD EXAMPLES OF CYBERCRIME HACKERS STEAL MONEY FROM GLOBAL BANKS

In 2015, a group of Russian-based hackers gained access to secure information from more than 100 institutions around the world. It was estimated that around £650 million was stolen from the financial institutions in total.

SONY PICTURES CRIPPED BY CYBERCRIME

In late 2014, major entertainment company Sony Pictures was hit with a crippling virus. Cybercrime group Guardians of Peace (GOP) were behind the apparent blackmail attempt, which saw around 100 terabyte of sensitive data stolen from the company.

ONE BILLION USER ACCOUNTS STOLEN FROM YAHOO

Yahoo had information from more than one billion user accounts stolen in 2013. Personnel information including names, phone numbers, passwords and email addresses were taken from the internet giant. At that time, Yahoo claimed that the details were not taken. In 2016, YAHOO had been targeted for the second time and accessed almost 500 million user accounts.

PREVENTIVE MEASURES

1. Install Antivirus
2. Review Financial Statements Regularly
3. Turn off your Computer when not in use
4. Secure configure your System

**Srilakshmi N
V CSE 'B'**

Quantitative Color Pattern Analysis

In order to understand the function of color signals in nature, we require robust quantitative analytical frameworks to estimate how animal and plant color patterns appear against their natural background as viewed by ecological relevance. Owing to the quantitative limitations of existing methods,



color and pattern are rarely analyzed simultaneously.

Given that every animal species sees colors, patterns, and brightness differently due to their unique eye adaptations, there are countless modes of vision that humans have never experienced. That's why scientists have developed free, open-

source software that can be run on photos taken with an average smartphone to simulate the perspective of animals. The framework enables people to customize digital photos taken on how a bee, fish, or mammal sees the world.

QCPA overcomes the limitations of existing analysis by combining digital photography and visual modeling. It has integrated existing spatio-chromatic color pattern analysis, including adjacency, visual contrast, and boundary strength analysis, to be implemented using calibrated digital photography through Multispectral Image Analysis and Calibration (MICA) Toolbox. It provides a novel psychophysiological approach to the modeling of spatial-acuity using convolution in the spatial or frequency domains, followed by Receptor Noise Limited Ranked Filtering to eliminate intermediate edge artifacts and recover sharp boundaries following smoothing. It uses a new type of color pattern analysis, the Local Edge Intensity Analysis as well as a range of novel psychophysiological approaches to the visualization of spatio-chromatic data.

QCPA combines novel and existing pattern analysis frameworks into what we hope is a unified, free, and open-source toolbox and introduces a range of novel analytical and data-visualization approaches. These analysis and tools have been seamlessly integrated into the MICA toolbox providing a dynamic and user-friendly workflow.

The software is primarily designed to help biologists and ecologists better understand how animals visualize each other and their environment.

QCPA can adjust images to reflect various light and color sensitivities, spatial-acuities, photoreceptor abundances, and other traits that differ between animal species. For instance, the image below displays a natural setting through human eyes, on the left, next to a model generated by QCPA that shows how a bee might perceive.

The framework's use of digital photos means it can be used in almost any habitat even underwater using anything from off-the-shelf cameras to sophisticated full-spectrum imaging systems. The flexibility of the framework allows researchers to investigate the color patterns and natural surroundings of a wide range of organisms, such as insects, birds, fish, and flowering plants.

For example, we can now truly understand the impacts of coral bleaching for camouflaged reef creatures in a new and informative way. It helps people wherever they are, to cross the boundaries between human and animal visual perception. It's a platform that anyone can build on and we are keen to see what future breakthroughs are ahead.

**Prajwal M
VII CSE B**

Blogs

Hard work

“The more you sweat in field, the less you bleed in battle”

People say success and failure are all part of life, we must learn to live with failure and prepare ourselves so that we don't fail again. But do people actually plan their failures and prepare for it? No one speaks about failures because from the beginning we are taught about positive thinking and always pray for success, but rarely people pray for handling failures.

The current generation is living a life of competition, be it

corporate or film industry, cultural or sports, there is a race everywhere, no one really can escape this. We can see the people who are at the front and recognise them, but what about those who are running in the race without a cause. A few are running due to peer pressure, a few due to parental pressure, a few from fear of failure and a few of them for learning something new on their journey.

This race has all kinds of hurdles in its way, many fail to complete it, as they are always worried about the destination and a very small amount of people focus on the journey and the lesson. What is the difference between those who are at the front and the ones who are at the back? The people who are in front of the race are the ones who learn something new all the time during their journey which makes them run more in distance and achieve more but those who are in back might eventually lose confidence and settle at some place and call it their destination. There is another case scenario which we hardly talk which is those people who really work hard and want to learn something and achieve something but lose to naturally born geniuses and gifted people. Gifted people face failure but are filled with confidence of doing something in their field because they are genius. But the hard-workers who fail against the geniuses might not have the enough courage to get back up and keep moving ahead, the failure of not achieving anything after continuous and consistent hard work will hurt them and break them down to nothing. Very few people in them have support to climb up get back to working hard no matter what the result, they are the ones who deserve appreciation and recognition, the geniuses have it already in them and build on it, but the hard-workers are the ones who build something from scratch and try to impact the world.

Hard work beats talent when talent doesn't work hard and this is one of the best quotes to keep in mind while working hard.

Rakshith Mahishi
III CSE 'B'

Data

Recently, I was head deep into a conversation (via WhatsApp) with my friend about 'David Attenborough' and his life work. Within a few minutes, I received a YouTube recommendation for the trailer of his Netflix documentary. How did that happen? Was Facebook overhearing my conversation or was it just coincidence? When was the last time you saw an advertisement that convinced you that your microphone is listening to you?

It is hard to imagine this, but what's happening is that my behavior is being accurately predicted by a set of algorithms. All my information: my likes, my interests, web searches, locations are all collected in real time and attached to my identity giving any buyer direct access to my emotional pulse at any point of time. And this is true for each and every one of us. These digital traces of us are being mined into a trillion-dollar a year industry used by the tech giants of the world: Google, Facebook, Amazon etc. So, the ads that seem uncannily accurate, that have to be eavesdropping on us are more likely to be evidence that their targeting works and that it predicts our behavior.

Social media began with a dream of a connected world, a place where we could share each other's experiences and feel less alone. Is it right that we have our moods, feelings be controlled by these Internet companies? Aren't we privileged to certain

data rights? How many times have these small recommendations, suggestions changed our course of action? One of the best examples of this is work of Cambridge Analytica during the Trump election of 2016. They had collected enough information on each American voter to determine the political mind set of any state at any particular instant of time.

So, the question is: What are my likes and my interests? Are they subject to something I see on my Instagram feed or is it my own will? Why did I buy the last item I bought on Amazon? Did I want it or was it just recommended to me?

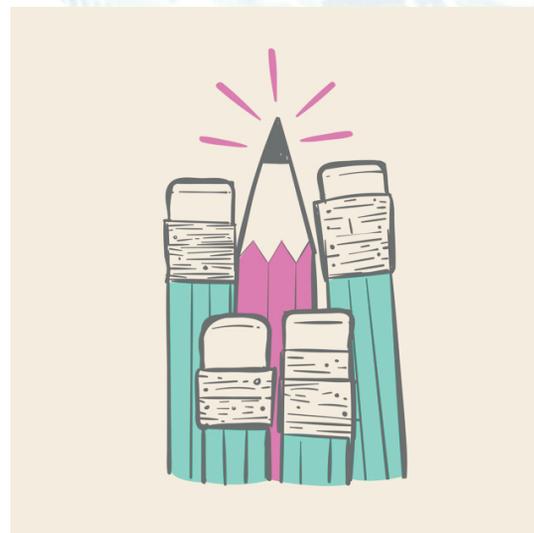
Shreyas K
III CSE 'B'

Individuality

Are You an Individualist?

Let's start with what is individuality? This is one amongst the nine 'Enneagram' types. It's a quality that one possesses who stands unique and apart from rest of the group or society or any matching scale of people. The qualities can be one's own needs or goals, rights and responsibilities that distinguish them from the rest.

Do you think you are an individualist? Then you must consider these below quirks.



You are highly introspective and very conscious individual. You have a very authentic connection with others. You are self-motivated and decisive in nature. You don't just have feelings; you live every emotion. You are supportive and strong when you are in a relation. You thrive to face the true nature of the individual's personality. You might not like to have small and unreal talks just to acknowledge one's presence. You have one-on-one relationship with your acquaintances. You have great sense of understanding any situations, know your emotional state and upcoming reactions, and also the behaviour of the surrounding persons. You are capable of understanding emotion in great depth, this emotional intuition that you have helps to sense how people are feeling, pick up on tensions and conflicts that might exist in the atmosphere. You are surely seen distinct. You are also compassionate. You have the courage to take criticism and compete. Staying alone and involved in your own thoughts, not feeling lonely is one of your idiosyncrasy. Contrarily, you crave for attention and sometimes opinionated. You have your own ideology of the world which needs to be evolving.

You need to try to be flexible with fake personality bearers for your personal growth. It's hard to stay in a superficial relationship for a long time. You might feel more hurt and disappointed when you are in a relationship crisis. Your modesty and authentic nature itself can be your biggest drawback. You might not be an easy person to be ruled over or dominated. If you are a good blend of creativity and imagination, you will be the greatest minds of all time. Something you should know about yourself if you think you are an individualist! You have the ability to convince and conquer the hearts of your companions. You have got to realize the potency. Once you realize this, you know how to channelize yourself to improve. You can develop as a leader. Your clever choice of words can make things work more smoothly.

Some of the personalities, you can relate are the top Physicists Albert Einstein, Max Planck, Erwin Schrodinger and so on; some of the top writers and artists are Frederick Douglass, a hero whose legacy is celebrated even by those who might otherwise contest his actual ideas; Leonardo Da Vinci, a well-known artist of the Italian Renaissance who's known for his enduring works 'The Last Supper' and 'Mona Lisa'; and a great philosopher, Aristotle, one of the most influential human in the history of the world.

"Always be yourself, express yourself, have faith in yourself, do not go out and look for a successful personality and duplicate it" – Bruce Lee

Stay Authentic!

Karthik Prasad N
VII CSE 'A'

TRANSFER LEARNING

During the evolution of the human race, one major aspect that helped humans to connect was learning their surroundings, and sharing their thoughts and ideas. Owing to this, the cognition of human beings has increased tremendously. Knowledge sharing plays an important role in our lives. This helps us to learn information from an event and apply them in a different scenario. The bridge between learning and application is built by the context and attributes of the information, association of events, and similarities observed between the original learning setup and the environment where we apply the skills learnt.

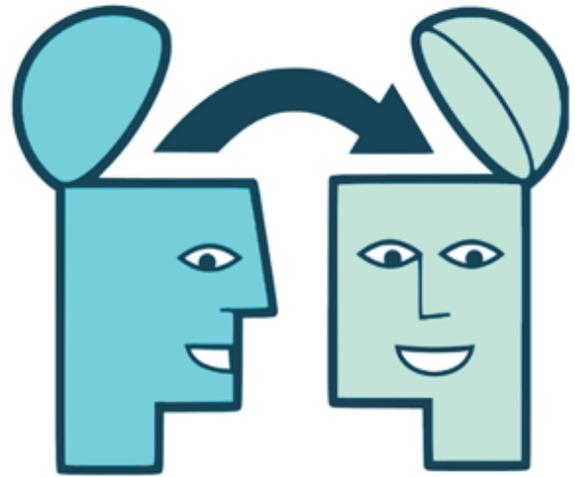
The same is applied in the field of machine learning, wherein the information gained while working with a specific problem is stored and used to solve a related problem. This is called 'Transfer learning'.

Transfer learning relies on 3 factors - Representation, Understanding and Experiences. The conventional machine learning models have been usually built from scratch and trained to solve a specific task. Transfer Learning can be used here, as we can make use of the existing model rather than building a new model from scratch.

Definition of Transfer Learning:

Transfer learning can be applied to train deep neural networks with lesser amounts of data. The weights learned by a neural network for a given task are transferred to improve generalization in a different task.

As stated in the paper 'A Survey on Transfer Learning', by Sinno Pan and Qiang Yang, transfer learning can be defined



based on the domain, tasks, and the corresponding marginal probabilities.

A domain D can be defined as, $D = \{x, P(X)\}$, where:

- x = feature space, and
- $P(X)$ = marginal probability for the data point "X" where $X = \{x_1, \dots, x_n\}$ in the feature space 'x'.
- Given this domain 'D', the corresponding task T can be defined as,
- $T = \{y, P(Y|X)\}$, where:
- y = label space where $Y = \{y_1, \dots, y_n\}$ in the label space 'y',
- $f: x \rightarrow y$ is the objective (target) predictive function such that $f(x_i) = y_i$,
- The task T is learned from training the feature vector/label pairs (x_i, y_i) for each x_i in the feature space 'x' and y_i in the label space 'y'.

If a source domain D_s and a source task T_s , and a target domain D_t with the corresponding target task T_t are given, our goal is to learn the target conditional probability $P(Y_t|X_t)$ in D_t . The only necessary condition is $D_s \cap D_t \neq \emptyset$ or $T_s \cap T_t \neq \emptyset$.

Types of Transfer Learning:

Inductive Transfer Learning, transductive Transfer Learning, Unsupervised Transfer Learning, Transfer Learning in Reinforcement Learning are the types of Transfer Learning.

Transfer Learning Strategies:

There are several strategies to transfer learning, and the most suitable strategy depends on the size of the dataset used in the target task and its similarity with the source dataset. Two of them being pre-trained models as feature extractors and fine-tuning pre-trained models.

Few applications of Transfer Learning:

Simulations, gaming, sentiment classification, image classification and zero-shot translation.

<https://link.medium.com/qvjLZ2L8Odb>

Raksha Harish
ALUMINI 2016 - 2020

Has Artificial Intelligence helped in dealing with Covid-19?

Artificial intelligence (AI) aims to mimic human cognitive functions. It is bringing a paradigm shift to healthcare, powered by increasing availability of healthcare data and rapid progress of analytics techniques. AI can be applied to various types of healthcare data (structured and unstructured). Popular AI techniques include machine learning methods for structured data, such as the classical support vector machine and neural network, and the modern deep learning, as well as natural language processing for unstructured data. Major disease areas that use AI tools include cancer, neurology and cardiology. The past year has been daunting in terms of personal safety and healthcare. Healthcare workers have worked round the clock to keep us safe in the pandemic. The most interesting part about technology is its ability to adapt to changing situations and so has AI proved to be helpful in this Covid-19 pandemic.

AI can easily track the spread of this virus, identifies the high-risk patients, and is useful in controlling this infection in real-time. It can also predict mortality risk by adequately analysing the previous data of the patients. AI can help us to fight this virus by population screening, medical help, notification, and suggestions about the infection control. This technology has the potential to improve the planning, treatment and reported outcomes of the

COVID-19 patient, being an evidence-based medical tool.

Main applications of AI in COVID-19 pandemic

I) Early Detection and Diagnosis of the Infection

AI can quickly analyse irregular symptom and other 'red flags' and thus alarm the patients and the healthcare authorities. It helps to provide faster decision making, which is cost-effective. It helps to develop a new diagnosis and management system for the COVID 19 cases, through useful algorithms. AI is helpful in the diagnosis of the infected cases with the help of medical imaging technologies like Computed tomography (CT), Magnetic resonance imaging (MRI) scan of human body parts.

II) Monitoring the Treatment

AI can build an intelligent platform for automatic monitoring and prediction of the spread of this virus. A neural network can also be developed to extract the visual features of this disease, and this would help in proper monitoring and treatment of the affected individuals. It has the capability of providing day-to-day updates of the patients and also to provide solutions to be followed in COVID-19 pandemic.

III) Contact Tracing of the Individuals

AI can help analyze the level of infection by this virus identifying the clusters and 'hot spots' and can successfully do the contact tracing of the individuals and also to monitor them. It can predict the future course of this disease and likely reappearance.

IV) Projection of Cases and Mortality

This technology can track and forecast the nature of the virus from the available data, social media and media platforms, about the risks of the infection and its likely spread. Further, it can predict the number of positive cases and death in any region. AI can help identify the most vulnerable regions, people and countries and take measures accordingly.

V) Development of Drugs and Vaccines:

AI is used for drug research by analysing the available data on COVID-19. It is useful for drug delivery design and development. This technology is used in speeding up drug testing in real-time, where standard testing takes plenty of time and hence helps to accelerate this process significantly, which may not be possible by a human. It can help to identify useful drugs for the treatment of COVID-19 patients. It has become a powerful tool for diagnostic test designs and vaccination development. AI helps in developing vaccines and treatments at much of faster rate than usual and is also helpful for clinical trials during the development of the vaccine.

VI) Reducing the Workload of Healthcare Workers

Due to a sudden and massive increase in the numbers of patients during COVID-19 pandemic, healthcare professionals have a very high workload. Here, AI is used to reduce the workload of healthcare workers. It helps in early diagnosis and providing treatment at an early stage using digital approaches and decision science, offers the best training to students and doctors regarding this new disease. AI can impact future patient care and address more potential challenges which reduce the workload of the doctors.

VII) Prevention of the Disease

With the help of real-time data analysis, AI can provide updated information which is helpful in the prevention of this disease. It can be used to predict the probable sites of infection, the influx of the virus, need for beds and healthcare professionals during this crisis. AI is helpful for the future virus and diseases prevention, with the help of previous mentored data over data prevalent at different time. It identifies traits, causes and reasons for the spread of infection. In future, this will become an important technology to fight against the other epidemics and pandemics. It can provide a preventive measure and fight against many other diseases. In future, AI will play a vital role in providing more predictive and preventive healthcare.

To conclude, Artificial Intelligence is an upcoming and useful tool to identify early infections due to coronavirus and also helps in monitoring the condition of the infected patients. It can significantly improve treatment consistency and decision making by developing useful algorithms. AI is not only helpful in the treatment of COVID-19 infected patients but also for their proper health monitoring. It can track the crisis of COVID-19 at different scales such as medical, molecular and epidemiological applications. It is also helpful to facilitate the research on this virus using analyzing the available data. AI can help in developing proper treatment regimens, prevention strategies, drug and vaccine development.

Mrudula K
CSE VII 'A'

Departmental Activities

Industry Based Emerging Technologies

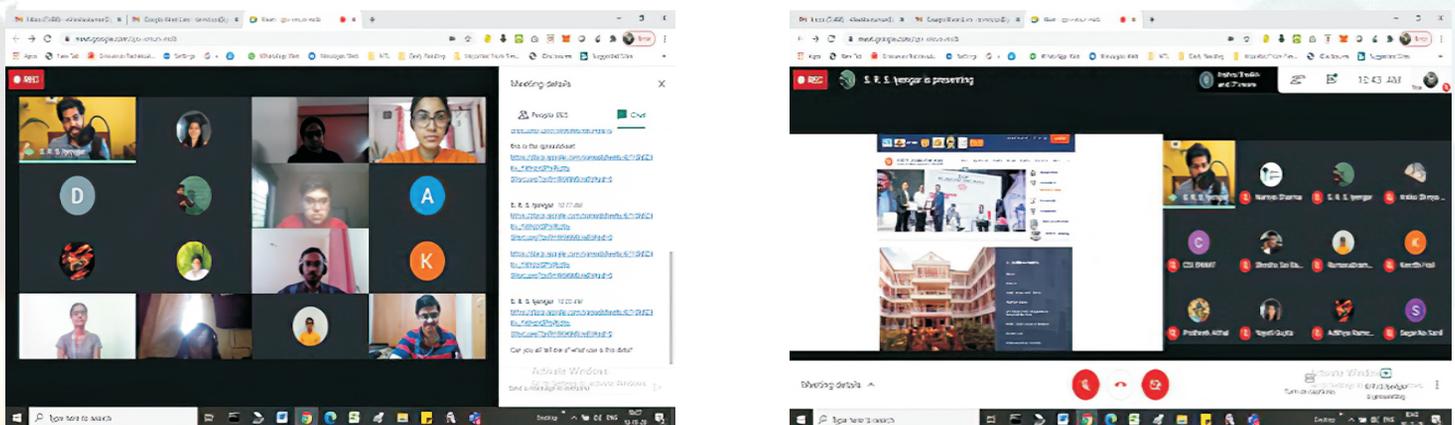
A two-day webinar series on 'Industry Based Emerging Technologies' was organized by Department of Computer Science and Engineering in association with Metamor Technologies, Bengaluru under BNMIT - Computer Society of India students' chapter on the 18th and 19th of June, 2020. We had a registration of 192 students from 2nd, 4th, 6th and 8th semester Computer Science & Engineering, Information Science & Engineering, Electronics & Communication Engineering and Electrical & Electronics Engineering had participated in the webinar. Mr. Chandrakant SH, IT Director and Mr. Mahesh R G, Program Director of Metamor Technologies were the key resource persons for this webinar.



Webinar on Industry Based Emerging Technologies

Modern Methods in Machine Intelligence

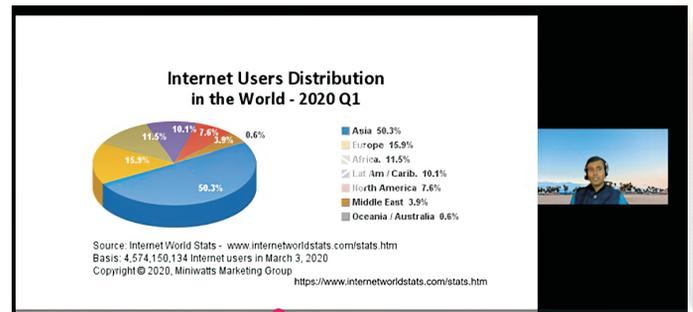
A workshop on 'Modern Methods in Machine Intelligence' was organized by Department of Computer Science and Engineering under BNMIT Computer Society of India Student Chapter on the 10th of November, 2020. We had a registration of 90 students from 5th semester Computer Science & Engineering, Information Science & Engineering, Electronics & Communication Engineering and Electrical & Electronics Engineering had participated in the workshop. Dr. Sudarshan Iyengar, Associate Professor, Department of Computer Science & Engineering of Indian Institute of Technology, Ropar was the key resource person for this workshop. The session started with understanding the basic concepts, fundamental issues and challenges in machine intelligence. An activity was conducted to understand the power of networking. The activity involved using a dataset and social communication tools to build a network of contacts in order to exchange various types of content online. The students were exposed to various filtered and non-filtered dataset on websites like Kaggle. Students learnt about graphs, algorithms behind the search engines, data analysis etc. They were made aware of the different types of problems that can be solved using the



Workshop on Modern Methods of Machine Intelligence

Webinar On – ‘Project Management’

The Student Chapter of Institute of Engineers, BNMIT organized a webinar on the topic ‘Project Management’ on 12th November 2020 from 11.00 AM to 12.30 PM. Mr. Yashvanth N is a Global Technical Marketing Leader working in Aruba, HPE, Bangalore. His current role is in Technical Marketing Engineering team, he focuses on Campus Switching, Network Security, Network Management, Network Designs, Reference Architecture, Aruba Enterprise solutions and Industry 3.0 and Industry 4.0 Digital transformation. Yash's Networking curiosity and passion drives innovation and help him to find new patents, as a result he received Aruba, HPE inventor award and he holds US granted patents. He has filed nearly 20 patents. He has received HPE President Quality Award, Enterprise Quality Award in 2017. The webinar was scheduled in Microsoft teams. Around 30 IEI student members participated in the webinar.

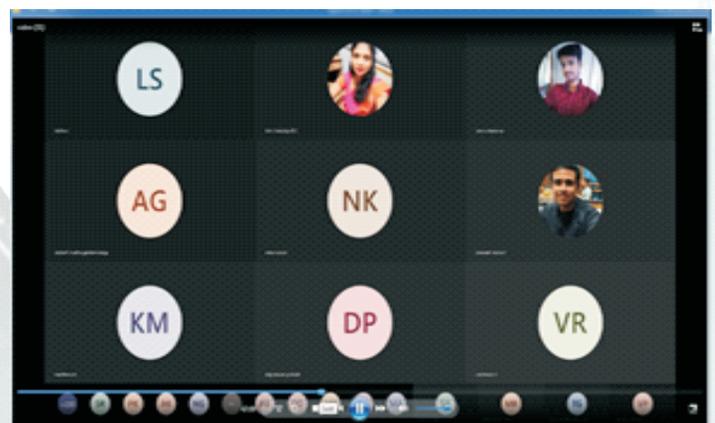
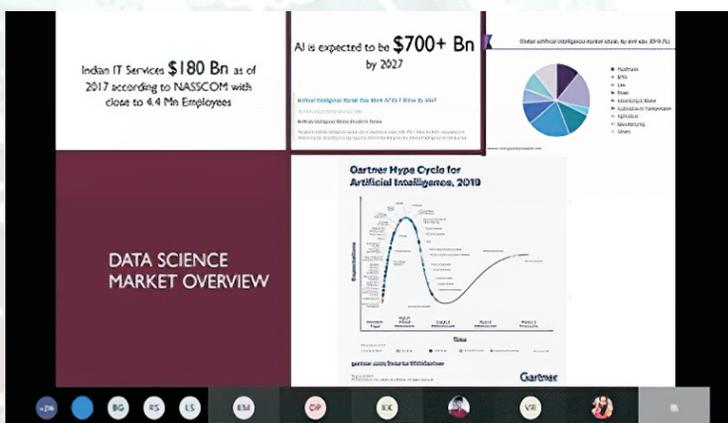


Webinar on Project Management

Technical Talk- Artificial Intelligence Industry Overview

A Technical talk on ‘Artificial Intelligence Industry Overview’ in association with Indian Society for Technical Education BNMIT Student's Chapter was organized by Department of Computer Science and Engineering on 11th December 2020 from 9.30AM to 10.30AM on the online platform MS Teams. Mr. Madhu Hosadurga Rajanna, Global Director, Schneider Electric, Bangalore was the Resource Person. The talk was arranged for the students of 3rd, 5th and 7th Semester students who had secured first class with distinction in their previous semester examination. Two hundred and forty students participated in the technical talk.

Mr Madhu Hosadurga, the Resource Person gave a hindsight, insight and foresight to the relation and principles of Artificial Intelligence, Machine Learning and Deep learning. Discussed about the data science market overview, boom of data science and the technology stack. Students were able to visualise the applications of Artificial intelligence in various domains, for instance, where a google assistant making a phone call to book an appointment. Students gained knowledge of the sample data science use cases, various kinds of roles in data science era and career opportunities available. Students interactively participated in the session by clearing their queries, thoughts and feelings about the topic.



Technical Talk on Artificial Intelligence Industry Overview

Technical Talk- Product Management as a Career

A Technical talk on ‘Product Management as a Career’ was organized by Department of Computer Science and Engineering in association with Indian Society for Technical Education BNMIT Student's Chapter on 16th January 2021 from 9.30AM to 10.30AM on the online platform MS Teams. Mr. Kartik Suryanarayana, Product Manager, Ellucian, Bangalore was the resource person. The talk was arranged for the students of 5th and 7th Semester students. Over hundred students participated in the talk.

Mr. Kartik Suryanarayana, discussed about the organisational function within a company dealing with new product development, business justification, planning, verification, forecasting, pricing, product launch, and marketing of a product or products at all stages of the product lifecycle. He also gave an insight of how the product manager is responsible for the success of a product and how strategic planning is made in the organisation. Students interactively participated in the session by clearing their queries, thoughts and feelings about the topic.

Students Club

The Computer Science and Engineering department has two student clubs which are established by the students

SPARKS-The Coding Club

SPARKS club is the 'Holy Grail' that coding aspirants are looking for. Learn, Adapt to and overcome any challenge you may face and continue the legacy of other like-minded, determined coders like yourself that are all around the world. The club has 172 active student members.

SPARKS CODING CLUB

CONTACT US TO ENHANCE YOUR CODING SKILLS
Mail us at: bnmit.sparks@gmail.com
Contact us at ::
9036528739 Charan
8112238859 Akshat

BNM Institute Of Technology

WHAT WE DO?

- LEARN NEW PROGRAMMING LANGUAGES
- IMPROVE EXISTING SKILLS
- APPLY KNOWLEDGE PRACTICALLY

ACTIVITIES

- SEMINARS
- TEST INTERVIEWS
- WORKSHOPS
- MINI PROJECTS
- HACKATHONS
- SELF LEARNING

@CodingSparks
@sparksbnmit

Register Now
Nov 2nd - Nov 6th

CLICK TO BECOME A MEMBER!!!

AUTOMATICA-The Robotics Club

Automatica is the student driven club that helps the students to work in real time with robots, drones etc. The club helps students to gain a hands on working experience on various hardware projects. The club has 110 active student members.

AUTOMATICA

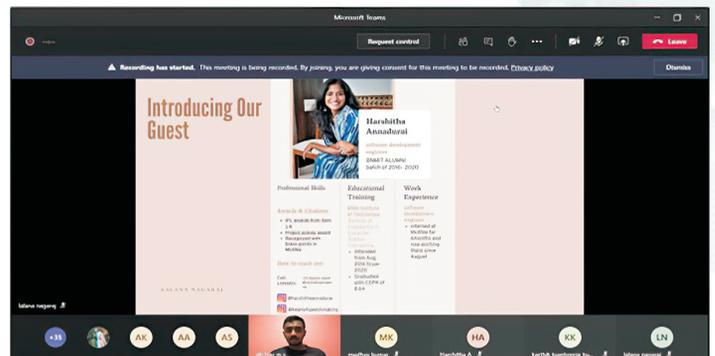
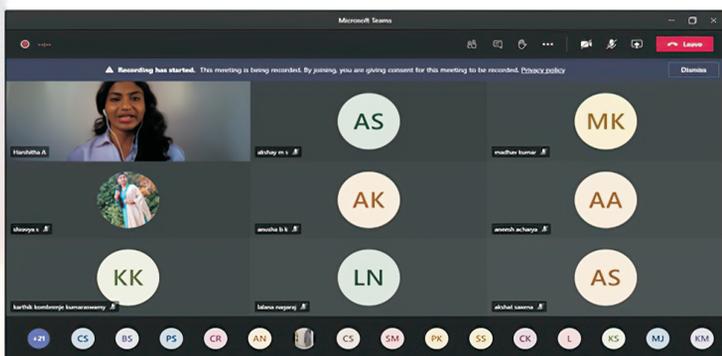
Design It
Build It
Drive It
Win It

Here is a chance to get innovative! Let's come together to build robots, drones and what not!
Time to put on our thinking caps and start building up!

IOT
ROS
ARDUINO

Webinar on Problem Solving

The webinar on 'Problem Solving' was conducted by Department of Computer Science and Engineering on 12.12.2020, for the members of the Sparks club. Students were given a clear understanding of the club and its purpose. We had Harshita Annadurai, Software Development Engineer at McAfee, our alumni to talk on the importance of Problem-Solving techniques to make sure the students understand and take the challenges seriously.



Webinar on Problem Solving

Biz-Tech Quiz

- Pepper is the first humanoid robot capable of recognising the principal human emotions and adapting his behavior to the mood of his interlocutor. Which company made pepper?
- X is a free and open-source software created by Google. Most of the assets in X have been used to create Chrome. Several browsers like Opera and Microsoft Edge running on the following software. Identify X.
- This company is the first in India to use biometric verification ensuring network security and also security to its customer and the first company that has implemented e-KYC. Name this telecom company.
- Originally conceived in 1958, this programming language was originally created as a practical mathematical notation for computer programs, influenced by the notation of Alonzo Church's lambda calculus. Name the programming language.
- Although it took at least another decade for the technology to catch up with the vision, the phrase 'Internet of Things' was coined in 1999. Who coined this phrase?
- Name the cloud migration specialist which was announced to be acquired by tech-giant Microsoft in September for an undisclosed amount.
- Google, Bing, and Hubspot Certified Professional and the teen tech prodigy, Advait Thakur is the founder and CEO of which company?
- Which company got its name from a creek that ran behind one of the founders' homes in Los Altos, California?
- This doodle celebrated the works of which eccentric computer scientist, mathematician, logician, cryptanalyst and theoretical biologist?
- Well-known entrepreneur and physicist Yuri Milner is collaborating with whom on Breakthrough Starshot, an, an ambitious project to develop the technology necessary to send a spacecraft to Alpha spacecraft Centauri, the star system 4.37, light years away from earth?

ANSWERS

1) Softbank 2) Chromium 3) Reliance Jio 4) LISP 5) Kevin Ashton 6) Movere 7) Apex Infosys India 8) Adobe 9) Alan Turing 10) Stephen Hawking

Penujuru Pranitha
CSE 'B'

Crossword Puzzle

Technology Buzzwords

Across

4. Application used to conduct an on-line chat conversation via text or text-to-speech

chatbot

5. Process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems.

Data mining

6. Design intelligent machines that can help and assist humans in their day-to-day lives

Robotics

7. Simulation of human intelligence in machines

AI

Down

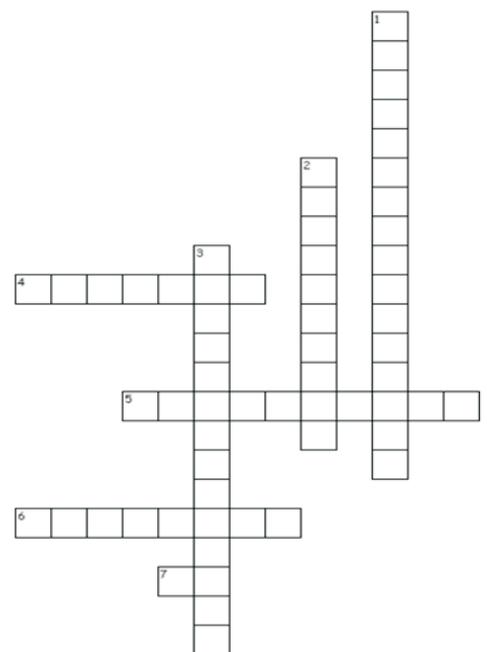
1. Use of quantum phenomena such as superposition and entanglement to perform computation

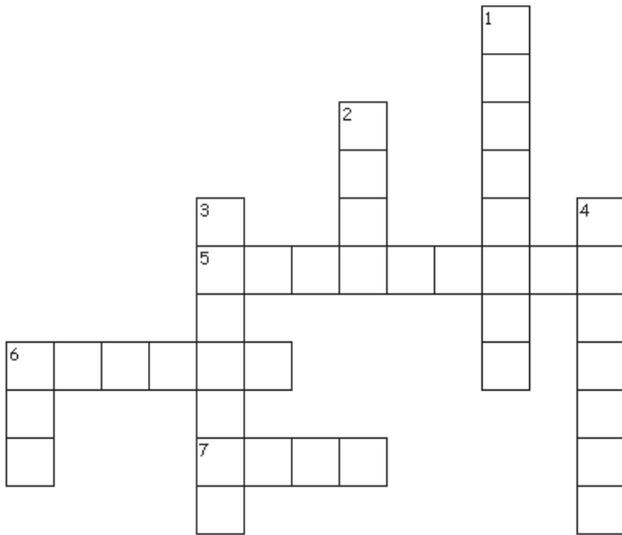
Quantum computing

2. Recording information in a way that makes it difficult or impossible to change, hack, or cheat the system

Blockchain

3. Through which computers can gain high-level understanding from digital images or videos.





Across

5. Program that translates from a symbolic version of instructions into a binary version

assembler

6. An area of memory, or a specialized memory, used to hold data temporarily during I/O operations

buffer

7. Colloquial name for a die or an integrated circuit chip

Down

1. Program that translates from a higher level language to assembly language

compiler

2. A string of 8 bits

byte

3. The amount of time that passes from the moment a hardware data request is issued until the data has arrived at its destination

Latency

4. An executable file

program

6. A set of parallel conductors that carry information from one functional unit of a computer to another

bus

Faculty Achievements

- **Dr. Niharika P Kumar** from the Dept. of Computer Science and Engineering, BNM Institute of Technology, Bengaluru, India has won the Best Paper - First Prize in the 1st All India Paper writing Competition on Emerging Research (PaCER), 2020 organized by WorldServe Online held in July 2020.

Student Achievements

- **Shreyas B** of VII Semester from the Dept. of Computer Science and Engineering, BNM Institute of Technology, Bengaluru, India has won the Best Paper - First Prize in the 1st All India Paper writing Competition on Emerging Research (PaCER), 2020 organized by WorldServe Online held in July 2020.
- **Srinidhi S P** of VII Semester from the Dept. of Computer Science and Engineering, BNM Institute of Technology, Bengaluru, India has won the Best Paper - First Prize in the 1st All India Paper writing Competition on Emerging Research (PaCER), 2020 organized by WorldServe Online held in July 2020.

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