Shell Newsletter

Department of Computer Science & Engineering

Volume 7 | Issue 1 | Dec 2021

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

Santoshi Nakamoto is a pioneer in Computer Technology and known as the inventor of Bitcoin. Thirteen years ago, a group of people led by Santoshi Nakamoto published a paper describing a new software system called Bitcoin. Bitcoin is now worth over $1 trillion, creating a phenomenon that proponents believe could rewire the entire global financial network. Nakamoto launched the Bitcoin network on January 9, 2009. For about two years, when Bitcoin was growing slowly, he posted on message boards and exchanged emails privately with developers. He stopped posting publicly in December 2010 and stopped talking to developers in 2011. Nakamoto never spoke about anything personal, either in public or in private messages that were later made public. Everything revolved around Bitcoin and its code. No other public information is available. In a time when anonymity is hard to come by, Nakamoto remains a towering personality incognito.

Inside Shell

Vidyayāmruthamashnuthe

B. N. M. Institute of Technology

An Autonomous Institution under VTU. Approved by AICTE.

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From Editor's Desk

Dear Readers,

It is my great pleasure to introduce Volume 7, Issue 1 of 'Shell.' As always, the issue presents a broad perspective of activities undertaken by our department in the past few months along with a few insights about the latest innovations and technologies happening around the world.

A return to normal – a modest but elusive goal – hadn't been clear sighted for a while. It has been a semester since our lives have got back on track and as I am writing this, I feel happy to see the immense enthusiasm in the members of our college towards contributing to this magazine. This is a testament that our thirst for knowledge and desire to share will always lead us down a common path towards improvement and a pleasure to learn something new. As the saying goes 'Vidyayamruthamashnuthe.'

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 a success. I invite you to immerse yourself into the unfolding dialect of Science and Technology.

Shreyas K
V CSE 'B'

Department Profile

The Department of Computer Science & Engineering started in 2001 with an intake of 60 students and the present intake is 120. The Department is renowned for imparting quality education with well-qualified and dedicated faculty members, who are experts in various domains of Computer Science &Engineering and strive for an exceptional career growth for the students.

The Department offers undergraduate and postgraduate programs in Computer Science & Engineering. A well-equipped Research & Development (R&D) Center, affiliated to VTU, has been set up to cater to the needs of the research scholars, as they conduct cutting-edge research towards doctoral degrees.

The Teaching-learning process put in place by the Department is well defined to help students explore the trending technologies via Skill Development Programs organized by the industry-institute Interaction Cell. Students are also encouraged to improve their performances in the University examinations through Performance Enhancement Classes.

The Innovative Project Labs (IPL) of the R&D Center encourages and equips the faculty and students to uncover innovative ideas, which are also funded through the Innovation & Entrepreneurship Development Cell (IEDC) to ensure prototyping to validate the ideas.

Department overview

Message From The HOD

Welcome to the Department of Computer Science and Engineering, BNMIT, Bangalore.

The Department is well-supported by seasoned faculty members with an average experience of 10 years. It also boasts of a state-of-the-art infrastructure facility that supports and encourages students to acquire knowledge and gain practical experience. During the course, students mould their careers, polish their technical skills and inculcate team spirit with exceptional oral and written communication skills. The Department also extends financial and technical support to the students to participate in competitions and hackathons at state, national and international levels.

The faculty members are encouraged to acquire higher degrees and conduct research in the areas that benefit the society. They are also supported in conductingand participating in workshops, symposium and conferences at national and international levels. Last but not the least, they are motivated to adopt innovative teaching methodologies and best practices to make classroom a pursuit of learning.

Dr. Chayadevi M L
HoD Dept of CSE

Neural Network from a Cat and Mouse Struggle-Generative Adversarial Network(GAN)

One evening in 2014, a 28-year-old Ian Good fellow came up with the idea of pitting two neural networks against each other to solve the problem of creating a computer that could generate photos by itself. Later that night, Ian coded and tested what is now called a Generative Adversarial Network.

Generative in GAN refers to its ability to generate new images from the training dataset. This is different from earlier neural network models that could recognize things. This concept of generating images is helpful in areas where there is a lack of sufficient images to train a neural network. Since the accuracy of neural networks depends heavily on the amount and quality of datasets, GAN plays an important role. The potential of GAN in generating is that it can generate photographs, CT images, paintings of famous painters, and facial images.

Adversarial in GAN refers to the two neural networks that are pitted against each other in a cat and mouse struggle. The Generator tries to slip through the discriminator by generating the best artificial images, just like a mouse would try to escape from a cat. One set of networks, called generators, is given a set of real images so that they can generate a set of artificial images. Another set of networks called discriminators tries to distinguish between the real set of images given to the model and the generated set of images from the generative network and then assigns a score. The Generator repeats to generate images until it achieves the desired score.

GAN has its own failures, such as Vanishing Gradient and Mode Collapse. In Vanishing Gradient, sufficient information is not provided by the discriminator to the generator to make progress. Backpropagation has a multiplying effect due to its use of the chain rule of differentiation. The gradient flowing from output layers to input layers starts to shrink, causing the discriminator in the input layers to learn slowly or stop learning. GAN is used to generate a variety of images to train the neural networks to identify or classify effectively.

But in mode collapse, the discriminator network can get stuck in local minima and generator learning. This trap generates a small variety of artificial images, which fails the idea of getting a diverse output. The Vanishing Gradient and Mode Collapse problems are solved by Wasserstein Loss Functions.

Ramasubramanya MS
VII CSE B

Metaverse

“The Internet is becoming the town square for the global village of tomorrow”.

Bill gates rightly predicated the future of the internet a long back. Internet has evolved a lot from a network between universities to modern web 3.0 running on blockchain.

Metaverse is considered to be the next big thing in the world of internet. A metaverse represents a combination of innovation, as it requires multiple technologies and trends to functions. Contributing tech capabilities including AR (augmented reality), flexible work styles, head mounted displays (HMDs), and AR cloud, the internet of things (IoT), 5G, artificial intelligence (AI) and spatial technologies. Researches expects that by 2026, 25% of people will spend at least one hour in a day in the metaverse for work, shopping, education, social media and entertainment. Facebook Inc is having been renamed to "Meta Platforms” by Mark Zuckerberg, to a rebrand that focuses on building the "metaverse," a shared virtual environment that it bets will be the successor to the mobile internet.

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There is a lot of excitement around metaverse, much of it driven by the technology companies preemptively claiming to be metaverse companies, or creating metaverse to enhance or augment the digital and physical realities of people. Moreover, activities such as

- Purchasing outfits and accessories for online avatars
- Buying digital land and constructing virtual homes
- Participating in a virtual social experience
- Shopping in virtual malls via immersive commerce
- Using virtual classrooms to experience immersive learning
- will eventually take place in a single metaverse Today there are many individual use cases and products, all creating their own versions of a Metaverse. Opportunities across multiple industries include:
- Higher education, medical, military and other types of trades can deliver a more immersive learning experience. They don't need to create their own infrastructure, as the Metaverse will provide the framework.
- Virtual events, having gained popularity over the last two years, can now present more integrated offerings.
- Retail can extend its reach to an immersive shopping experience that allows for more complex products.
- Social media can move to the Metaverse, where users can interact through threedimensional avatars.
- ·The adoption of Metaverse technologies is still nascent and fragmented, and we recommending refraining from heavy investments in a specific Metaverse. It is still too early to determine which investments will be viable in the long term, and the priority should be to learn, explore and prepare for a Metaverse.

Rushil
III CSE 'B’

Rise of Automotive Hacking

Abstract:

The current automobile industry's biggest problem is cyber-security. Modern cars not just have GPS running with music players, but have dozens of computers being used for monitoring and controlling nearly every system of the vehicle like engine, steering, brakes and entertainment system. Thus, it is very essential to include automotive cyber security.

Introduction:

There are softwares which can control cars and also their infotainment system. These computers are called ECU [Electronic Control Unit] which can converse through different network and messaging protocols in the Controller area network of the vehicle to connect the engine and controlling brakes.

According to the report from Upstream Security, there were at least 150 automotive cybersecurity incidents in 2019, since 2016 94% increases year-over-year .

Hackers still infiltrate data centers and back-end servers and steal pertinent user data. About 40% of these issues are related to the backend application servers.

The NationalHighwayTrafficSafetyAdministration(NHTSA) defines it as the following:

“Cybersecurity, within the context of road vehicles, is the protection of automotive electronic systems, communication networks, control algorithms, software,users, and underlying data from malicious attacks, damage, unauthorized access, or manipulation.”

The following are the missions for vehicle cybersecurity:

- Keep the data safe- GPS location info, data connected with the bluetooth speaker via phones.
- Prevent vehicle damage and manipulation.
- Car hacking is categorized as follows:
- Key Fob Hacks- Gain access to cars by spoofing and cloning the signal that car and key use to communicate.
- Server Hacks- Hacking into a central server gives access to sales data, mobile apps
- Mobile App Hacks- hackers gain access to the information and control available in automotive apps.

Some incidents of Car Hacking:

A ransomware attack on the Australian transportation company Toll Group, affected 1000 servers and 40,000 employees.

2015, Miller and Valasek Remote Hack- they took control of a Jeep Cherokee.

There was a data breach on Toyota which exposed personal information of 3.1 million customers.

Prevention from cyber-attacks:

- Some of the guidelines by Auto ISAC- Auto Information Sharing and Analysis Center are outlined as follows:
- Risk Assessment and management
- Security by Design
- Threat Detection and Protection

Conclusion:

Auto manufacturers must embrace cybersecurity as a key component of both the development and deployment phase of their cars' AI functionalities. Cyber-attacks and cyber-crime are a growing concern for business and the customers.

It is said that the future will be filled with “Self-Driving” cars which compared to regular cars are safe comfortable and convenient.

Brunda M.S
V CSE 'B’

Has the Apple M1 Chip revolutionized the Computer Industry?

Are you a content creator, storyteller, or someone who programs applications that need high-performance devices such as in the engineering and science field? Then this is for you. Apple announced in 2020 that it was moving away from Intel to produce its own customer silicon, launching its first in-house chip, M1, based on the ARM architecture in the month of October. Let's try to answer a few questions to figure out how these Mac M1s are destroying the Intel Macs.

The M1 is NOT a CPU!

The M1 is not a CPU, it is a whole system of multiple chips put into one large silicon package.

The CPU is just one of these chips. M1 is one whole computer onto a chip i.e., a System on a Chip (SoC). The M1 contains a CPU, graphical processing unit (GPU), memory, input and output controllers, and many more making up a whole computer.

Today if we buy chips, whether from intel or AMD, we get what amounts to multiple microprocessors in one package. In the past, computers would have multiple physically separate chips on the motherboard, because we can put so many transistors on a silicon die today, companies such as Intel and AMD began putting multiple microprocessors onto one chip. We refer to these chips as CPU cores. One core is a fully independent chip that can read instructions from memory and perform calculations. Instead of adding even more general-purpose CPU cores to increase the performance, Apple has followed a different strategy by adding even more specialized chips doing a few specialized tasks that tend to be able to perform their tasks significantly faster using less electric current than a general-purpose CPU core. The wide variety of specialized chips in M1 include CPU, graphical processing unit

(GPU), image processing unit (ISP), digital signal processor (DSP), a neural processing unit (NPU), video encoder/decoder, secure enclave, and unified memory. This is part of the reason why a lot of people working on images and video editing with M1 Macs are seeing such speed improvements.

Apple's Unified Memory Architecture

For a long time, low-cost computer systems have had CPU and GPU integrated into the same chip. These have been famously slow for several reasons; there were separate areas of memory that got reserved for the CPU, GPU, and large GPUs produce a lot of heat, thus you cannot integrate them with the CPU without getting rid of the heat problems. Apple's unified memory architecture tries to solve all these

problems. There is no special area reserved just for CPU or just for GPU, memory is allocated to both processors. They can both use the same memory. Apple uses memory which serves both large chunks of data and serves it fast, in computer language, it's called low latency and high throughput. Thus the need to be connected to separate types of memory is removed. Apple has gotten the watt usage of the GPU down so that a relatively powerful GPU can be integrated without overheating the SoC. And ARM chips produce less heat allowing the GPU to have a higher heat range than a GPU on the same silicon die as an AMD or Intel CPU.

AMD has started putting stronger GPUs on some of their chips and moving gradually toward some form of SoC with the accelerated processing units (APU) which are CPU cores and GPU cores are placed on the same silicon die. Intel and AMD business models are based on selling general-purpose CPUs, in which people just slot onto a large PC motherboard and assemble physical components from different vendors. In the new SoC world, you don't assemble physical components from different vendors, you buy the design for graphics, CPUs, modems, IO controllers, and others from different vendors and use that to design an SoC in-house. For Apple, this is simple. They control the whole widget.

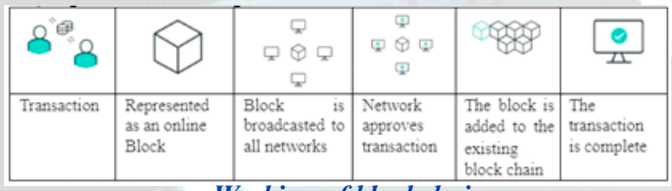
Conclusion

Thus, it's a solid YES on the above question that Apple's M1 chip has practically revolutionized the computer industry by changing the hardware architecture of traditional computer processors and providing more value products for less money. On previous MacBooks, everything from the CPU, the GPU, the T2 chips, the memory, the thunderbolt controller, and I/O chips were on the Logic board's different areas. So, data had to travel back and forth between all the components, which caused latency. Now, with the new M1 chip Macs, every piece is connected using high-bandwidth fabric, which connects the unified pool of memory to access every component without needing to copy the different memory pools like traditional systems must do. It demonstrates that AMD and Intel have to come up with witty solutions to counter problems artificially

Akshay MS
V CSE 'A'

Blockchain:Revolutionary techology of the future

The solutions to tomorrow's problems demand higher levels of engineering expertise and innovation than what is available today. One such technology that can have a significant impact on the way we are working today is the technology of block chain. A blockchain is a distributed database that is shared among the nodes of a computer network. It is a chain of blocks that store information with digital signatures in a decentralised and distributed network. Blockchains store data in blocks that are linked together via cryptography*. As new data comes in, it is entered into a new block. Once the block is filled with data, it is chained onto the previous block, which makes the data chained together in an ordered way. Different types of information can be stored on a blockchain, but the most common use so far has been as a ledger for transactions. The goal of blockchain is to allow digital information to be recorded and distributed but not edited. In this way, a blockchain is the foundation for immutable ledgers, or records of transactions that cannot be altered, deleted, or destroyed. This is why blockchains are also known as Distributed Ledger Technologies (DLT). Fig. 1 shows the workings of the Blockchain.



Working of blockchain

Block chain technology is explained with the following example: A company owns a server with 10,000 systems that are under the same roof, and the company will have direct control over all the systems. However, this has a drawback. What if there's a power cut or internet issues? In such cases, data may be lost. The blockchain allows the data held in that database to be spread out among several network nodes at various locations. This not only creates redundancy but also maintains the fidelity of the data stored. This system helps to establish an exact and transparent order of events. This way, no single node within the network can alter information held within it. Because of this, information and history are irreversible. Due to the decentralised nature of blockchain, all transactions can be viewed transparently by having a personal node, ensuring transparency.

But transparency and data security are two aspects that are contradictory to each other. The block chain technology provides transparency while providing great levels of data security. New blocks are always stored linearly and chronologically. That is, they are always added to the "end" of the blockchain. After a block has been added to the end of the blockchain, it is extremely difficult to go back and alter the contents of the block unless a majority of the network has reached a consensus to do so. That's because each block contains its own hash, along with the hash of the block before it, as well as the previously mentioned time stamp. Hash codes are created by a mathematical function that turns digital information into a string of numbers and letters. If that information is edited in any way, then the hash code changes as well.

There are several features which bring technology to the service of mankind with more efficiency than ever before. The technology can make the transactions edit-proof and tamper-proof. Removing human involvement for verification can automate the entire process with the utmost accuracy in data collection and could be a significant improvement. Third-party interventions can be eliminated, which can reduce the costs. The feature of decentralisation makes the transactions very secure and hard to tamper with. However, there are some drawbacks, such as high technology costs, low transactions per second, data storage limitations, a history of use for illicit activities, and so on, that necessitate additional research in this area to find suitable solutions to these limitations.

Due to such unique features and capabilities, blockchain finds itself as a preferred technology in many areas of human life. The research indicates that the predominant application areas could be cryptocurrency, money transfer, financial exchange, insurance, secure personal information, secure IoT, data storage, health care, risk management, and so on. While a lot of research is going on to exploit the benefits of this revolutionary technology, blockchain has proven itself to be an efficient banking alternative and a way to secure personal information for citizens of countries with unstable or underdeveloped governments.

To sum up, blockchain technology is revolutionary. The combination of transparency and security makes it acceptable in many walks of life in the future. It is a very challenging research topic for researchers and students of technology.

*Cryptography is the study of secure communications techniques that allow only the sender and intended recipient of a message to view its contents.

Samhitha Holla
III CSE 'B'

Holographics Augmented Reality

A widely held belief is that augmented reality (AR), once it becomes a mainstream medium, can disrupt marketing and management in numerous ways. However, one frequently discussed – yet mostly unanswered - question is whether AR will render existing physical products and services obsolete.

For some product categories (e.g., Post-it notes, manuals, navigation technology), acceptance rates are higher than others (e.g., pets, memo). In addition to utilitarian benefits, digitalized products, and familiarity with AR, certain product and consumer characteristics are also identified as driving substitution (e.g., not visible to others).

Furthermore, multiple marketing implications are explored , including the disruptive potential of AR, the possibility of copying and pasting the real world, the threat of counterfeits, the role of offline and blockers, and four generic response strategies for companies. etc..

Medical and Health

In the past, surgeons could only create surgical path ways by overlaying 2D images on a map of the body. Now, surgeons can actually place holograms inside the patient's body, enabling them to better navigate around tissue structures and avoid unnecessary surgery. Surgeons can now keep both hands available as the hologram provides specific instructions, so they don't need to manually check their devices, such as tablets or phones, while operating.

Real time Gaming

Battleship is a board game that is played on a game board. AR technology can overlay a virtual game on top of the real world to develop an AR battleship board game with a hologram display. First, the group examined the multi-user interaction for the AR battleship board game and holographic display from a different angle. Second, we will develop the multi-user interaction for AR Battleship. The third phase involves integrating the AR Battleship game with a pyramid holographic display.

E-Commerce Shopping

A camera application will be developed which will function directly through the default camera of a smart phone. Instead of selecting the size of the cloth in the shopping app, users will click the camera icon to access the camera that will show the product in 3D using the augmented reality technology, and then they will know if the cloth fits them or not, or whether to go ahead and buy it.

Lalana Nagaraj
V CSE 'A'

Blogs

Life

I wake up with a jolt feeling all cold and scared. All these vibrant colors I see under this bright sun scare me. They remind me of the ideal world which we all know doesn't exist. All of this brightness is too much for me to take in because life is not always colorful, is it? It takes dark turns. Why weren't we told about all of these when we were younger? We were never trained to face reality. We are brought up in a protected soap bubble and are taught of a butterfly world and all of a sudden one day when this bubble fails to handle all the pressure and bursts, we are left naked and exposed to a world that resents fantasies, a world that has the ability to snip your butterfly into a million pieces even before you realize you own one. Life is not always flowers and ice cream it is mostly thorns and ferret. We take birth as green as day, grow up being a part of a family and in the process when responsibilities blow past us on a daily basis, we flutter, sway and rustle, eventually get detached and come crashing down, getting relieved of all these worldly bonds to find peace. But right now, in these tough times, it is really difficult to stay alone and what's more is that every time someone asks us how you are, we pretend like everything is fine. It's a stereotype, we just don't realize that it is okay to be “not-fine”. We are just so scared to admit it. Most of us have lost someone over the past few months, someone we loved dearly, and we know we can get through but we just don't know how. We have always been made well aware of the type of problems we might come across but never were we told of the ways to deal with them. We were never told that we would face righteous ambiguities. Although there's one thing that I've learnt myself. It does not matter how we deal with our problems; all that counts is if we had the courage to face them. We just have to manage to get through. Life is not an exam, it is, instead a journey. At

every crossing along this journey, we all learn something, might be small might be big, might make a difference or it might not, what matters is that we learnt. We are left to fight our battles alone, the only person worthy of complete trust in this war-field is us.

Life is a fickle game, the only one standing steady in it, is YOU.

Jyotsna Sharme K J
V CSE 'A'

The Importance of Self-Learning

Growing up in a fast-paced world, students need to be on par with the current technologies. In order for them to learn what's needed they need to cultivate the habit of self learning. Most students are spoon-fed since their childhood and never really get a chance to learn something absolutely new from scratch. When put in a situation where they have no option but to walk the extra mile in order to learn something they come out of their comfort zone and get a step closer to achieving their goals. Self learning is an art which only few students tend to grasp quickly and get used to the pressure and work their way around it. Self learning also helps them gauge their boundaries and their limitations. The ones who become successful are the ones who overcome their limitations and stand strong during the long process of learning and implementation and that is the most important skill the industry looks for. Its not about how many skills a person acquires or how much impact they can provide to a project but how consistent are they in learning something new. A fresher is just expected to prove the employer that they are feasible to learn something new in a quick way and also have an impact on the projects. Self learning paves a certain path for you to move ahead in something you are interested in and helps you gain a lot of insights on the topic you want to work on.

RakshithMahishi
V CSE B

Department Activities

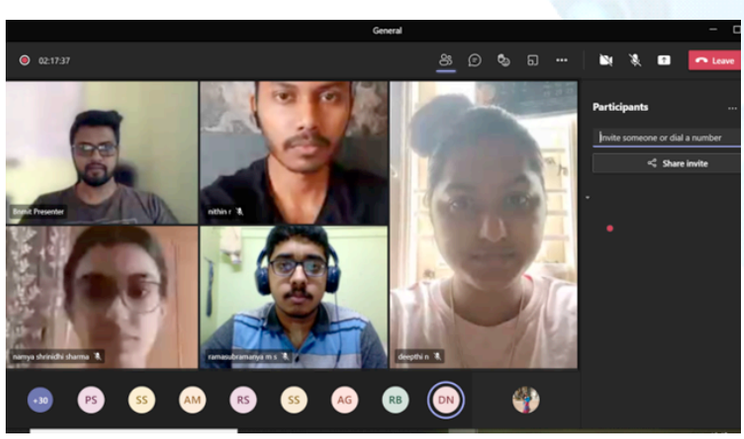
Motivational Talk on "My Story-Motivational Session by Successful Innovators"

The Department of Computer Science and Engineering organized a talk on 'My Story-Motivational Session by Successful Innovatos' on 16th December 2021. The resource person Mr. Shreyas S P is the Founder and Director at HyCube Works Private Limited, Bangalore, India. 87 students from fifth semester of Computer Science and Engineering attended the session.

The talk brought insight into the journey of the speaker as a Successful Entrepreneur, as a student and his venture in establishing his Company - HyCube Works Private Limited. The talk went on as a Question Answer Session which covered the challenges faced by the speaker while establishing his company followed by some useful tips to students.

Webinar on 'Android Mobile/Web Development (Java)'

The Department of Computer Science Engineering conducted a workshop on "Android Mobile/Web Development (Java)" for 12 days from 28th June to 10th July 2021 for 6th semester students under NewGen - IEDC, DST, GOI.The resource personwasMrPavan J S,senior Android Developer, Zoho Develop Scripts, Dubai. He has practical experience to design, develop and deploy applications to play store and good knowledge on mobile development lifecycle/architecture. 115 students attended the workshop.



The session started with the introduction and installation of Java SDK and Android Studio. The speaker demonstrated various Android components such as activity, services, broadcast receiver, content provider, support user interface, threading and fragments. All functionalities were explained with the code and the output was shown on the Emulator. The knowledge and hands-on experience gained by the students from the sessions were helpful for them to create more user-friendly applications on Android phone and also to build creative applications like home automation, finance application, business applications, audio and video applications and medical applications on Android phone.

Workshop On "Installation of Kali Linux and Network Attacks"

The Vanguard Cybersecurity Club of Computer Science and Engineering department organized a workshop on 'Installation of Kali Linux and Network attacks' on 10th and 11th July 2021. This was a two-day session and totally 54 students attended.

The session started with an introduction to the Operating System 'Kali Linux'. Information on the same was given along with a brief explanation of virtual machine. The detailed procedure on how to setup a Kali Linux virtual machine was shown. The speaker gave inputs on VM Ware and Virtual Box and provided links to download the required files. On the second day of the workshop, an explanation of how de-authentication attack works was given along with the demonstration of the attack. Tips on how to prevent the attack were shared. Cracking passwords of Wi-Fi networks with WPA encryption was demonstrated by the speaker and all the necessary Linux commands were shared. The advantages of WPA2 encryption and why the encryption is a really common was explained. The session ended with a QnA.

Webinar on "Fundamentals of Artificial Intelligence and Machine Learning"

Department of Computer Science Engineering conducted an online student workshop on Fundamentals of Artificial Intelligence and Machine Learning under Learning with Vodafone University Engagement Program from 10th to 17th of May, 2021. The workshop was conducted for a total of 8 hours and was attended by a total of 218 students from all branches of BNMIT.

The session began with an introduction to Machine Learning, its fundamentals and types. This followed with the explanation of various Machine Learning Models – Simple Linear regression and Evaluation Metrics: Regression. Information about Supervised ML Techniques – Logistic Regression and Evaluation Matrix for Logistic Regression was also provided. This was followed by an explanation of Supervised ML Algorithm – KNN and evaluation with confusion Matrix and Unsupervised ML Algorithm – K-Mean clustering and evaluation Techniques for k-mean clustering.

Two-Day Hands-on Workshop on "Introduction to IoT using Blynk and Google Firebase Cloud"

A Two-day Hands-on workshop on "Introduction to IoT using Blynk and Google Firebase Cloud" was organized by Department of Computer science & Engineering, BNMIT in association with CSI on 4th and 5th February 2022. The aim of the workshop was to introduce students to Internet of Things platform with the help of various real time applications. 90 students from Third semester, CSE department had participated in the workshop. Dr. Srinivasa Shetty, CTO, SST Technologies along with his team of 3 members were invited as the expert members to conduct the workshop.

On the one, workshop began with an introduction to Embedded systems. The importance of embedded systems was discussed following which the concept of Arduino board was introduced. The speaker gave brief description about the Arduino board and its usage. The students were then given few real time applications to be implemented on an Arduino board. Some of the experiments were: RGB LED display using Arduino board, Controlling the Blinking of LED in Arduino board, Button Pin Controlled LED, Printing in Serial Monitor and Temperature mapping using Sensor.

The second day , workshop was about controlling the devices using Bluetooth. Students were introduced to two new platforms: Blynk and Google Firebase Cloud and were given real time applications to be implemented in those platforms. Some of the experiments conducted included: RGB LED Control using Bluetooth, LED Control using DHT11, Temperature and Humidity control sensor using DHT11, working with Google Firebase, controlling the output using Blynk.

After the implementation of each experiment, additional time was given for doubt clarification and to sort out implementation issues, if any. Students were provided kits that can be interfaced with their laptops for conducting the experiments. Students were introduced to various sensors and other IoT components which was very exciting for them. The workshop concluded with a feedback session from students. The overall feedback from the students were very positive and they found this workshop really useful.

Technical Talk on "Introduction to Virtual Reality and Augmented Reality"

The Department of Computer Science & Engineering, BNMIT in association with Indian Society for Technical Education (ISTE) Student Chapter, BNMIT conducted a Technical Talk on "Introduction to Virtual Reality and Augmented Reality" on 23rd December 2021. The talk was conducted with an objective to create awareness about Augmented Reality & Virtual Reality, its applications, its need in the field of IT and the challenges in the domain.

The resource person Dr R. Rajkumar started the session with the question "What is Augmented Reality & Virtual Reality?" and he answered it in a manner relatable to IT professionals. The concept of mixed learning was also touched on. He explained about the creation of an innovative application that is the "Augmented Reality BOOK". Insights about how the upcoming 5G technology can support the implementation of Augmented Reality, Virtual Reality and Mixed Reality in real time application were given. The session concluded with information about the effect of deep learning in the domain and fundings available. Explanation of how deep learning can be used to enhance the performance of Augmented Reality & Virtual Reality was mentioned along with the various funding agencies that are interested in providing financial assistance for building Augmented Reality and Virtual Reality based applications.

Technical Talk on "RPA (Robotic Process Automation) and its impact"

The Department of Computer Science & Engineering, BNMIT in association with Indian Society for Technical Education (ISTE) Student Chapter, BNMIT conducted Technical Talk on "RPA (Robotic Process Automation) and its Impact" on 30th November 2021. The resource person Mr. Rakesh Arjun Hamsagar, a Senior Sales Engineer at Automation Anywhere, Bangalore started the session with insights about the technology trends in the current market.

He explained about the various cloud services, service models and architecture with many real time examples followed by discussion on monolithic architecture, microservices architecture and applications built on the microservices. Robotic Process Automation is productivity software that sits on top of existing systems and performs manual, repetitive, and rule-based activities traditionally performed by individuals. Few examples include moving files and folders, filling forms, reading from and writing into database etc.

A live demo on Automation Anywhere Community Edition for the scenario of booking a flight ticket with changing few attributes in a scenario was given. Students actively participated in the session by clearing their doubts, thoughts and idea on the concept of RPA. Overall, the technical talk was very interesting, interactive and informative. It provided an insight into the need of RPA (Robotic Process Automation) and its impact. It inspired students to learn more about RPA and also works towards using them to human life easy.

Virtual Webinar on "Intellectual Property Rights – Patent, Industrial Designs and Copyrights"

The Department of Computer Science Engineering conducted a virtual webinar on "Intellectual Property Rights - Patent, Industrial Designs and Copyrights" on 22nd January 2022 for the students of 3rd semester. The resource person was Mrs. Girija V, founder of IPaatEntiti IP Solutions, Patent Attorney & Agent Trademark Attorney. 207 students attended the webinar which was conducted on Microsoft Teams.

The session started with an introduction to Intellectual Property Rights. The speaker started the session by introducing the concepts of Trademarks, its various types and benefits. All functionalities regarding patenting and the different ways to protect IPR were explained. Knowledge about the different elements of trade secrets was shared along with an understanding of what can be protected using patents and what cannot. The session concluded with a brief discussion about the various documents required for filing patent application.

Workshop on "Computational Mathematics and Aritificial Intelligence using MATLAB"

A Two-day hands-on technical session on "Computational Mathematics and Artificial Intelligence using MATLAB" was organized by the Department of Computer science & Engineering, BNMIT, in association with CSI on 3rd and 4th December 2021. The workshop aimed to introduce students to MATLAB programming environment with hands-on sessions. 150 students from CSE and ISE enrolled and participated in the workshop.

Students got an awareness of the various toolboxes and real-time applications of MATLAB. Here are a few examples of how neural networks are used in machine learning applications that were demonstrated during the workshop: Segmenting images and videos semantically, detecting objects in images including pedestrians and bicyclists, detecting cancer by guiding pathologists to classify tumours benign or malignant. Students executed small programs to understand different data types, functions and syntax of the constructions. Students were familiarized with operations on vectors, matrix, arrays and special arrays. In the afternoon sessions, they were given hands-on training on MATLAB Programming.

Students were introduced to plotting graphs and bar charts, making them more informative, drawing multiple functions on the same graph, and using subplot and line space functions. The session also provided the students, knowledge about the generation of signals in MATLAB, audio processing and image processing on MATLAB. The entire session was very interactive. Through this workshop, the students were able to explore the impact of MATLAB in industry and Academics.

Workshop on "Web Development"

The Sparks Coding Club of the Computer Science and Engineering Department organized a workshop on "Web Development" on 29th January 2022. It was conducted to enlighten the members about the basics of web development. The webinar was held on Microsoft Teams.

The workshop was conducted to provide a hands-on session on Web Development. The focus was on introduction to web development, technologies used to develop a web page, different opportunities available as career, the basics of HTML, CSS and JavaScript. Other topics that were covered included designing a personal portfolio, improvising it using front end libraries like bootstrap and tailwind, React basics and Data Connectivity. Speaker had taken an example and performed a run through of the different steps for better understanding. An interactive discussion followed the session where attendees cleared their doubts about the topics covered.

Faculty Achievements

Patents filled 2021-22

1. ***Prof. Abhijit Das*** *has filed a patent on "*Early Detection of Denial of Service (DoS) attack and Deception attack in industrial cyber physical systems."
2. **Prof. Santosh Reddy** P has filed a patent on "Smart Cultivator".

Book Published by Faculty 2021-22

1. **Prof. Santosh Reddy P** has published a book called "Python Programming Fundamentals" under INSC International Publishers. under INSC International Publishers.

Journal Publications by faculty memebers 2021-22

1. Application of Block chain in Healthcare - A Systematic Review, **Dr. Niharika Kumar**, Australian Journal of Wireless Technologies, Mobility and Security vol.1, no.3, e-ISSN 2200-1883.
2. Network Intrusion Detection System based on Generative Adversarial Network for Attack Detection, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications (IJACSA), vol. 12, no. 11, pp. 757-766,2021.
3. Convolutional Neural Network for Classification of SiO2 Scanning Electron Microscope Images, **Dr. Kavitha Jayaram**, International Journal of Business Intelligence and Data Mining, DOI:10.1504/IJBIDM.2022.10038244, vol 1(1), June 2022.
4. Trickle Based Routing Technique in IPv6 Based RPL (TRRPL), **Prof. Manikantha K, Prof. Manjushree K**, GRADIVA REVIEW JOURNAL, ISSN NO : 0363-8057, vol 8 no. 3 2022 PP: 369-376

Journal publications by faculty members 2021-22

1. Application of Block chain in Healthcare - A Systematic Review, **Dr. Niharika Kumar**, Australian Journal of Wireless Technologies, Mobility and Security vol.1, no.3, e-ISSN 2200-1883.
2. Survey on BigData, MapReduce and Blockchain Technologies, **Dr. Sneha K**, Journal of Emerging Technologies and Innovative Research, (JETIR), vol.8, no.7, ISSN-2349-5162.

3. A Comparative study of Transfer Learning Models for Offline Signature Verification and Forgery Detection, **Prof. Manikantha K**, Journal of University of Shanghai for Science and Technology, vol.23, no.7, ISSN: 1007-6735, pp 1129-1139, July 2021 (SCOPUS)

4. Network Intrusion Detection System based on Generative Adversarial Network for Attack Detection, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications (IJACSA), vol. 12, no. 11, pp. 757-766,2021.

5. Convolutional Neural Network for Classification of SiO2 Scanning Electron Microscope Images, **Dr. Kavitha Jayaram**, International Journal of Business Intelligence and Data Mining,DOI:10.1504/IJBIDM. 2022.10038244, vol 1(1), June 2022.

6. Trickle Based Routing Technique in IPv6 Based RPL (TRRPL), **Prof. Manikantha K**, Prof.Manjushree K, GRADIVA REVIEW JOURNAL, ISSN NO: 0363-8057, vol 8 no. 3 2022 PP:369-376

7. FO-DPSO algorithm for segmentation and detection of diabetic mellitus for Ulcers, **Dr. Sheba Selvam**, International Journal of Image and Graphics, ISSN NO:0219-4678, vol 22, no.1 2022 (SCOPUS)

8. Deep Reinforcement Learning based Ensemble Model for Intrusion Detection System, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications, vol. 13, no.4, 2022(SCOPUS).

9. Design and Development of an Efficient Network Intrusion Detection System using Ensemble Machine Learning Techniques for Wifi Environments, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications, vol. 13, no. 4, 2022(SCOPUS).

10. A Deep Transfer Learning Approach to Enhance Network Intrusion Detection Capabilities for Cyber Security, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications (IJACSA)(SCOPUS).

11. Anomaly-based Network Intrusion Detection using Ensemble Machine Learning Approach,**Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications, vol.13, no. 2, 2022(SCOPUS).

12.An Efficient Feature Selection Approach for Intrusion Detection System using Decision Tree, **Prof. Abhijit Das**, International Journal of Advanced Computer Science and Applications,vol. 13, no. 2, 2022(SCOPUS).

13. Deep-Reinforcement Learning-Based Architecture for Multi-Objective Optimization of Stock Prediction, **Dr. Krishnamurthy G. N**, European Journal of Electrical Engineering and Computer Science ISSN (Online): 2736-5751.

14. An Efficient Multi-Objective Optimization-Based Framework for Stock Market Prediction,**Dr.Krishnamurthy G. N**, International Journal of Engineering Trends and Technology, vol.70,no. 2, pp 294-304, February, 2022 ISSN: 2231 – 5381 (SCOPUS).

15.Weighted Hybrid Model for Improving Predictive Performance of Recommendation Systems Using Ensemble Learning, **Prof. Raghavendra C K,** Indian Journal of Computer Science and Engineering (IJCSE), e-ISSN: 0976-5166, p-ISSN: 2231-3850, vol. 13, no. 2 Mar-Apr2022(SCOPUS).

16.Switching Hybrid Model for Personalized Recommendations By Combining Users Demographic Information, **Prof. Raghavendra C K**, Journal of Theoretical and Applied Information Technology, ISSN: 1992-8645, e- ISSN: 1817-3195, vol 100, no 3, February 2022 (SCOPUS).

17.PAD: A Pancreatic Cancer Detection based on Extracted Medical Data through Ensemble Methods in Machine Learning, **Prof. Santosh Reddy P**, International Journal of Advanced Computer Science and Applications(IJACSA), vol. 13, no. 2, 2022 (SCOPUS Q3).

Conference publications by faculty members 2021-22

1.A Comparative Analysis of Deep Learning Approaches in Intrusion Detection System, **Prof. Abhijit Das**,International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), IEEE, E-ISBN:978-1-6654-3559-8, P-ISBN:978-1-6654-0254-5, 27-28 August, pp. 555-562, 2021

2.Abstract and Image Analysis of High-Temperature Materials from Scientific Journals using Deep Learning and Rule-Based Machine Learning Approaches,**Dr. Kavitha Jayaram**, ICDSMLA 2020, SPRINGER,E-ISBN:978-981-16-3690-5, P-ISBN:978-981-16-3689-9, pp- 489-500.

3. Analysis Prediction Accuracies for Memory based and Model based collaborative Filtering Models, **Prof. Raghavendra C K**, Inventive Systems and Control(ICISC-2022) organized by JCT college of Engineering and Technology, India, SPRINGER, January 2022.

4. Deep Transfer based Skin Carcinoma Detection, **Prof. Raghavendra C K**, First International conference on Technologies for Smart Green Connected Society, ECS Transactions, Volume 107-12055, 2022.

5. Hyper Parameter Optimization Technique for Network Intrusion Detection System Using Machine Learning Algorithms, **Prof. Raghavendra C K**,

International Conference on Machine Intelligence and Data Science Applications (MIDAS-2021), SPRINGER, 26 th -27 th December 2021 at Comilla University, Cumilla, Bangladesh.

6. The state of the art in Deep Learning based Recommender System, **Prof. Raghavendra C K**, 3rd International Conference on Mobile Computing and Sustainable Informatics (ICMCSI 2022) organized by Tribhuvan University, Nepal, SPRINGER,27 th - 28 th January 2022.
7. Distributed File System on Medical Data Using Machine Learning Techniques for Healthcare Surveillance, **Prof. Santosh Reddy P**, 3 rd International Conference on IntelligentComputing, Information and Control Systems(ICICCS), SPRINGER, March 2022pp 871-887
8. An Efficient Novel Approach Prediction of Survival Time on Pancreatic Cancer UsingMachine Learning Paradigms Toward Big Data Analytics, **Prof. Santosh Reddy P**, 4 thInternational Conference on Intelligent Computing, Information and Control Systems (ICICCS),SPRINGER, Advances in Intelligent Systems and Computing,29-30 June 2022

Students Achievements

1. Survey on BigData, MapReduce and Blockchain Technologies, **Dr. Sneha K, Vijaya Durga K**, Journal of Emerging Technologies and Innovative Research (JETIR), vol.8, no.7, ISSN-2349-5162.
2. A Comparative study of Transfer Learning Models for Offline Signature Verification and Forgery Detection, **Prof. Manikantha K, Aishwarya R Bhat, Pavani Nerella, Pooja Baburaj, Sharvari K S**, Journal of University of Shanghai for Science and Technology vol.23, no.7, ISSN: 1007-6735, pp 1129-1139, July 2021 (SCOPUS)
3. **Asmi Jain** of 3rd Semester has participated inHackathon 5.0 conducted by IEEE-BNMIT Student branch in association with IEEE Nanotechnology Council on 7th October 2021 and won Second Place.
4. **Sameehana Manvi** of 3rd Semester has participated in FIZZY FLIGHT event conducted by National Level Annual Technical Symposium Phase shift 2021, held at BMSCE on 26th & 27th November 2021 and won Second Place.

Whereas most technologies tend to automate workers on the periphery doing menial tasks, blockchains automate away the center. Instead of putting the taxi driver out of a job, blockchain puts the service providers like Ola, Uber, Rapido out of a job and lets the taxi drivers work with the customer directly. Bitcoin is a remarkable cryptographic achievement, and the ability to create something that is not duplicable in the digital world has enormous value.

Bill Gates, Business Magnate, Investor, Author, Philanthropist, and Humanitarian

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