SIES
RISE WITH EDUCATION

Graduate School of Technology

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IEEE COMPUTER SOCIETY
SIES GST STUDENT BRANCH CHAPTER

IEEE SIESGST PRESENTS

TECHNOZINE

ILLUSION A GLITCH IN THE MATRIX

VOL 01

2022

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About SIES

SIES
RISE WITH EDUCATION
Graduate School of Technology

The South Indian Education Society (SIES) was established in 1932. It is a pioneer in the field of education, knowledge, and learning in this metropolis. Society has been serving the cause of education and has carved for itself a niche, as a provider of quality and value-based education from nursery to doctoral level in a wide variety of fields. The institute seeks to achieve the educational mission by focusing on the modes of inquiry, which strengthens thinking skills and provides extensive field experiences to bring together theory and practices.

"This society should sincerely serve the cause of education and the educational needs of the common man of this cosmopolitan city"

- SIES MISSION
(Set by our Founder Shri M.V.Venkateshwaran in 1932)

"To be a centre of excellence in Education and Technology committed towards Socio-Economic advancement of the country".

- SIES GST VISION

SIES Graduate School of Technology, an integral part of this well-established community, started in the year 2002 and is located in the list of educational hubs in Navi Mumbai imparting quality based technical education, offering a four-year Bachelor of Engineering degree courses in Electronics and Telecommunication Engineering, Electronics & Computer Science, Computer Engineering, Computer Science & Engineering (Internet Of Things and Cyber Security Including Block Chain Technology), Artificial Intelligence & Data Science, Artificial Intelligence & Machine Learning, Information Technology and Mechanical Engineering. Additionally, offering Master of Engineering courses in the booming field of Artificial Intelligence & Data Science and Information Security. SIES GST has been well known in terms of producing quality and quantity. It stands to be a prestigious institution with a rich set of qualified faculties who have always been there to serve the young growing minds. SIES GST aims to enlighten its students and bring the best out of them.

About IEEE SIESGST

The resplendent IEEE student chapter took its glorious inception in 2006, nestled within the esteemed grounds of SIESGST. IEEE, as one of the most venerable student chapters of the prestigious SIES Graduate School of Technology, has relentlessly pursued the noble goal of magnifying intellectual brilliance and cultivating an atmosphere that encourages the ethereal development of each individual who graces our domain.

Our mission is to inspire young minds with the latest technological advancements, achieved through contemporary workshops that welcome aspiring students. Within our chapter, participants can engage in workshops covering various transformative disciplines such as Data Analytics, Cybersecurity, 6G, UI/UX, LoRaWAN, and more.

This grand occasion attracts enthusiastic participants not only from our institution but also from colleges across Mumbai, Navi Mumbai, and India as a whole. The outstanding winners of each captivating event will receive impressive rewards, including cash prizes, designed certificates, and medals as tokens of appreciation.

This year also marked the second edition of Epsilon, our flagship event that gathered brilliant minds from around the world for captivating discussions on 'The Internet Spectrum.' Epsilon 2022 featured industry experts in Blockchain Security, Cybersecurity, IoT, and 5G, sharing profound insights and exchanging knowledge. With 23 distinguished speakers, the event transcended boundaries, fostering a global community of learning. Its impact extended worldwide through YouTube, garnering overwhelming engagement and testifying to its success in captivating and educating audiences globally.

IEEE SIESGST extends heartfelt gratitude to our esteemed Principal, Dr. Atul Kemkar, the respected HOD of EXTC, Dr. Preeti Hemnani, our wise Branch Counselor, Prof. Biju Balakrishnan, WiE incharge Prof. Vaishali Mangrulkar and the entire pantheon of our beloved student chapter, whose ceaseless dedication and unwavering efforts have propelled the glorious progress of IEEE SIESGST to soaring heights of excellence.

We were honored to have 23 esteemed speakers hailing from various corners of the world join us, each contributing their invaluable expertise and knowledge within their respective domains. Their collective objective was to share their profound insights , ensuring that attendees gained a wealth of knowledge tailored to their specific areas of interest.

The impact of Epsilon extended far beyond the physical confines of the symposium, resonating with a global audience through its live streaming on YouTube. This widespread exposure resulted in an overwhelmingly positive response from individuals spanning the globe, further solidifying Epsilon's reputation as a premier event for those seeking to delve deeper into the ever-evolving realm of the Internet Spectrum.

Every year, with immense pride and glorious celebration, IEEE SIESGST presents its magnificent national-level annual technical festival known as "TECHOPEDIA". This year was celebrated as the eleventh glorious edition of our beloved and highly anticipated technical festival, Techopedia XI. Each passing year, a fresh wave of exceptional talents flocks joins the organizing committee, adorning the festival with their unique ingenuity, built upon a timeless foundation that has stood steadfast for eleven illustrious years. Witness the exponential growth of event quality and the vibrant dynamism of our formidable team!

FROM THE DESK OF OUR BRANCH COUNSELOR

"It is an honor for me to present the 7th edition of the annual technical magazine 'TECHNOZINE' of our very own IEEE Student Branch."

I am privileged to hold the post of the IEEE Branch Counselor at the SIES GST Student Branch where my prime aim is to encourage the young growing minds of our college by igniting the spark to learn in them. The student branch has indeed made me proud with the effortless operation of the Executive Committee while administering myriad events that would not have been possible without their cooperation and vivacity. As an entity representing the values and high standards of quality set by IEEE, I gladly claim that IEEE SIESGST has done a successful job in living up to those expectations.

'TECHNOZINE' is an almanac showcasing the cumulative effort of the entire IEEE team and the minds who have worked behind the success of all events that have been conducted throughout this year. It also includes a plethora of technical articles written by our students.

I am very glad the Microwave Theory and Technology Society (MTT-S) is putting efforts to organize quality programs. Computer Society(CS) Chapter is already embracing new heights.

None of this would have been possible without the support of our respected Advisor Dr. P V Parameswaran, principal Dr. Atul Kemkar and our HOD Dr. Preeti Hemnani. I extend my warm regards and thanks to them.

I would also like to thank and appreciate the team of IEEE SIESGST and the ones behind 'TECHNOZINE'. I wish success to each one of you in all your future endeavors.

- Prof. Biju Balakrishnan

IEEE Branch Counselor, CS & MTT-S Chapter Advisor

FROM THE DESK OF OUR WIE AFFINITY GROUP INCHARGE

I congratulate and appreciate the entire IEEE team for successfully unveiling the Technozine magazine. Best of luck students for your future endeavors.

-Prof.Vaishali Mangrulkar

WiE Affinity Group Incharge

IEEE SIESGST student branch is one of the active student branches of Bombay Section. Students of IEEE SIESGST continuously working hard with full enthusiasm to achieve the goals set by IEEE SIESGST.

It's my great pleasure and honor as the Incharge of WiE Affinity Group. IEEE WiE is one of the world's leaders in changing the face of engineering. WiE focuses on building strong mentor networks, making lifelong friendships, and trying to make a difference not only for the women, but also, for the benefit of humanity. Our aim at WiE is to nurture women engineers and inspire them to fulfil their dreams.

This year we focused on women empowerment. Under this IEEE WIE organized Women of Vision: IMPERIUM- panel discussion and interaction with students on Entrepreneurship and conducted STEM lectures for school students.

FROM THE DESK OF IEEE CHAIRPERSON

'IEEE SIESGST' this one platform, has been a key element in my professional and personal development. It has undoubtedly played a significant role throughout my undergraduate career.

My tenure at IEEE has been overwhelming with countless opportunities and experiences. It all started when the volunteer and event head applications were rolled out by the team. I immediately decided to fill the form and was selected as an Administration volunteer. I was also given the opportunity to work as an event head for Inquisitive, a national level quiz competition under the banner of TECHOPEDIA 9.0. Little did I know that this was just the beginning for me. From there, I gradually progressed from being merely another volunteer to being the Vice Chairperson of MTT-S Chapter in my third year and then eventually became the Chairperson of IEEE SIESGST. Throughout my tenure, I encountered the steadfastly supportive pillar of our student branch counselor, Prof. Biju Balakrishnan, a wonderful group of encouraging seniors, a reassuring batch of teammates and an even more passionate group of juniors who made this remarkable journey seem like a dream for me over the course of three years.

We held numerous seminars, webinars, and workshops with this incredible group of professionals on subjects like Web Scraping, LoraWan, Cloud Computing, and many more. We held our annual symposium, Epsilon, with more than 500 attendees, covering trending domains such as Blockchain, Cybersecurity, 5G and IOT security. Given that this was our first time holding such a huge event offline, the Eleventh Edition of our yearly technical festival, Techopedia XI, was a colossal success.

IEEE SIESGST fosters a wonderful environment for all the young brains to grow into responsible and creative individuals. It has always helped students who are eager to work and upskill themselves, by providing them with a platform to learn about new technologies and by attempting to support them with the extra set of skills like leadership, time management, and flexibility. When I look back, I am just thankful that IEEE existed, and when I consider where we are now, I am in awe. In these three years, IEEE SIESGST has given me a variety of chances to develop and flourish, from volunteering to being chosen as the chairperson, from being an aspirant to a leader.

Best wishes to the future generation of highly talented individuals who will undoubtedly raise the bar for IEEE.

-Vatsal M Kore

IEEE Chairperson 2022

FROM THE DESK OF IEEE REPRESENTATIVE

When each student in the college was eagerly looking to find their place and sometimes had trouble finding a sense of belonging within the campus, I found IEEE SIESGST. Besides knowing that I had been selected as one of the Publicity Volunteers, I did not really know what to expect going in. Soon enough, I realized that this is one of those spaces that will equip me with inestimable skills for life, so I seized the opportunity. Working with a group of people could either be delightful or frightening, but luckily, I mainly experienced the former emotion. I found the high-spirited atmosphere of this team to be the most impressive, which imprinted a sense of affiliation in me. With a boost in confidence, happiness, and optimism, I applied to become the Joint Secretary for the upcoming term and got designated as one. This opportunity furthered my chances of exploring not only content writing & research but also event management, public speaking and helped me deem the scope of progress I have in me. I got to work with amazing team-players who contributed a different perspective to various points of issue, which promoted creative and productive solutions. Through the process of conducting any given event successfully, I learned the importance of time, discipline, responsibility, and efficiency.

IEEE SIESGST has always strived to achieve impactful outcomes through all the initiatives taken to touch down somewhere between better and best. Epsilon symposium was one such initiative where we brought in 23 national and international industry experts to speak on their technical fields of expertise. As Techopedia, the annual technical festival of IEEE SIESGST, was being conducted in offline mode after three years, its smooth execution was of utmost importance to me. From conceiving an event idea, bringing in sponsorships, building projects, crafting 3D art models to keeping the team motivated, each member had a hand in the success of Techopedia. It was an amazing sight to see each volunteer putting in the hours, working dedicatedly to make Techopedia XI an absolute hit.

The responsibility that comes with managing a team of 90+ members can only be experienced and not envisaged. I have understood that when there is a bone of contention between free-thinkers, it is always better to have a couple more irons in the fire to settle for the best possible outcome for the team's sake. I have become adept at making better decisions and standing by them; at the same time, I am comfortable accepting my lapses and fixing them. IEEE SIESGST will never cease to amaze me. I am excited to see what this team has to offer in the forthcoming tenure. Rooting for each member of the team to accomplish greater goods and see newer heights. This stint of mine was extremely delightful for however long it lasted, and for that, I am grateful. IEEE forever and beyond!

-Anusha Ganapathy

IEEE Representative 2022

FROM THE DESK OF CS CHAIRPERSON

"Find a group of people who challenge and inspire you, spend a lot of time with them, and it will change your life." This 'group of people' is what my team at IEEE SIESGST is.

As a first year student, when I was asked about a team or chapter I would like to join, my instant replies would always be "Oh it's definitely the Cultural Committee or wait no! The Technical Team sounds interesting!" Little did I know I was about to be acquainted with a council, a magnificent team of such bright minds no less than a family to me.

My journey at IEEE has been like a stairway of opportunities and experiences. It all began when I participated in Technopoly, an event under TECHOPEDIA 8.0 with my friends, and won the first prize. I closely noticed how the event was being organized and loved the team spirit they exhibited. Attending events organized by the team back then gave me a boost and was the reason I decided to join one of the technical committees of our college in the future. I then joined the organizing team of TECHOPEDIA 9.0 as an event volunteer for Inquisitive - A National Level Quiz Competition. I went on to be the first Vice Chairperson of the Computer Society chapter under the student branch and the CS Chairperson in my final year with the aim of motivating students to develop strong technical skills in domains like data science, cybersecurity, data structures and algorithms, competitive coding, etc. With the support of my team and the guidance of our seniors, we conducted a plethora of workshops and webinars on topics like UI/UX, Data Analytics, Web Scraping, and Cloud Computing with more than 200+ participants. Despite being our first time to conduct an event offline at such a large scale, the Eleventh Edition of our annual technical fest, Techopedia XI proved to be a roaring success.

I got the opportunity to volunteer and represent my student branch at the sectional and regional level that helped me interact and network with people from many industry sectors and gain a larger domain knowledge. All of this has only been possible due to the meticulous support and efforts of our pillar of strength, our branch counselor, Prof. Biju Balakrishnan.

When I reflect on my journey at IEEE SIESGST, I have seen myself evolving as a person from a timid introverted girl to a strong individual with great confidence and a voice for her opinions. IEEE has helped me grow and improve in a way no other team ever could. This team has a very special place in my heart. Words fall short for me to describe these three years of my journey here, and without a doubt, when asked about the one thing in my undergraduate years. It gives me immense happiness to see the juniors come up with such amazing events and work with so much hard work and dedication. I wish the best for the new team and hope to see them grow bigger, better and reach greater heights.

- Nandita Nandakumar
CS Chairperson 2022

FROM THE DESK OF WIE CHAIRPERSON

IEEE brings endless opportunities which are often life-altering and fulfilling. The joy of volunteering brings knowledge and recognition in various ways possible. I started as an Editorial Volunteer in my first year and became Event Head for Tech-Forage in my Second year. Back then I only knew about IEEE being a global organization but the opportunity to represent our college and showcase your leadership skills is the greatest learning scope you get here. The thought process behind constructing any event is to challenge one's capabilities. As a team, we have an understanding amongst us, and trust me hopping onto the roles and seeing how much everyone was working hard to find solutions in each aspect of the event, is fulfilling and absolute bliss to witness. Supervising, helping, and beholding the event from Day 1 till its closure was one amazing rollercoaster ride I never want to forget.

As a WiE Chairperson, I tried to create a balance in the teaching-learning process. From STEM Lectures to advocating women empowerment, we did it all.It is always good to share the knowledge and privilege you receive, I will wholly preserve and be grateful for this experience which taught me teamwork, perseverance, and fortitude. Every task, event and responsibility teaches a lesson, this lesson is passed onto your peers and every volunteer you meet. IEEE is not just a student organization, it's a treasure of knowledge and challenges. Every new day is an opportunity, everyday you teach and learn something new.

As a team we have come across many challenges and difficulties but we made it to a place where we are immensely proud of our work and capabilities. With the help of Prof. Biju Balakrishnan and Prof. Vaishali Mangrulkar, we overcame the transition from conducting events online to celebrating Techopedia XI on a successful scale. I would like to extend my gratitude to the Department of EXTC for their constant support and encouragement.

IEEE SIES GST is an unforgettable part of my undergraduate education and everything I have I devoted it to this wonderful team. IEEE Forever & Beyond, Go IEEE Go WiE!

-Shruti Singh

WiE Chairperson 2022

FROM THE DESK OF MTT-S CHAIRPERSON

It has been a lifetime journey to be a part of IEEE SIESGST. I have enjoyed and benefited from my three years of connection with the organisation, and I am appreciative of the possibilities and experiences it has given me. I've had the honour of working with a group of talented and highly motivated people while I've been with IEEE SIESGST, and they've played a significant role in moulding my career development. My mentor, Prof. Biju Balakrishnan, has been a consistent source of motivation, and with his advice and assistance, I've been able to successfully negotiate the difficulties that come with being a member of an organisation that is dynamic and constantly changing.

Being a member of IEEE SIESGST gives you access to important research publications, cutting-edge technology, and industry leaders, which is one of the biggest advantages. The organisation provides plenty of possibilities for networking, allowing members to get in touch with experts, innovators, and thought leaders throughout the world. I've had the chance to participate in a number of conferences and events that have significantly shaped my grasp of the subject and given me access to the most recent technological developments.

I joined the IEEE SIESGST family as a volunteer for Techopedia 9.0's publicity, and here is where my journey started. From there, I developed and eventually became the head of Publicity. As the Publicity head, I improved my analytical abilities, developed my transaction management and logistics expertise, and sharpened my communication abilities. I developed my potential and was soon chosen to lead the team and oversee ties outside of the university as the MTT-S Chairperson. That aided me in seeing how crucial balance is in all parts of my life.

My involvement with IEEE SIESGST has been one of the best parts of planning and taking part in various tech-related activities. Both our annual symposium, EPSILON, and our annual technical festival, TECHOPEDIA, attracted crowds of 500 or more. These activities gave students a chance to display their talents and network with professionals in their fields. Together with these occasions, I also had the chance to take part in a number of IEEE activities including the Young Professional Meetup 2021 and the IEEE Region 10 Symposium TENSYMP-2022. I also worked on the marketing team for the IEEE Move India Operations Committee. I gained significant knowledge about the industry from these experiences, which also assisted me in honing my professional abilities.

To sum up, my experience at IEEE SIESGST has been significant and unforgettable, thanks to my supporters, Prof. Biju Balakrishnan, my seniors, and my batchmates and juniors. I will always treasure the experiences I had and the things I learned while I was a member of IEEE SIESGST.

- Aaryan S Kumbhar
MTT-S Chairperson

PASSWORD-LESS AUTHENTICATION

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Myths of the Password

Traditional systems are well protected by a password. Most of the time, these passwords are designed by the user. Using one complex password, you can get the most secure system. Complexity is the most important criteria for security. Regularly changing your password can improve the security of your application. Also, this password is kept safe at large companies. Today, biometrics is solving all our security problems.

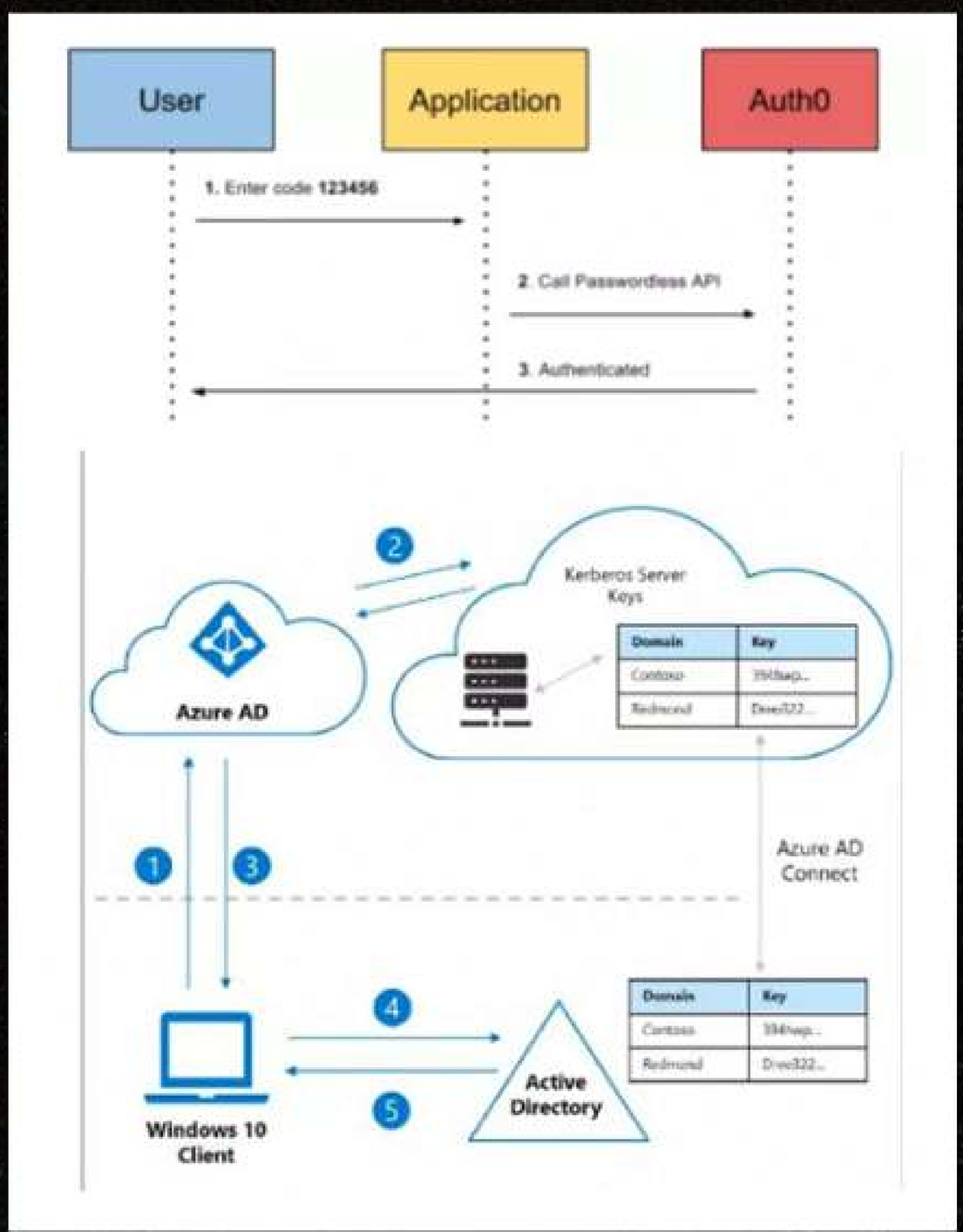
What are the best practices?

Security experts believe that a unique password should be maintained for every website, and the length of the password is much more important than its complexity. When you are changing the password, you should not update the older version, but rather create a new one. Biometrics is also in use along with the two-way authentication system.

Authentication Ecosystem without a Password

A way of authenticating users' identities without using passwords is known as password less authentication. Instead of a password, the user authenticates using something they are or something they have (such as a mobile device,biometric). A fresh authenticating message is created each time a user seeks access. Because no credentials are fixed within the password less platform, so an attacker cannot take anything.

Beyond Identities, password less authentication makes use of the technology that is already there in modern devices to deliver safe authentication. These include the Trusted Platform Module and biometrics (TPM). Sensitive data can be stored in the TPM's protected enclave. That sensitive information is a private cryptographic key in the case of password less authentication.



Password less authentication is a big step in cyber security, but it's not going to demolish the entire password-based authentication system. The use and storage of passwords will be minimal, making the user experience fluid.

~Mrs. Kranti Bade, Dr. Varsha Patil

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Learning Analytics

Learning is becoming more dispersed in terms of space, time, and medium. As a result, a vast amount of information about learners and learning is generated. This information consists primarily of traces left by students as they interact with networked learning environments. In recent years, there has been a surge in interest in the automatic analysis of educational data to improve learning outcomes, a field of study known as learning analytics. The most widely used definition of learning analytics is, **"the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimize learning and the environments in which it occurs"**

Learning analytics represents a field at the crossroads of a variety of academic disciplines (for example, learning science, pedagogy, psychology, Web science, and computer science, etc.). It synthesizes several existing techniques (e.g. machine learning/artificial intelligence, information retrieval, statistics, and visualization) and borrows from various related fields (e.g. academic analytics, action analytics, educational data mining, recommender systems, personalized adaptive learning).

A four-dimensional reference model for LA can be depicted with the goal to provide a comprehensive overview of learning analytics and related concepts, which will aid researchers in communicating with one another as they work to address the various challenges that will arise as knowledge of the technical and pedagogical issues surrounding learning analytics grows.

The reference model for LA has four dimensions,

- What? What kind of data does the system collect, manage, and analyze?
- Who? Who is the analysis aimed at?
- Why? What is the purpose of the system's data analysis?
- How? What method does the system use to analyze the data it collects?

According to the many stakeholders' point of view, there are a variety of aims in LA. Monitoring, analysis, prediction, intervention, tutoring/mentoring, assessment, feedback, adaptation, personalization, recommendation, awareness, and reflection are all possible LA aims.

LA employs a variety of methodologies and techniques to uncover hidden patterns in educational data sets. The following four approaches that have gotten a lot of attention in the last several years in the LA literature are: statistics, information visualization (IV), data mining (DM), and social network analysis (SNA).

Thus, data, analysis, action, and learning are all steps in the LA process. Thus, the focus of LA is the development of strategies that harness educational data sets to help the learning process.

~Masooda Modak,
Kalyani Pampattiwar, Namrata Patel

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A Glimpse of Cloud Computing

Cloud computing is defined as the on-demand availability of computer system resources without direct management from the user. In simple terms, cloud computing allows you to store and manage your data without the need of setting up your servers but instead, doing the same on the Internet on a pay-as-you-go basis. There are various types of deployment models and service models users can choose from to best fit their needs.

To get a better understanding of cloud computing, we need to understand how a company would manage its data without it. The company would have to create its data server to store the data it gathers. Then the company would also require a crew for the maintenance of this data server. Besides loading up on expenses, an on-premise system like this can be prone to data loss and would have an unreliable system for data recovery.

Contrasting, a company that uses cloud computing services will not require to create its data server but instead, would use the computing service to manage and store its data, hence reducing costs. Additionally, the services are hard to breach and the systems for data recovery are excellent.

Cloud services are also a part of our day-to-day lives. For example, Google Photos is an application enabled due to the capabilities of cloud computing technology which allows us to store a lifetime's worth of images and memories with little to no storage costs. Similarly, streaming sites such as Twitch and Netflix provide such enormous amounts of content that they use cloud computing services for their needs.

Since we live in an era where data is the most valuable commodity, it would be no surprise to know that a system that aids in managing data in a reliable and cost-efficient manner would be considered a booming industry. In 2021, the cloud computing market was valued at $368 billion and is expected to be valued at over $1.5 trillion by 2030.

~Ratul Raj

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Conceptual Design using AI

"Humans are very good at unsupervised learning, and we need to make substantial progress in that direction to approach human-level AI."

—Yoshua Bengio, Deep learning researcher and University of Montreal professor.

Artificial intelligence, or AI, has become a buzzword that is overused in many fields, including design. The future effects of AI, machine learning, and deep learning are the subject of continuous discussions amongst designers and developers. Virtual, augmented, and mixed realities (VR, AR, and MR) and how they might affect our jobs.

AI will primarily focus on efficiency and speed. Due to AI's increased speed and efficiency, designers can produce designs more quickly and affordably. Conceptual architectural design is an intricate process that produces fresh concepts by drawing on prior knowledge and imagination. Since the design requirements are still in the conceptual stage, the application of artificial intelligence to this process shouldn't be focused on finding a solution in a predetermined search space. Instead, this procedure should be viewed as a thorough investigation of the requirements.

What value does design thus add to the discussion? With AI, new connections between the customer and the product will need to be made. The dialogue between companies and customers about what artificial intelligence can and should accomplish for goods and services will continue after these contacts.

Businesses will flourish with AI if designers provide the essential emotional context for innovation. The conventional position of a designer has already been replaced by an AI system that has created millions of different packaging designs for Nutella. The graphic identity for Nutella was generated by an AI program using data from a database of dozens of patterns and colors to produce seven million distinct iterations that have been sprayed across the front of jars in Italy. In less than a month, all seven million jars had been sold. So, Designers are not being replaced by robots. Even IBM CEO Ginni Rometty recently said, "If I considered the initials AI, I would have preferred augmented intelligence."

In the difficult and complicated realms of VR, AR, and MR, which all need a significant amount of design work, AI could assist designers in creating 3D VR worlds much more efficiently. A clever AI system might produce a number of design choices after a basic design is formed and a few criteria are given. The designer would then select the best design on his or her preferences.

~ Dr. Varsha Patil, Ms. Kranti Bade

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Generative AI & Blockchain

Generative AI and blockchain are two relatively new technologies that are quickly gaining attraction in various industries. While they may seem like unrelated concepts at first glance, they actually have a lot in common and can be used together in powerful ways.

Generative AI involves using algorithms to generate new, original content, such as text, images, music, and videos. Blockchain, on the other hand, is a decentralized, digital ledger that records transactions across a network of computers.

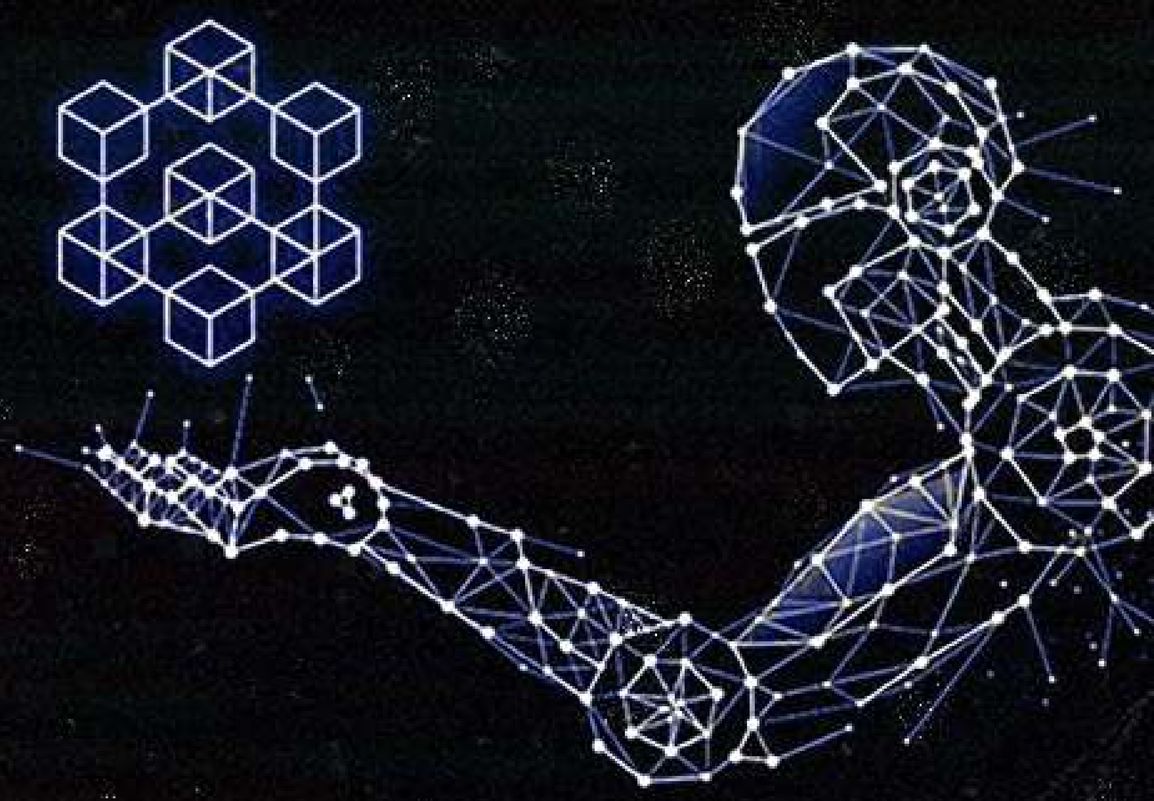
One of the main advantages of combining generative AI and blockchain is their ability to enable the creation of decentralized content platforms. For example, a generative AI model could be trained on a large dataset of images, and then used to generate new images that are added to a blockchain. This would allow users to access and share a wide range of unique, high-quality images without the need for a central authority.

Another potential application of generative AI and blockchain is in the field of digital art. Generative AI models could be used to create unique, one-of-a-kind digital artworks, which could then be authenticated and recorded on a blockchain. This would provide a secure, transparent way for artists to create and distribute their work, and for collectors to verify the authenticity of their purchases.

In addition to these applications, generative AI and blockchain also have the potential to be used together in other industries, such as finance and healthcare. For example, generative AI could be used to generate complex financial models, which could then be recorded and verified on a blockchain. In the healthcare industry, generative AI could be used to create personalized treatment plans, which could be securely stored and accessed on a blockchain.

Despite the impressive capabilities of generative AI and blockchain, there are also some limitations to it. One of the main challenges is the amount of data and computational power required to train generative models and as more mining capacity joins the blockchain network, the Proof-of-Work (POW) puzzles have to be made harder.

Overall, the combination of generative AI and blockchain has the potential to enable the creation of new, decentralized content platforms and applications. As these technologies continue to evolve, it will be interesting to see how they will be used together in the future.



~Sahil Saini

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TREND AND DEVELOPMENT IN ETHICAL HACKING

The field of ethical hacking and cybersecurity is constantly evolving as new technologies and attack methods are developed. Here are some of the latest trends and developments in the field and how they can be used to improve the security of an organization:

Cloud Security: With more and more organizations moving their data and applications to the cloud, securing cloud infrastructure and resources has become a top priority. Ethical hackers can help identify and mitigate cloud-specific vulnerabilities, such as misconfigured cloud services, and provide guidance on best practices for securing cloud environments. Cloud-based services such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) have their own set of security challenges. Ethical hackers can help by identifying misconfigurations and ensuring that data is properly encrypted in transit and at rest.

Artificial Intelligence and Machine Learning: These technologies are increasingly being used in cybersecurity, including in ethical hacking. Machine learning can be used to analyze large amounts of data and identify patterns that indicate a potential security threat. AI can also be used to automate repetitive tasks such as vulnerability scanning and incident response. By using AI and Machine Learning techniques, organizations can improve their ability to detect and respond to cyber-attacks in real-time, by identifying patterns and anomalies that might indicate an attack.

Internet of Things (IoT) Security: IoT devices are becoming more common in organizations and they often lack proper security measures.

TREND AND DEVELOPMENT IN ETHICAL HACKING

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Ethical hackers can help identify vulnerabilities in IoT devices and provide guidance on securing them. IoT devices such as smart cameras, thermostats, and other connected devices are becoming more common in organizations and homes. These devices often lack proper security measures and can be easily hacked, providing cyber criminals with an easy way to gain access to networks. Ethical hackers can help organizations to identify these vulnerabilities and provide guidance on securing these devices.

Automation: Automation of ethical hacking tools and techniques can help organizations to improve the efficiency and speed of their security assessments. Automated tools can also help to identify and prioritize vulnerabilities, allowing organizations to focus their resources on the most critical issues. Automation can also help to reduce the number of false positives and false negatives, making it easier for organizations to identify and respond to real security threats.

Phishing and Social Engineering: Phishing and social engineering attacks continue to be a major threat and are becoming increasingly sophisticated. Ethical hackers can help organizations to identify vulnerabilities in their human defenses and provide training to employees on how to identify and avoid phishing attempts. Phishing attacks, in which attackers use deceptive emails or social media messages to trick victims into providing sensitive information, continue to be one of the most common types of cyber-attacks. Social engineering attacks, which use psychological manipulation to trick victims, are also on the rise. Ethical hackers can help organizations to identify these vulnerabilities and provide training to employees on how to identify and avoid these types of attacks.

Quantum Computing: Quantum computing is a rapidly developing field that has the potential to revolutionize computing and cybersecurity. Quantum computers can perform certain types of calculations much faster than traditional computers, which could make some encryption methods obsolete. Ethical hackers can help organizations to understand the implications of quantum computing and develop strategies to protect against quantum-based attacks.

In conclusion, staying informed about the latest trends and developments in ethical hacking and cybersecurity is crucial for organizations.Moreover, as organizations continue to rely on cloud services, IoT devices and other new technologies, it is more important than ever to stay informed about the security risks associated with these technologies. Ethical hackers play an important role in identifying and mitigating these risks, and their skills and knowledge are increasingly in demand.

In order to stay ahead of the latest trends and developments in the field of ethical hacking, it is important for organizations to invest in continuous training and education for their employees. This will help to ensure that they have the skills and knowledge necessary to identify and respond to potential security threats.

Finally, organizations must also invest in incident response plans and disaster recovery strategies in case of a security incident. This will help organizations to respond to a security incident and minimize the damage caused quickly and effectively.

In summary, the field of ethical hacking and cybersecurity is constantly evolving and organizations need to stay informed about the latest trends and developments in order to improve their security posture and for better protect against cyber-attacks.

~Faizan Kalam

Predict Maintenance Needs for Industrial Equipment

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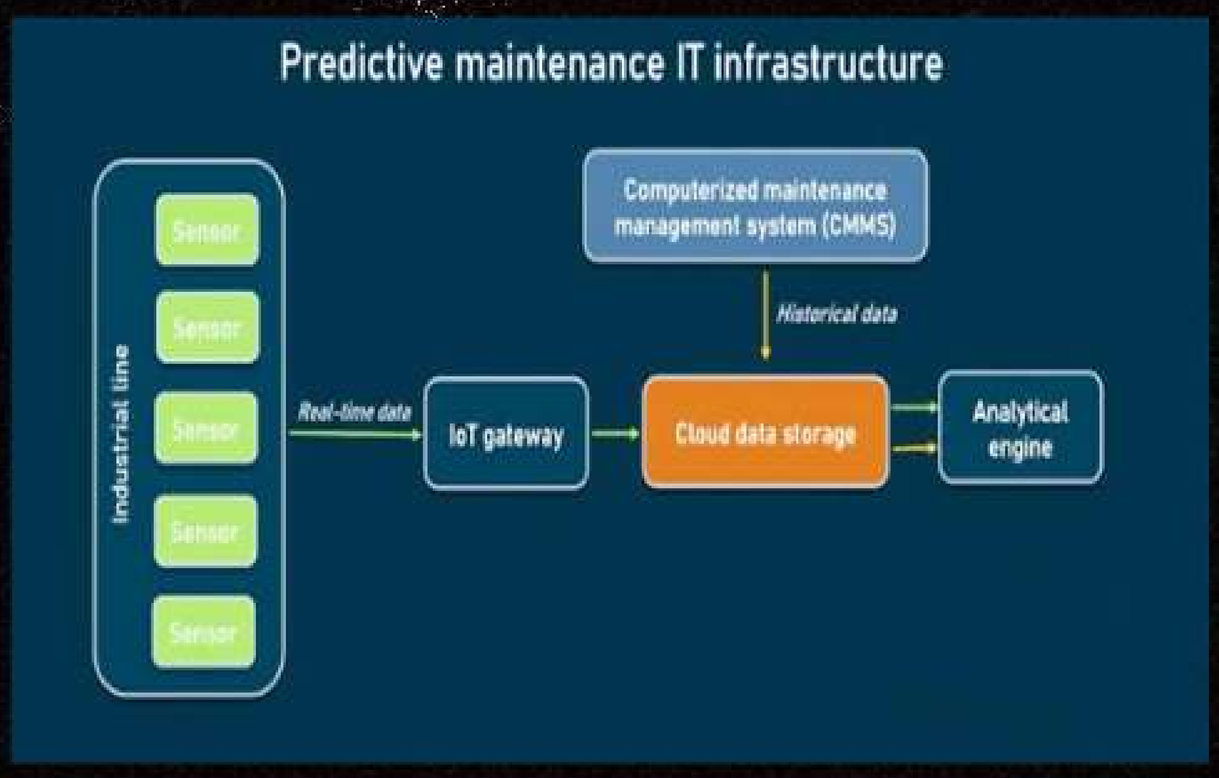
Industrial equipment is an essential component of many businesses. It is used to manufacture products, process materials, and perform various tasks in a variety of industries such as manufacturing, construction, and transportation. Industrial equipment can be expensive, and it is critical for businesses to keep it in good working order to ensure that it functions effectively. However, industrial equipments are subject to wear and tear over time, and it requires regular maintenance to keep it operating at peak efficiency. This can include routine inspections, cleaning, lubrication, and repairs. Neglecting to maintain industrial equipment can lead to costly breakdowns and downtime, which can have a negative impact on a business's productivity and profitability.



Therefore, it is important for businesses to have a maintenance plan in place to ensure that their industrial equipment is well-maintained and ready to work when needed. This can include scheduling regular maintenance checks and keeping a supply of replacement parts on hand. By taking the necessary steps to maintain their industrial equipment, businesses can ensure that they have the reliable and efficient tools they need to succeed.

Predicting when maintenance is needed can be a challenging task for businesses. One of the main challenges is the cost of unscheduled downtime. If industrial equipment breaks down unexpectedly, it can lead to costly delays and disruptions to a business's operations. This can have a significant impact on the company's bottom line. Another challenge is the risk of equipment failure. If maintenance is not performed on a regular basis, the equipment may not function properly, which can lead to accidents or injuries. This can result in legal liabilities for the company, as well as damage to its reputation.

One potential solution to these challenges is the use of machine learning. Machine learning is a type of artificial intelligence that enables computers to learn and improve their performance over time. By analyzing data from industrial equipment, machine learning algorithms can predict when maintenance is needed and help businesses schedule it in advance. This can help businesses avoid costly downtime and reduce the risk of equipment failure.

Using machine learning to predict maintenance needs can be especially useful for businesses with a large fleet of industrial equipment. It can help them optimize their maintenance schedules and reduce the overall cost of keeping their equipment in good working order.

WHAT IS MACHINE LEARNING?

Machine learning is a method of data analysis that automates the construction of predictive models. It is a subset of artificial intelligence that focuses on the development of computer programs that can learn from data and improve their accuracy over time without being explicitly programmed.

Predict Maintenance Needs for Industrial Equipment

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In machine learning, a model is first trained on a labelled dataset, which consists of input data and the corresponding correct output. The model makes predictions based on this training data, and the accuracy of these predictions is then measured. If the model's predictions are not accurate, the model is adjusted, and the process is repeated until the model is able to make predictions with a satisfactory level of accuracy.

Using machine learning for maintenance prediction can provide several benefits, including increased accuracy and cost savings. One of the main benefits of using machine learning for maintenance prediction is increased accuracy. Traditional maintenance prediction methods often rely on heuristics and rules of thumb, which can be subjective and May not considerall the relevant factors. Machine learning algorithms, on the other hand, can analyze a large and diverse set of data to identify patterns and make more accurate predictions. This can help to reduce the number of false positives and false negatives, leading to more efficient maintenance schedules and fewer unexpected failures.

Machine learning can be remarkably effective for maintenance prediction because it allows a system to learn from data and improve over time. Some specific benefits include:

- Improved accuracy
- Reduced downtime
- Cost savings
- Improved efficiency
- Scalability

There are many potential ways that machine learning could be used to improve industrial equipment management. Some examples include:

- Predictive maintenance
- Optimization of equipment usage
- Quality control
- Inventory management
- Safety

If you're interested in implementing machine learning in your business, it's important to start by identifying specific problems or opportunities that it could address. You should also consider whether you have the necessary data and resources to effectively implement and maintain a machine learning solution. Finally, it's a promising idea to collaborate with a team of experts, such as data scientists or machine learning engineers, to ensure that your implementation is successful.

~Rithvik Shetty

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Ancient Revolution

From the 19th century we've seen new inventions done by outsiders like distance between the sun and earth, gravity, shape of earth, and numerous other discoveries. The discovery of distance between the earth and the sun was made by astronomer Christiaan Huygens but this was formerly given in hanuman chalisa on its 5th Chopai 3 and 4 line by Tulsidas Ji . Earth and other earths revolve around the sun is also given in our vedic book " Rigveda " in its shloka. The Indian sage who gave the infinitesimal proposition was Acharya Kanad. His real name was Kashyap. It is said that he was born in 600 B.C. in Prabhas Kshetra which is near Dwarka in Gujarat Kanad pursued his fascination in the world by having a conception of the small particles. And it was further rediscovered by John Dalton. The gravity was discovered by Baskaracharya II in the 11th century in his book Surya Siddhanta in his shloka

"Madhye samantandasya bhugolo vyomni tisthati bibhranah paramam saktim brahmano dharanatmikam "

Isaac Newton further rediscovered it in 17th century. In 1875, the Vymaanika Shaastra, a 4th Century BC textbook written by Sage Bharadwaj was discovered in a temple in India. It contains 3000 shlokas in 8 chapters which were physically delivered by the ancient Hindu Sage Bharadwaj. The book greatly dealt with the operation of ancient vimanas and included information on steering, preventives for long breakouts, protection of the airships from storms and lightning and how to switch the drive of solar energy or some other form of energy.

Acharya Charak – Father of Medicine - Acharya Charak had contributed a lot in the field of the drug – Ayurveda of ancient India, therefore well known as Father of Medicine. He's known as the compiler or editor of the medical composition entitled Charaka Samhita. It's believed that Kashmir was the native place of Acharya Charaka. The Charak is one of the foundational discourses of classical Indian drug .

The Acharya Charak was blindly believing in the Ayurveda and the nature's flora which can cure all the mortal conditions. According to him, health and diseases are not destined and life may be dragged by mortal trouble and attention to life. He was the first person to have known the conception of digestion, metabolism and immunity. A body functions because of three principles or dosha continuously regulating in mortal system movement, transformation,lubricating and stability . This is being worked when the Dhatus like blood, flesh and marrow act upon the food eaten. The body produces different quantities of dosha in different human beings so we're different from one another.

Rishi Kanva – The wisdom of Wind - Rishi Kanva was an ancient Hindu rishi of the Treta Yuga, to whom some of the hymns of the Rig Veda . The wisdom behind wind was explained by great sage Kanva in some of the section of Rigveda. Vedas described 48 different forms of winds produced due to lightning. In Rishadansh type, the wind takes down the bad quality which is the Gayatri Chhanda. The Gayatri Chhanda is associated with fire.

Rishi Kanva explains Rishadansh being used with Ghoswarpas in pieces in fire wisdom through Gayatri Chhanda, which presents brave kingdom and fire in the sky. Kanva rishi's wisdom of lightning these winds are considered to be thriving with a substance called Gana and force which is Gayatri Chhanda . Mamuta by great Rishi Kanva explains it with Brahmin Varna, east direction, spring and summer season through Gayatri Chhanda in Vaman Aryama Science. Rishi Kanva had been looking after Shakuntala when she was abandoned by her mother and father. Bharat, the son of Shakuntala was brought up by him.

~Krish Yagyik

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Splitting The Time Science

Time machine, all of us are familiar with this term. So, what is a Time machine? Is it anything that exists in reality?

Time travel is the concept where there is movement between certain parts in real-time. Time travel has been an immensely liked fictional category in novels, like the famous novel of H.G. Wells named "Time machine". It is uncertain if we could travel in the past or future, but it is said that we always travel through time in the forward direction. But we cannot fast forward it before we live it. We cannot say that it is not possible so even if there is the slightest possibility, physicists always grab it and find ways for it to exist in real time. Traveling in time has theoretical support through physics and is usually connected to quantum mechanics or wormholes.

Albert Einstein's theory of space and time makes an entity called 'space-time' and provides an intricate explanation of how they work together. Physicists have been trying to use relativity theories to figure out time travel. But writing the equations and doing the theory work is not physics if it doesn't get applied in real-time. The issue with creating the time machine is, building it requires negative energy. As all the matter around us has positive energy, negative energy is not something that we will find lying around. Even if we decide to create it as we have in our theory we couldn't make the necessary amount of energy, also handling that negative energy is not easy. The other problem is less practical but has a significance which is 'Paradoxes'. Assume that when we go into the past through a time machine and make changes in ways that may affect the time from where we had come, for example, if we go back in time with the time machine and destroy the time machine then we might get stuck in past as even though the machine comes from the future, it doesn't exist because it gets destroyed in the past.

Wormholes are the tunnels between two distant points in time through which we can travel when we will be able to create them. Instead of traveling through the many millions of years, we consider these tunnels as a shortcut to that specific time.

Under the perfect conditions, if we know the complete details of wormholes, we can shorten the time from hours to minutes. But their existence has always been doubtful, Einstein's theory of space-time has been proven true every time and hence scientists think if those wormholes exist then they would be unstable as the gravity all around the earth also affects the wormholes which will lead to their collapse. But as far as scientists know, negative energy can be created only in small amounts, too small to counteract a wormhole's gravity. It is possible that because of the big bang, it had created some teeny, tiny wormholes along with the massive galaxies and planets just as it had created the black holes.

Time traveling is not easy as shown in the movies or books, they always try to explain but making science fiction a physics movie or book won't entertain the audience. Time travel is still in the process of existing in real-time, with the theories and failed experiments listed it is not that far when we will be traveling in time in all the possible ways.

~Aditi Bande

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The Voyage of Hubble Telescope

The Hubble Space Telescope, named in honour of Astronomer Edwin Hubble was launched into space on April 24, 1990. From determining the age of the Universe to observing the changes in celestial bodies in our solar system, Hubble is one of humanity's most significant scientific instruments. It's been more than 30 years now that the Hubble telescope has been sending detailed pictures of The Universe and helping us to discover hidden parts and explore more about the Universe.

The idea of such a telescope was conceived in the 1940s and was named as Large Space Telescope. It took decades of planning and research before it was launched on April 24, 1990. Since its launch, Hubble has overcome its difficulties to perform innumerable scientific observations that revolutionized humanity's understanding of the Universe. It has changed the understanding of the universe, its view from orbit unleashing a flood of cosmic discoveries that transformed astronomy forever. Hubble has helped answer some of our times most compelling astronomical questions and revealed enigmas that we never knew existed. Throughout history, humanity's eyes on the universe have never been seen with more clarity or focus.

The Hubble Space Telescope is a mirror-based optical system that collects and focuses light from the universe to be analysed by science and guidance instruments. The optical system, called the Optical Telescope Assembly (OTA), gives Hubble a unique view of the universe by gathering infrared, visible and ultraviolet light.

The Voyage of Hubble Telescope

The OTA is supported by a graphite epoxy skeleton. Graphite epoxy is found in golf clubs, bicycles and tennis rackets and that's why it was chosen for the frame of the OTA because of is lightweight, stiff and strong. Temperature fluctuations could also potentially damage Hubble's mirrors, so the mirrors are kept at a constant temperature of about 70 degrees Fahrenheit or 21 degrees Celsius

Hubble uses two mirrors, laid out in a Cassegrain telescope design, to collect and focus light. After light travels down the length of the telescope, it hits the concave, or bowl-shaped, primary mirror. The light reflects off the primary mirror and travels back toward the front of the telescope. There it hits the secondary mirror, which is convex or dome-shaped. The secondary mirror concentrates the light into a beam that travels back toward and through a hole in the primary mirror. The light is then directed into science and guidance instruments for analysis.

The primary mirror is 7.8 feet/2.4 meters in diameter, while the secondary mirror is only 12 inches/30.5 centimetres wide. The size of the primary mirror allows it to collect 40,000 times more light than the human eye. Though the primary mirror is large, it was designed to be as lightweight as possible. Instead of a solid core, Hubble's primary mirror has a honeycomb core, reducing its weight from 3,636 kg to 818 kg.

After Hubble was launched in 1990, NASA discovered that the primary mirror had an error called "spherical aberration." The curvature of the mirror was off by less than one millionth of a meter — or a mere 1/50th the width of a human hair. But it was enough to leave Hubble's images slightly blurry compared to what they should have been. Even with the error, Hubble efficiently kept delivering the observations.

NASA worked with Ball Aerospace to develop the Corrective Optical Space Telescope Axial Replacement (COSTAR) to remedy the spherical aberration. COSTAR contained small mirrors on robotic arms that corrected the light beams entering Hubble's original scientific instruments. Once its vision was restored, Hubble could capture incredibly detailed images with its powerful OTA.

Hubble views the universe with greater precision than Earth-based telescopes because it is not hampered by Earth's atmosphere. The atmosphere distorts light that travels through it and blurs images taken of outer space. Additionally, the atmosphere blocks some wavelengths of light (like the ultraviolet), which hinders Earth-bound observations. From its position above the atmosphere and with its powerful optical equipment, Hubble can observe what is unobservable to telescopes on the ground.

Hubble Space Telescope has changed our perception of space and how enchanting and gigantic the Universe can be. The significant achievements of the Hubble Telescope are showing moons around Pluto, the Formation of planets and galaxies, calculating the Age of the Universe as 13.8 billion years and a collision between a Comet and Jupiter. A Black hole's sub-optimal image was recently captured out of supermassive Black holes by James Webb Space Telescope. It also discovered Eagle Nebula and is still contributing to date.

~Aditi Kurhekar

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Satellite Communication System

Introduction:

In today's society, sending messages from one side of a country to a person in a faraway land just by a few touches on our electronic equipment such as smartphones and laptops is easily possible. So how does Satellite Communication works? Communication basically means sending a message from one person to another through a medium. Satellite systems make this type of communication possible today, which helps us send messages for more considerable distances. Satellite communications play a vital role in the global telecommunications system. Satellite communication is based on ground equipment consisting of antennas used for sending and receiving radio waves. Space communication is mainly based on the different types of radio waves such as infrared waves. Satellites communicate by using radio waves to send signals to the antennas on the Earth. The antennas then capture those signals and process the information coming from those signals. This type of to and fro of message result in the whole system working correctly.

History of Satellite Communication:

The idea of communicating through a satellite first appeared in the short story titled "The Brick Moon," written by the American clergyman and author Edward Everett Hale and published in The Atlantic Monthly in 1869–70. The story describes the construction and launch into Earth orbit of a satellite 200 feet (60 metres) in diameter and made of bricks.The brick moon aided mariners in navigation, as people sent Morse code signals back to Earth by jumping up and down on the satellite's surface. The first practical concept of satellite communication was proposed by 27-year-old Royal Air Force officer Arthur C. Clarke in a paper titled "Extra-Terrestrial Relays: Can Rocket Stations Give World-wide Radio Coverage?" published in the October 1945 issue of Wireless World.

Clarke, who would later become an accomplished science fiction writer, proposed that a satellite at an altitude of 35,786 km above Earth's surface would be moving at the same speed as Earth's rotation. At this altitude the satellite would remain in a fixed position relative to a point on Earth. This orbit, now called a "geostationary orbit," is ideal for satellite communications, since an antenna on the ground can be pointed to a satellite 24 hours a day without having to track its position. Clarke calculated in his paper that three satellites spaced equidistantly in geostationary orbit would be able to provide radio coverage that would be almost worldwide with the sole exception of some of the polar regions.

Methodology:

Satellite Communication consists of an Uplink (Sender), Satellite (Medium) and Downlink (Receiver). Usually this system consists of one uplink and multiple downlinks as per the requirements of the message and the sender. Earth stations send information to satellites in the form of high powered, high frequency (GHz range) signals. The satellites receive and retransmit the signals back to earth where they are received by other earth stations in the coverage area of the satellite.

There are three types of communication services that satellites provide:

1) Telecommunications System Telecommunication services include telephone calls and services provided to telephone companies, wireless, mobile, and cellular network providers. The voice calls made by everyone are under this type of space satellite communication. To make a call with a satellite phone, you have to dial the desired number, at that time, the device will search for the nearest satellite to send the call signal.

Satellite Communication System

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The next step is when the satellite returns the transmission to Earth to the gateway receiver.

2) Broadcasting System: Broadcasting services include radio and television delivered directly to the consumer and mobile broadcasting services. DTH, or satellite television services are received directly by households. Cable and network programming is delivered to local stations primarily via satellite. Satellites also play an essential role in providing programming to cell phones and other mobile devices, such as personal digital assistants and laptops.

3) Data Communications: System Data communications involve the transfer of data from one point to another. Corporations and organizations that require financial and other information to be exchanged between their various locations use satellites to facilitate the transfer of data to multiple places required.

Uses of Satellite Communication System

Satellite communications technology is often used during natural disasters and emergencies when land-based communication services are down. Mobile satellite equipment can be deployed to disaster areas to provide emergency communication services. The maximum distance covered by other type of ground communication is generally 1500 kms whereas the space communication helps in breaking the limiter on this distance.

Currently there are approximately 2,000 artificial satellites orbiting Earth relay analog and digital signals carrying voice, video, and data to and from one or many locations worldwide.

Future Scope of Satellite Communication System:

In a relatively short span of time, satellite technology has developed from the experimental (Sputnik in 1957) to the sophisticated and powerful. Mega-constellations of thousands of satellites designed to bring Internet access to anywhere on Earth are in development. Future communication satellites will have more onboard processing capabilities, more power to satellites. Further improvements in satellites' propulsion and power systems will increase their service life to 20–30 years from the current 10–15 years. In addition, other technical innovations such as low-cost reusable launch vehicles are in development. We have heard in recent times about SPACEX who is actively researching and successful about reusable launch vehicles. With increasing video, voice, and data traffic requiring larger amounts of bandwidth, there is no dearth of emerging applications that will drive demand for the satellite services in the years to come. The demand for more bandwidth, coupled with the continuing innovation and development of satellite technology, will ensure the long-term viability of the commercial satellite industry well into the 21st century.

~Shubham Jadhav

Intelligent Cardiac Sickness Prophecy

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Cardiac Disease has become a common outcome due to today's lifestyle. Many known Indian personalities have succumbed to cardiac arrest, for example Raju Srivastava, Pradeep Patwardhan, KK, Puneeth Rajkumar, Siddharth Shukla and many more. Comorbidities like blood pressure, diabetes, and cholesterol are notably considered but along with this, overdue of physical-based activities like gym training or physically intensive sports also affect the blood flow. Heart disease is difficult and claims thousands of lives every year. If the early indicators of heart disease are ignored, the patient could suffer severe consequences quickly.

Today advancement in diagnosing cardiac disease is an essential requirement where building a computer-aided smart system enriched with machine learning, RF and KNN models can be trained on the clinical dataset and evaluated.

To get around these issues, numerous studies on clinical decision-support systems have been conducted using various methods like data mining and machine learning. Numerous data mining techniques, including fuzzy learning vector quantization networks, hybridized rough sets, and neural networks, have been developed in line with medical diagnosis. Principal component analysis, radial basis function neural networks, and association rules have all been applied in the medical applications of these approaches.

Widely used datasets like the CHSLB dataset, which means Cleveland, Hungary, Switzerland, and Long Beach, can be easily collected from Kaggle. Additionally, accuracy can be predicted and calculated.

The purpose of this study is to predict cardiac sickness using the internet and mobile apps using a variety of computational intelligence approaches, including K-nearest neighbour (KNN), random forest (RF), decision tree (DT), and AdaBoost (AB). The KNN was selected because it can compete with the most accurate models and offers incredibly exact predictions. How accurate the forecasts are is determined by the distance. The KNN technique can be used in applications that demand great accuracy as a result. RF is a technique that is based on the bagging algorithm and employs ensemble learning. DT handles data well and works best when given a linear pattern. It has the capacity to quickly process enormous amounts of data.

Therefore, developing an Intelligent system for early-stage prediction at an affordable cost is needed for society.

~Namrata Patel,
Masooda Modak , Kalyani Pampattiwar

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Blockchain Technology

Blockchain is a word that often evokes fear and uncertainty. But what if we told you that this powerful technology has the potential to revolutionize nearly every aspect of our society for the better? To understand how blockchain can change the world, we first need to understand how it works.

One of the biggest challenges in our society is trust. We often question the authenticity of information, particularly when it comes to products and services. For example, have you ever purchased salmon labeled as sustainably caught, only to wonder how you can trust that claim? Or, have you ever made a donation to a charity and wanted to know how your funds were being used, but struggled to find transparency? These are just a few examples of the trust issues that plague our society.

Enter blockchain - the solution to these problems. Unlike traditional systems that are controlled by central authorities, blockchain is a decentralized network of computers that work together to validate, store, and encrypt information. This means that no one can tamper with or corrupt the information stored on the blockchain. Because of its decentralized, peer-to-peer, and distributed nature, blockchain is virtually tamper-proof and cannot be taken down by any one entity.

When information is added to the blockchain, it is grouped into blocks and verified by a network of computers called "miners." These miners are compensated for their work with cryptocurrency, such as Bitcoin. Once verified, the new blocks are added to the chain, creating a mechanism called consensus, where the information is examined by every computer on the network, ensuring that the data has not been tampered with and is in its chronological order.

The possibilities of block chain are endless. Some experts predict that it has the potential to eliminate poverty, stabilize government, and even bring balance to the world. In developing countries, where access to financial services is limited, block chain could provide a way for individuals to store and transfer wealth through virtual currencies.

In conclusion, block chain may seem daunting at first, but it's a technology that has the power to solve some of the most pressing issues in our society. It's a decentralized, secure, and transparent system that can be trusted to keep our information safe and accurate. It's time to start embracing the future of block chain.

~Bruno Calabretta

AI : Boon or Bane?

A thing is not good or bad. Its purpose, decides whether it is good or bad or whether it is boon or bane. Nowadays, Artificial Intelligence is thriving. Some consider it to be the stepping stone of inventions done by humans while others claim it to be the destructive thing constructed by humans. Artificial Intelligence is growing. That should not be a frightening thought to a generation that is growing up with it in the background. Its development has expanded so much that it is not confined or limited to research laboratories anymore. Artificial Intelligence has been continuously gaining influence in different sectors, even in business, by its innovation to learn specific tasks with minimal command or input. Companies have taken notice of this.

With the benefits of AI as an attractive package, businesses have begun investing in research and development to refine what Artificial Intelligence can do. Artificial Intelligence is the advancement of computer systems capable of accomplishing tasks that require intelligence. These tasks include decision-making, speech and emotion-recognition, and visual perception. This is just the basic things that AI can do. We are talking about computer systems and algorithms that can replicate human skills. Artificial Intelligence, as well as machine learning and deep learning, are able to recognize different patterns and make necessary algorithms to replicate human behavior. These technologies can perform these tasks with large quantities of data available, based on what humans think and how they perform tasks.

One obvious benefit of AI for companies is the ability to improve the quality and accuracy of production results while performing tasks faster. With the enormous amount of data that AI can use to "learn," decisions will be made with a higher rate of accuracy. As the amount of information and data increases, along with the increase in the speed of processing it, manual decisions will then be addressed and exceeded by digital real-time decision-making.

Along with these progresses, AI is, sort of, disrupting the workplace by bringing change. We, humans, are creatures of habit, and we tend to fear what we do not understand, especially if it brings in the possibility of being replaced by a machine, a program, or even an app. In some way, that notion has basis and credibility since machines for production and service efficiency have replaced workers. But "jobs" and skills that AI is being implemented for are meant to take off the mundane and monotonous part of the workplace and help human resources go to the next level. If we fear AI, then we are significantly underestimating who we are and what we are truly capable of.

AI is expected to change customer support even more as the years go by. Customer Experience is critical for any business. AI has been used to do the initial sorting of customer complaints, inquiries, and applications for services before endorsing the customer to the right department that would address their needs. But AI is growing further than that.

AI : Boon or Bane?

Sentiment analysis technology is being added to customer support software that would have the ability to handle inquiries and complaints effectively. AI-enabled customer support software will effectively assist in giving quick and accurate answers to the customers and build greater engagement with your target market. And because AI can learn massive amounts of data, it can effectively provide customer service and sell opportunities that would benefit the business.

Whether you are part of a big enterprise or a private individual, cyber security is a big concern.And AI is an essential factor in both sides of the spectrum regarding cyber security. Hackers are known to be relentless in their endeavors. They attack every 39 seconds or an average of 2,244 times a day. An estimated 24,000 malicious apps are blocked every day. The attacks are significant in number and, most likely, AI-assisted. On the other hand AI-enabled software assists in identifying vulnerabilities in a network, effectively adjusting to combat attacks, and providing solutions to counter with proper defense strategies. The roles of artificial intelligence in cyber security are also extensive to secure you and your systems.

We have only touched the surface of what Artificial Intelligence can accomplish. But it is essential to realize that AI is meant to make our lives better. It can be considered a tool to assist us to rise above our circumstances. Only if we use it properly will it be useful to us. Whether it is boon or bane completely depends on how we treat it- as a tool- to use or to rely upon.

~Aditi Kurhekar

Blockchain Technology: Will Banks be Nullified?

It's doubtful that blockchain technology would render banks obsolete. Although blockchain has the potential to disrupt and transform the financial sector, it is more likely to augment and supplement bank services than to displace them completely. Blockchain is a decentralized database that enables safe and transparent transaction recording. By offering a more effective, secure, and transparent system, it has the potential to transform how financial transactions are handled.

The usage of smart contracts is one of the key ways that blockchain might affect banks. In smart contracts, the agreement details between the buyer and seller are directly encoded into lines of code. These contracts self-execute. These agreements may be automatically implemented without the use of intermediaries like banks. These agreements can also lessen the importance of banks in specific kinds of financial transactions.

Smart contracts are still in the early phases of development, so it's vital to keep in mind that it's unclear how broadly they will be used. In addition, some financial transactions, including loans and mortgages, will probably always need the bank's assistance.

Using bitcoin is another way that blockchain may influence the banks. Cryptography is used for the security of all financial transactions by cryptocurrency. Because it is decentralized and runs on a peer-to-peer network, no one entity, like a bank, has control over it.

Although the usage of cryptocurrencies has the potential to upend established financial institutions, it is crucial to remember that they have been adopted very slowly and makeup just a tiny portion of the entire financial sector. In addition, plenty of banks are looking into the usage of cryptocurrencies. They are beginning to provide services in this area, such as the ability to purchase and sell cryptocurrencies or the capacity to use them as loan collateral.

In conclusion, it seems doubtful that blockchain technology would render banks obsolete. Although blockchain has the potential to disrupt some areas of the financial sector, it is more likely to complement than replace the services provided by banks entirely.

~Kiran Pal

Electronic Health Record : A Security Perspective

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Data is the driving force behind all we do. As a result, patients' traditional medical records are being converted into Electronic Health Records to help manage the massive volume of patient records more orderly manner. These EHRs can now be kept on cloud platforms so that many hospitals, doctors, and patients can use them. The platform for maintaining these records in the cloud serves as a reliable third party. The only way for each entity participating in the healthcare industry to communicate with others is through this reliable intermediary. As a result, there is a threat to the security, privacy, and confidentiality of data kept on the cloud. Patient private information, including addresses and phone numbers, may be leaked if unauthorized individuals obtain patient data and sell it on the open market. Such data breaches appear to have occurred often in the past. Data breaches at the Kudankulam Nuclear Power Plant (Sep 2019), Dominos India (May 2021), Air India (May 2021), and many more may be examples.

However, a ransomware attack that occurred at the All India Institute of Medical Sciences (AIIMS), Delhi, on November 23, 2022, which was reported as an act of cyber terrorism, is one such recent data breach. Several VIPs, including previous prime ministers, ministers, bureaucrats, and judges, have their data saved on the AIIMS computer. Hackers allegedly sought 200 crore rupees in cryptocurrencies. Hospital administrators worry that the intrusion may have exposed the personal information of 3–4 crore patients. It's exceedingly hazardous to grant patients full read access to their data. If this is the case, attackers can access both the backup systems and the entire hospital network and EHR can be easily modified.

This presents researchers with a variety of research challenges even though there are many technological solutions available at the moment, such as encryption methods to control access rights. As researchers, we can consider using tamper-proof technologies, like blockchain. Again, it is uncertain whether the blockchain implementation of EHR would help with the problem of data breaches. Can we have other solutions to these issues, such as ownership and access controls? As a result, the platform is open for researchers to focus on these problems and make notable contributions to the area.

~Kalyani Pampattiwar,
Namrata Patel, Masooda Modak

AI in Space

Artificial Intelligence has been used in a wide range of human activities of development. Development of Space Technology is one of the most essential parts of humanity's research. AI is being used in space for various purposes which we will discuss further but before anything else, we should know, why we use AI and what is AI?

Artificial Intelligence leverages computers and machines to mimic the abilities of humans, such as problem-solving and decision-making. We can say the machine thinks and acts rationally to solve the problem that it encounters. AI has its history of improvement. Alan Turing, during world war, created the first machine that solves the problem which was then used to decode Hitler's messaging system (ENIGMA Code). It got the attention of the world, as it was the first machine to do the work autonomously to decode Hitler's code system in 1950. Since then, technology has advanced immensely, today's machines can multitask and perform almost every task that a human is capable of.

AI Rovers are machines that are used to send in space. This Rover has to find its way to the planet and once it reaches there, it makes decisions to roam through the planet. These Rovers study the planet and send the data they collect back to the scientists on Earth. They take pictures, samples, etc. for further study. This rover is an important application of AI, and many of the important discoveries made on Mars are due to the autonomous rovers. The intelligence-based assistants are created to support the astronaut throughout their mission. Robots can also be helpful in physical tasks, such as docking, spacecraft navigation, and more.

Satellites generate a huge amount of data; more than 100 petabytes in an image, which is quite impossible for humans to process. Machine learning algorithms are used to process those images and the data that has been collected.

Space research organizations from all over the world use AI robots for operating and designing missions with less danger to the spacecraft and the astronaut. It detects the internal and external problems and takes appropriate actions so that it doesn't affect the mission's objectives. With this AI machine, it is possible to evaluate the operational risk analysis and determine the critical missions. After programming the model to identify the risk and its classifications, we get the assessments in real-time. Locating the space debris and creating ways to reduce its creation is also done by AI robots.

Scientists and AI systems alongside have discovered planets which are 98% similar to Earth. Humans can't reach near the sun but studying it is more important. AI offers various opportunities for space exploration like exploring the sun's atmosphere which was predicted to be 2500 Fahrenheit by 2024. AI has changed the vision of space technology, to study planets as far away as possible.

AI in Space

Deep learning (DL) is a specialized technique within ML, where the machine utilizes multi-layered artificial neural networks to train itself on complex tasks like image recognition. This can happen via supervised learning (e.g feed the pictures of the Moon and Earth to the system until it can successfully identify both types) or unsupervised learning, where the network finds structure by itself. Good examples of deep learning are online translation services, image libraries and navigation systems for self-driving cars or spacecraft

The German Aerospace Center (DLR) has been developing AI methods for space and Earth applications for many years and in 2021 set up an Institute of Artificial Intelligence Security. In 2018 DLR launched an AI assistant to support its astronauts in their daily tasks onboard the International Space Station (ISS). NASA is also using AI for many applications, and has set up an Artificial Intelligence Group that performs basic research that supports scientific analysis, spacecraft operations, mission analysis, deep space network operations and space transportation systems. ISRO is actively developing high-end propulsion technology to assure cost-effective re-usable, recoverable, restartable, and dependable space launches using AI-based sensors embedded in propellants.

~Aditi Bande

ACHIEVEMENTS OF THE YEAR

IEEE BOMBAY SECTION

Volunteers, Committee and Affinity Group Awards 2021

CERTIFICATE
OF ACHIEVEMENT

presented to

MTTS - SIES Graduate School of Technology (STB29561)

under the category "BEST STUDENT CHAPTER/SOCIETY" for their commendable performance and admirable volunteering for the upliftment and betterment of IEEE Bombay Section. Their efforts and activities have helped the section grow to greater heights. We thank them for their contribution and wish them luck for their future endeavours.

Anjali Deshpande

Dr. Anjali Deshpande
(Chair, Award Committee)

Dr. Satyanarayana Bheesette
(Chair, IEEE Bombay Section)

Best Student Chapter/Society Award

SIES Graduate School of Technology, Navi Mumbai has received the Best IEEE Student Society Chapter award for the years 2022 and 2023 from IEEE Bombay Section. The award was for our commendable performance and admirable volunteering for the upliftment and betterment of IEEE Bombay Section.

ACHIEVEMENTS OF THE YEAR

IEEE

IEEE Regional Exemplary Student Branch Award 2022

Presented to

SIES Graduate School of Technology

Bombay (Mumbai) Section, R10

For exemplary performance as an active IEEE Student Branch offering technical programs, activities, professional networking opportunities that enable members in building critical skills.

8th October, 2022

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. FOUNDED NEW YORK 1884

K. J. Ray Liu
IEEE President 2022

IEEE Regional Exemplary Student Branch Award 2022

SIES Graduate School of Technology, Navi Mumbai has received IEEE Regional Exemplary Student Branch Award from IEEE USA for the past 3 years. The award was for exemplary performance as an active IEEE Student Branch offering technical program, activities, professional networking opportunities that enable members in building critical skills.

ACHIEVEMENTS OF THE YEAR

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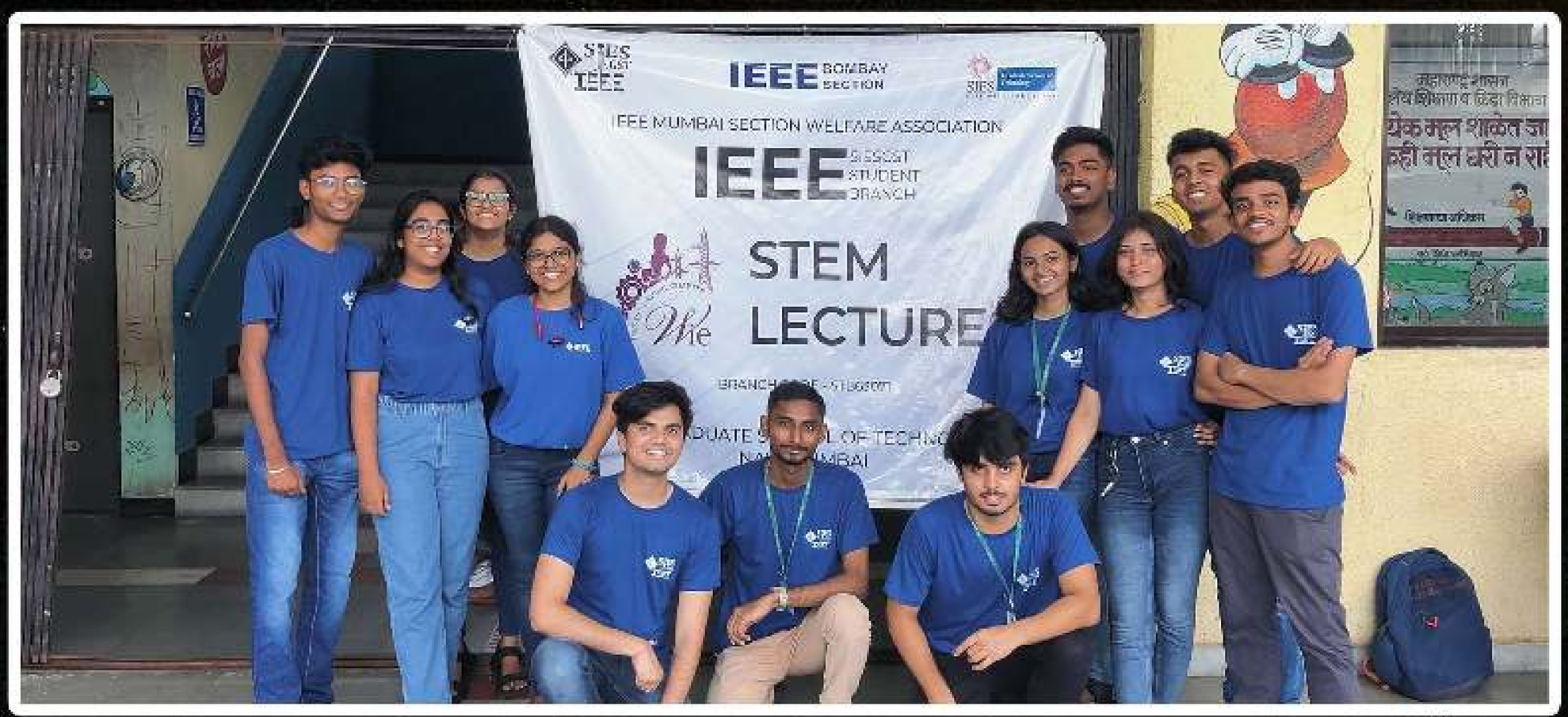
SMELT 3.0 Best Practices Poster Presentation Contest

Winner of Networking Activity of SMELT 3.0

EVENTS

STEM WORKSHOP:

IEEE SIESGST took an initiative to organize a STEM workshop aimed at providing underprivileged students with valuable knowledge and insights into technical aspects of education. Through this workshop, the students were introduced to various fields of study, and are now better equipped to identify their academic interests and strategies to facilitate their studies.



SELENIUM:

Under its CS and MTT-S chapters, the IEEE SIESGST organized a two-day event. The first day featured a webinar titled "Power Beaming and Space Solar," with the goal of introducing attendees to this expansive topic, which could potentially serve as a future energy source. On the second day, a hands-on workshop titled "Unboxing the Web" was conducted, with the objective of teaching participants how to extract web data using BeautifulSoup, and to familiarize them with the fundamentals of data scraping and parsing.

EVENTS

AFTER GRADUATION:

A series of Instagram Live sessions hosted by IEEE SIESGST were designed to assist undergraduate students in making career decisions or just learning about the numerous alternatives available after finishing their degree program.

INSPECT ELEMENT 2.0:

IEEE SIESGST, in collaboration with CSI SIESGST, organized a front-end web development competition based on the theme 'Breaking Bad' for undergraduate students eager to demonstrate their proficiency in coding languages such as HTML, CSS, and JavaScript, as well as to provide a forum where they could collaborate and develop new technological concepts.

EVENTS

IEEEXTREME 16.0:

Every year, IEEE hosts a hackathon and competitive programming challenge where teams of IEEE student members compete against one another to solve a series of programming problems over the course of 24 hours. To showcase their mastery in coding languages and competitive programming, the 24 Hour Programming Competition was created specifically for IEEE members.

DML TALK:

IEEE SIES GST with its chapter MTT-S conducted a DML Talk on "Technologies and Spectrum Above 100GHz for 6G and Beyond". This workshop was an excellent opportunity for everyone where they got a chance to interact and learn with the highly experienced and knowledgeable speaker Mr. Kaushik Sengupta.

EVENTS

EPSILON 2022:

IEEE SIESGST with its chapters MTT-S and Computer Society, conducted the second iteration of its Symposium EPSILON 2022: 'The Internet Spectrum' . Epsilon 2022 was a three-day academic convention from 13th to 15th August where the invited industry experts discussed their expertise in the field of 'The Internet Spectrum', which was the theme extensively explored at this Symposium. The event ran along three tracks namely,

Track 1 - Blockchain Security under IEEE
Track 2 - Cybersecurity under Computer Society
Track 3 - IOT and 5G under MTT-S

Day 1 of Epsilon featured a Talk session in each of the three tracks. The topics included "Security for the Blockchain Age," where we delved into the world of blockchain and its security and web3, "The Insights of Cyberworld," where we went over the plethora of cybersecurity fundamentals and career options, and "Elementary of 5G and IoT," which walked viewers through the fundamentals of 5G and IoT security and their needs.

EVENTS

Hands-on workshops on three different topics were conducted under Day 2 of Epsilon. Starting with a workshop instructing the procedure of 'Creating a Smart Contract' using solidity and deploying the smart contract under Track 1. Next was '21 Hacker Street' under Track 2 which demonstrated the utilisation of CTI based on OSINT which included subjects including cyber-related crimes, CII, and cyberterrorism. Under Track 3 was a workshop titled 'IoT Hacking - Internet of Thieves' which focused on the testing process for embedded devices.

Final day of Epsilon was a series of Panel Discussions. The 1st panel saw an exchange of views focused on the topic of 'Blocks for a Better World: Blockchain'. A comprehensive dialogue on 'An Outlook on Cyber security' was seen in the 2nd panel. Finally, the 3rd panel was an extensive colloquy on the idea of 'Valiant Vulnerability'.

Epsilon 2022 turned out to be highly enlightening and interesting. We had 23 speakers join us from all over the globe over the course of the three days, with the same goal of imparting knowledge on their particular specialty.

EVENTS

TECHOPEDIA XI:

IEEE SIESGST celebrated the eleventh edition of our treasured national-level annual technical fest Techopedia from 20th to 22nd of January, 2023. ‘ILLUSION: A Glitch In The Matrix’ was chosen as the theme to honour Techopedia's triumph over the previous 11 years. The entire fest consisted of 4 events in total viz. Squabble, Inquisitive, Mystification, Cold War. Participants were granted the opportunity to embark on a journey to travel through the challenging idea of glitches and illusions. The top performers from all the events were allocated with exciting cash prizes and certificates.

EVENTS

SQUABBLE: It was a National Level Debate competition and a platform where the participants showcased their oratory skills with a technical perspective which consisted of group discussion and one-on-one debate with time limitations.

EVENTS

INQUISITIVE:

It was a National level Quiz competition where the participants got to validate their cerebral capacity by engaging in quizzes on the occurrences, technologies, advancements and affairs from all over the world. This year event followed the theme of Illusion and glitches in the world.

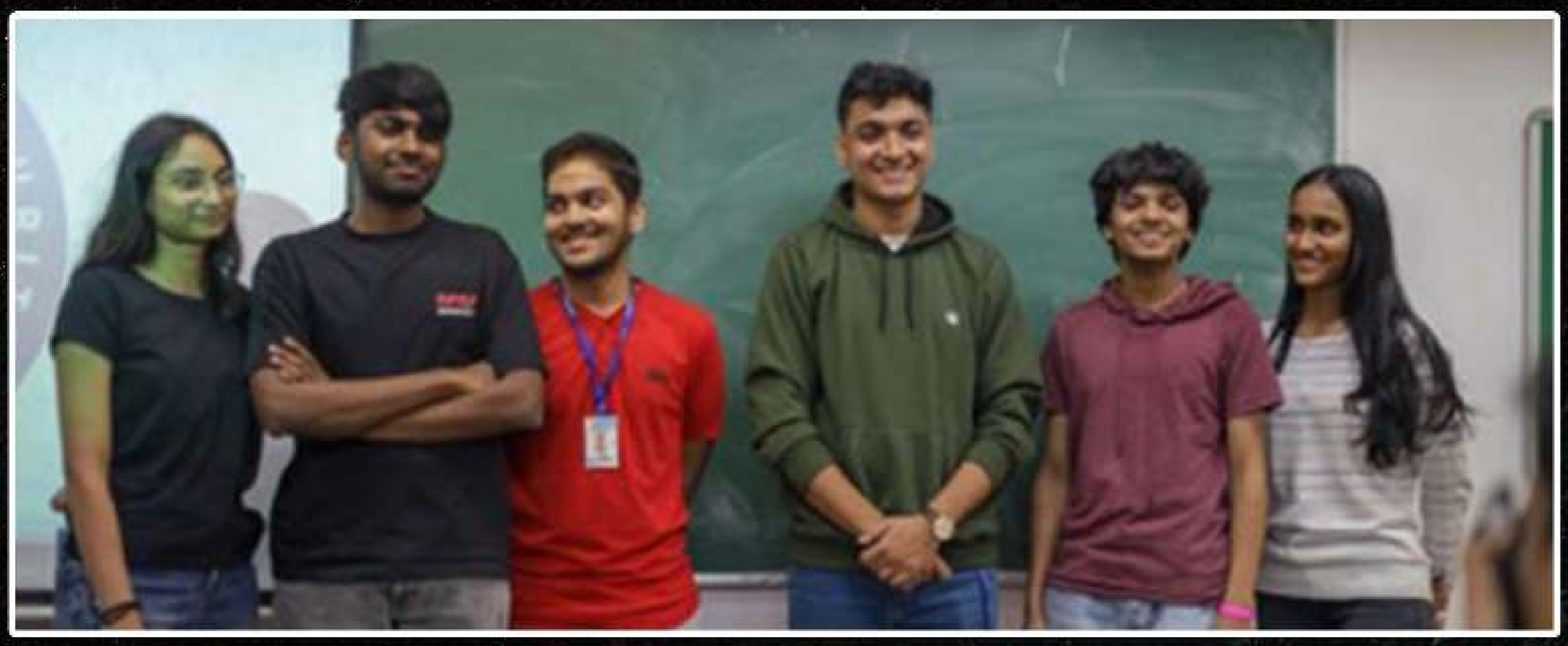
MYSTIFICATION:

The game was an epic journey full of challenges. Mystification was all about one's ability to crack solutions for their problems. A team of 2 members that set out on their journey by deciphering clues and tackling several technological obstacles.

EVENTS

COLD WAR:

This event was the grand finale of Techopedia XI where the winners and runner-ups of all the previously aforementioned events took part in and competed to claim the prestigious title of Techopedia winner. A total of 6 teams with 2 players each were selected for the commencing rounds of Cold War with a prize pool of x amount for the winning team.



IEEE SIESGST
Council 2022-23

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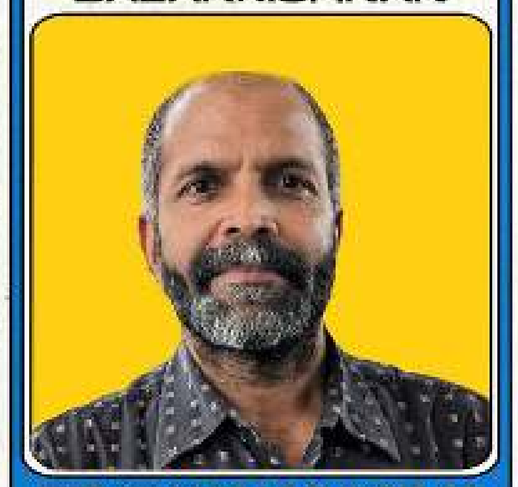
PROF.BIJU BALAKRISHNAN



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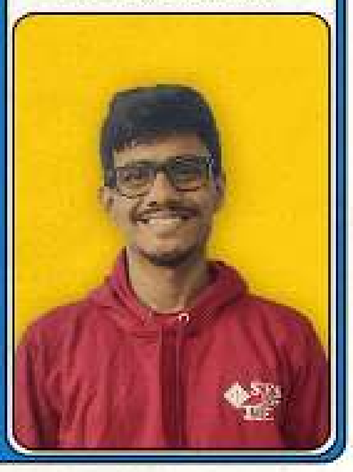
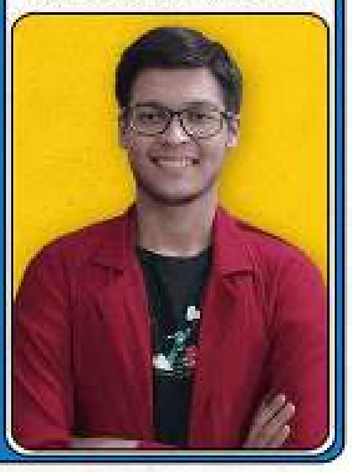


TECHNICAL MENTOR

SWAPNENDU MUKHERJEE



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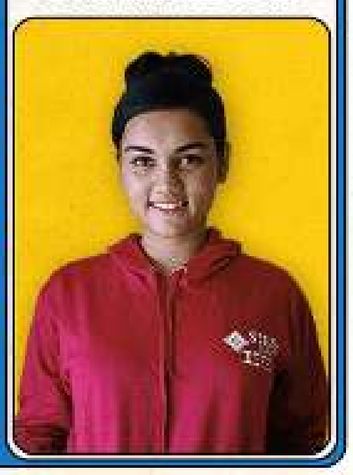

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MEDIA MENTOR

PRATHAMESH PATIL

PR MENTOR

NETRA MUDALIAR

IEEE SIESGST
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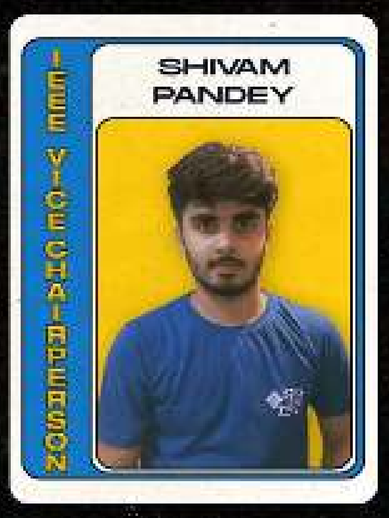

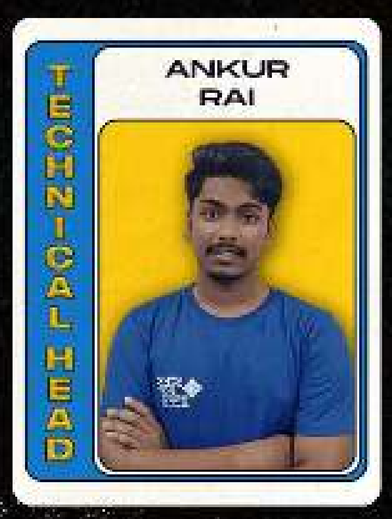

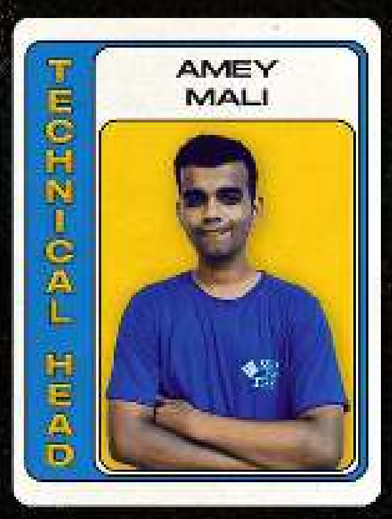

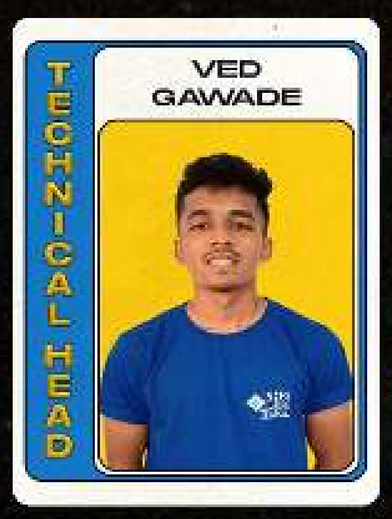

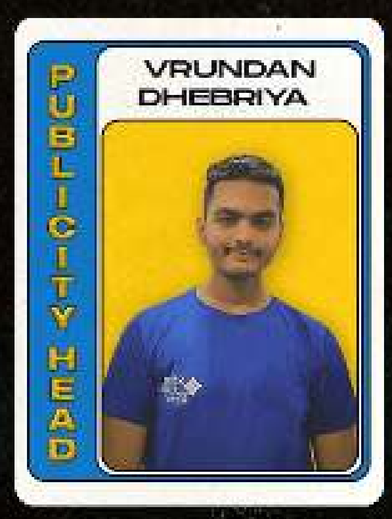

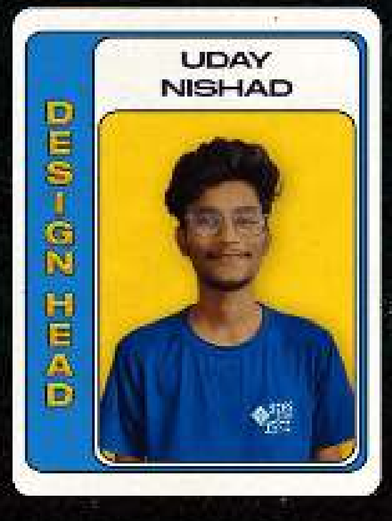

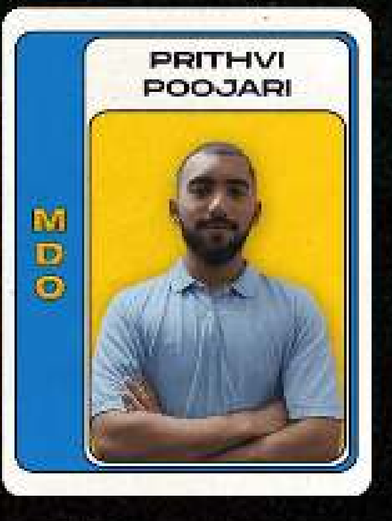

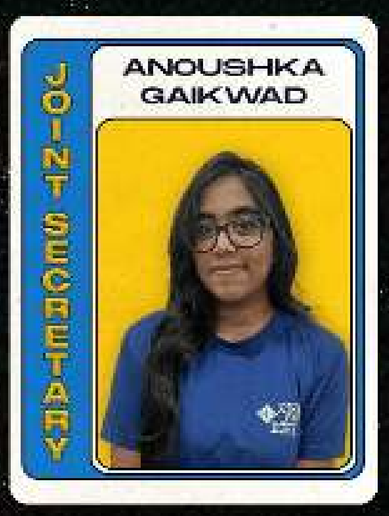

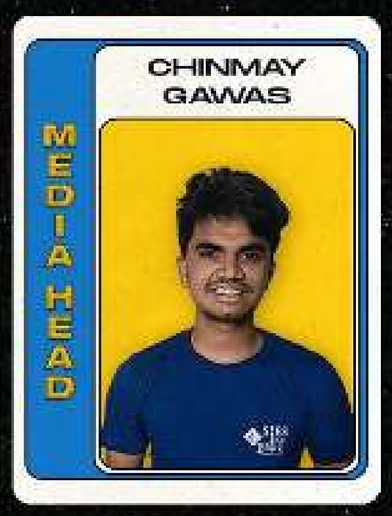

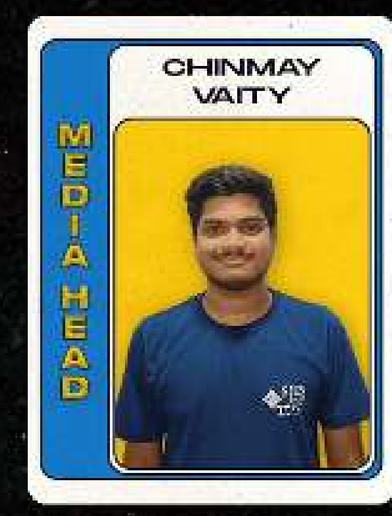

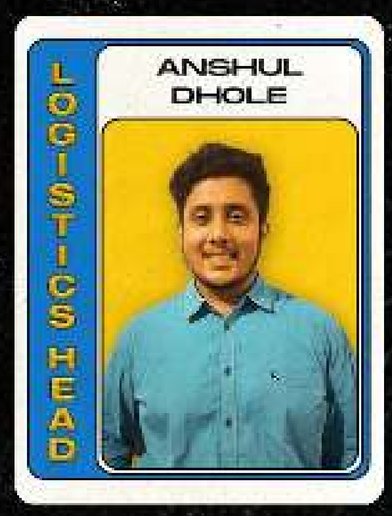

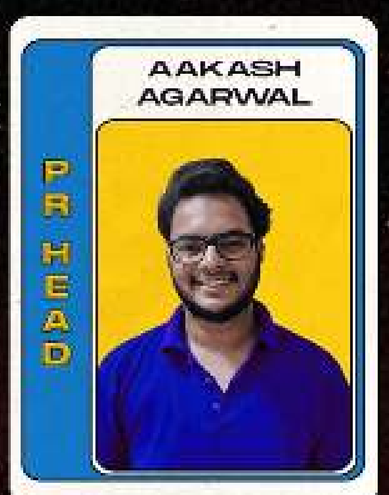

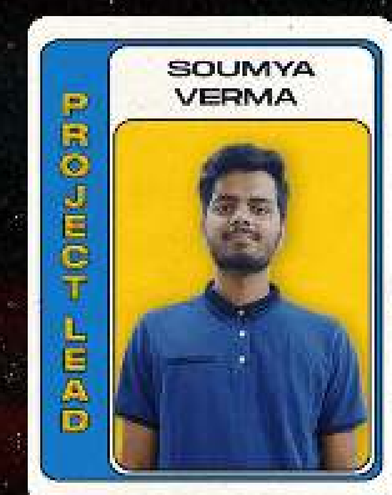

PHOTO GALLERY

AISYWLC 2022

TENSYMP 2022

IEEE DAY 2022

FROM THE EDITORS' DESK

One of the key factors to success behind every team is how well they present themselves outside the team. This was one of the major responsibility of the editorial team here at IEEE. Representing the team's activity on a professional level through detailed and precise documentation was a demanding challenge which we faced with a sporting laugh and an unwavering resolve. Besides our role in the team, IEEE taught us various other skillsets and encouraged us to participate in various forms of activities and events, learning new things down the road. This team also gave us the opportunity to learn under the astute leadership of Biju sir and make so many new friends and comrades in arms along the way. IEEE always encourages creative minds and ambitious hearts, and observing such a marvel during our tenure was truly a fulfilling experience for us. This magazine is a testimony to our enduring and steadfast determination as well as a reminder to the future generation to appreciate the efforts of their forebearers.

IEEE will always have a special place in our hearts and we will be forever grateful towards it. This is the editorial team, signing off.....

~ Dhruv Suvarna, Secretary 2022

Anoushka Gaikwad and Parvathy Nair, Joint-Secretaries 2022

CREDITS

PRINTED & PUBLISHED BY: IEEE SIESGST Student Branch

EDITORIAL BOARD: Dr. Atul Kemkar, Dr. Preeti Hemnani, Prof. Biju Balakrishnan, Prof. Vaishali Mangrulkar, Vatsal Kore, Anusha Ganapathy, Dhruv Suvarna, Tushar Ninave.

TECHNOZINE MAGAZINE: The Official Annual Magazine of IEEE SIES GST Student Branch

EMAIL: ieee@siesgst.ac.in, bijub@ieee.org

WEBSITE: www.ieeesiesgst.co.in

DESIGNED BY: Tushar Ninawe, Kunal Zambare and Uday Nishad.

TECHNOZINE

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ieee@siesgst.ac.in

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