

E-MAZINE

JULY 2024

ISSUE 1

EXPLORING TECHNOLOGY & INNOVATION

GENERATIVE AI

A NEW DIMENSION OF TECHNOLOGY



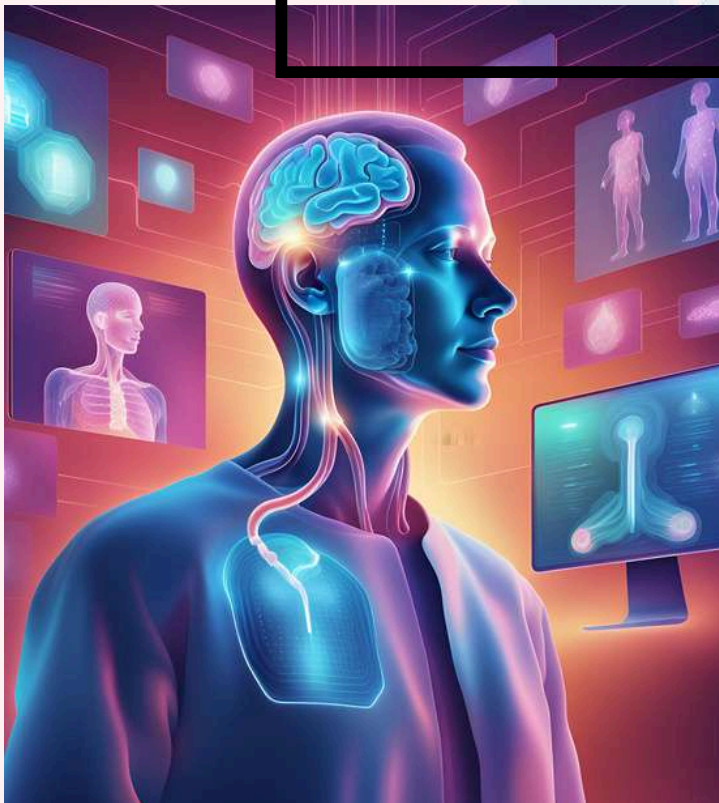
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The Editor's Desk

INNOVATION TO EVOLUTION

Change is a continuous process that leads to evolution. Hence, we have also evolved with this first issue of "E-MAZINE" the magazine from the ECE department focusing on all the emerging technologies and being a logbook for the department activities with the wall of fame to applaud all achievements of students and faculty members.

Every technological innovation is a step towards the evolution of mankind. Generative AI is also an innovation which has started changing/evolving our lives. The current issue is focused on Gen-AI, an advanced capability of AI through which it can understand our needs and provide us with output in the form of text, images, videos, PPTs etc. Are such advancing capabilities a threat to mankind? Will AI take over all our jobs? Many such questions have been asked these days and my perception states "Our Natural Intelligence is beyond the current Artificial Intelligence, and we should optimize and utilize AI appropriately".

All authors have shared their views which capture the good and bad of AI and Gen-AI. I thank everyone for their contribution to bringing this issue alive. Interestingly, we have also asked chatGPT, the most popular Gen-AI for their contribution as an author of an article and also as the poet for a poem. The next issue will target the "Rise of Semiconductor Industry in INDIA". Soon more information will be shared.

Stay Healthy and Be Happy

**Divya Kiran, Editor-in-Chief
Assistant Professor, ECE, MSRUAS**

GENERATIVE AI

Generative AI is like a wild ride into the future, offering a virtual playground where imagination knows no bounds, a virtual buddy, able to create all sorts of digital masterpieces - from silly cat memes to deep, thought-provoking essays. It's truly amazing to see AI generate photorealistic landscapes or compose music that could rival the greats. But if AI consistently outperforms humans and delivers superior quality, there's a good chance that we might miss out on the unique flair that only human-made works can offer. After all, there's something magical about the imperfect, handcrafted touch that makes us smile.

However, as with any new technology, some serious concerns need to be addressed. One example is the emergence of deepfake videos, serving as a sheer warning about the power of AI to manipulate reality. These sneaky clips use AI to swap faces, manipulate voices, and stir up mischief. While they can be good for a laugh, they also raise questions about truth, privacy, and the fine line between reality and fiction.

AI offers unparalleled opportunities, no doubt but it also calls for a conscious effort to preserve and cherish the authenticity and richness of human expression. As AI becomes an integral part of our lives, things are about to get interesting! Jobs might shift around, our smart gadgets could get even smarter and privacy might be a bit trickier to keep. After all, in this AI-powered future, a little caution can go a long way.

**DRUSHI KRUTHIK: ASSOCIATE STUDENT EDITOR
6TH SEM, ECE DEPARTMENT**



Pen & Perspectives

II Unveiling the Layers of Language Models II

Human exploration and exploitation of nature are based on certain methods that lead to what we call development. We would like to know the inner workings of a system; the scientific laws behind the external behaviour. The goal is to design, analyze, and synthesize systems according to our specifications. The specifications are related to system performance, reliability, and safety considerations under different circumstances. This has been the core of humanity's endeavour for thousands of years. All great developments in the last five hundred years in the field of natural sciences and engineering are hinged upon the three pillars of design, analysis and synthesis in an evolutionary manner. The issues faced in synthesis led to a new design and analysis framework. The problems in the analysis will force us to rethink the modelling perspective. We cannot accept a black-box system just by looking at inputs and outputs. Presently, Large Language Models (LLM) are essentially black boxes.

LLMs are developed through deep learning architectures and are not explicitly programmed. The key layers of the architecture are transformers and attentional mechanisms. LLMs are trained on a large number of documents. The state-of-the-art LLMs presently have hundreds of billions of parameters that must be tuned during the training. This means that even their developers do not fully understand how they work or why they produce incorrect or nonsensical outputs.

While LLMs have shown amazing abilities in different automated tasks such as classification, generative data, natural language processing, image processing, etc., their black-box nature raises concerns about their reliability and potential for misuse. We need to develop methods to "peek inside" these models and understand their inner workings. The interpretability of the results and chain of reasoning leading to the response is important to "break" the black-box nature of LLMs. Understanding how LLMs process information is complex as neurons in an LLM architecture do not correspond to specific words or data points but rather to intricate patterns of data points and their statistical relations. Recent advancements have brought some insights, but the mysteries of LLMs are yet to be unravelled and remain a major challenge.

Sparse autoencoders have emerged as a potential tool for interpretability and explainability of analysis of internal LLM patterns. By analyzing how neurons activate together, they enable the mapping of concepts and relationships within the model in a hierarchical clustered manner. These patterns can also be studied during the process of training as LLMs change the parameter values during the iterations. It is still at initial stages but the sparse autoencoders provide a foundation for further analysis. In totality, these encoders provide a map of the tuning of parameters in LLMs.

Researchers are also making progress in controlling LLMs. By identifying and manipulating specific features within the models, they can influence their behaviour. For instance, amplifying features related to gender fairness can create an LLM whose response does not show gender biases and discrimination. This technique could be used to mitigate harmful outputs or adjust model discriminatory traits. Additionally, methods are developed to distinguish between factual and hallucinated outputs. By analyzing the consistency of an LLM's responses to the same prompt, they can identify potential hallucinations. This work is crucial for improving the reliability of LLMs.

The field is making strides in opening up the black box of LLMs, with multiple research teams contributing to this growing knowledge base. Try to imagine the situation of a human who was trying to understand how to grow crops thousands of years ago. The present LLM research activities are as exciting as that.

Dr. Hariharan Ramasangu

Head of Research, Relecura Technologies



Pen & Perspectives

II Generative AI: Adding a New Dimension to Technology II

In the realm of technological innovation, the rise of Generative Artificial Intelligence (AI) marks a pivotal turning point. Unlike traditional AI, which focuses on problem-solving or classification tasks based on predefined rules, Generative AI has the remarkable ability to create new content autonomously. From generating art and music to crafting human-like text and even designing products, Generative AI is ushering in a new era of creativity and possibility.

At its core, Generative AI operates on the principle of learning patterns from vast datasets and using that knowledge to generate new content. Through techniques like neural networks and deep learning, these systems can mimic and understand the nuances of various forms of human expression. This capability has profound implications across industries.

One of the most prominent applications of Generative AI lies in the realm of art and design. Artists and designers are harnessing their power to explore uncharted territories, pushing the boundaries of creativity beyond what was previously imaginable. Whether it's generating surreal landscapes, composing symphonies, or designing avant-garde fashion, Generative AI is revolutionizing the creative process by providing a tool that collaborates with human creators, offering fresh perspectives and novel ideas.

Moreover, Generative AI is transforming storytelling and content creation. Writers, journalists, and filmmakers are leveraging its ability to generate compelling narratives and engaging content. By analyzing vast amounts of text and multimedia, these systems can create personalized stories, news articles, and even entire scripts tailored to specific audiences. This not only streamlines the content creation process but also opens up new avenues for storytelling and audience engagement.

In addition to its creative applications, Generative AI is also driving innovation in product design and optimization. Companies are using it to generate and iterate through countless design possibilities, leading to the creation of more efficient and aesthetically pleasing products. Furthermore, Generative AI is playing a crucial role in fields like drug discovery, material science, and computational biology, where its ability to simulate and generate molecular structures is accelerating the pace of research and development.

However, alongside its promise, Generative AI also raises ethical and societal concerns, particularly regarding issues of intellectual property, authenticity, and the potential for misuse. As this technology continues to evolve, it's essential to navigate these challenges thoughtfully and responsibly, ensuring that Generative AI remains a force for positive change.

In conclusion, Generative AI represents a paradigm shift in technology, offering a new dimension of creativity and innovation. By unlocking the power of generative systems, we have the opportunity to reimagine the possibilities of human-machine collaboration and shape a future where creativity knows no bounds.



Pen & Perspectives

II GENERATIVE AI II

We live in an era where AI has taken over many simple tasks in our daily lives. The days that used to start with “Good morning, Dad and Mom” have now been replaced with “Good morning, Alexa”. AI has made life easier by helping with chores, reminding us of things to do, and assisting in maintaining diets or other tasks. As time passes, AI is rapidly growing. From work to leisure, AI assists both children and the elderly. Is this revolution beneficial or detrimental? As Stephen Hawking stated, “It will either be the best thing that has happened to us or the worst thing that has ever happened to us.” AI has made our lives easier, but it also has made the young minds lazier.

From simple reports to complex algorithms and programs, our minds depend on AI. From putting effort into finding information in hours to finding it out in seconds is the change that AI has brought into our daily lives. It was the mothers who were our day-to-day reminders but now it's our AI tool making life easier by unloading the extra work of a mother's life. Will the growth of it end up making us unemployed? AI tools are scary but reliable at the same time. It has got us benefits in integrating AI into our daily lives, one of the best ways to make us pleased with ourselves as we have a tool that tells us what is nice and what could be better. The drawback is that people will cut off the connection between humans and be alone with the AI tool. It comes with pros and cons, just a tool to simplify our lives and work.

ABDUL KHADER SAMWAN
6TH SEM, ME DEPARTMENT

II GENERATIVE AI: Redefining LivesII

In the era of technological innovation, Generative AI redefines creative boundaries, utilizing algorithms to mimic human creativity across images, text, and music. This marks a significant shift, promising vast expansion in technology sectors. The words you just read? They came from a Generative AI pretty cool, right? It's like a glimpse into what these smart systems can do. But hey, let's chat about why this matters. Think of Generative AI not just as some fancy tool for making stuff but as a game-changer in so many areas, we care about. In healthcare, AI whips up fake data for research, helping us discover new cures and boost patient care without spilling any personal secrets. And finance? It's getting a cool boost from AI that can spot market trends and catch fraud, making all that tricky data much easier to handle. Schools and the arts are joining the AI party, with learning stuff and artwork made just for you, sparking your interest and creativity. And for the tech-savvy, AI is easing the coding grind, speeding things up and cutting down frustrations. Us Bengalurians are using AI to check for faults in the tracks of our metros too! So, here's the scoop: Generative AI is more than just a fancy add-on; it's changing how we vibe with the digital world. As we explore AI's possibilities, staying true to our values is key, ensuring this tech does wonders for everyone. Guided wisely, AI is set to unlock our creative and problem-solving potential, leading us to a future where tech and imagination blend in amazing ways. Picture a world where technology meets our wildest dreams. P.S.: Just so you know, AI helped me with the grammar and crafting of those sentences. It's like having a smart buddy to ensure everything sounds spot on.

DAKSHA SUBRAMANYA
2ND SEM, AI & ML DEPARTMENT



Pen & Perspectives

GENERATIVE AI

Imagine this: You, a startup founder, ready to launch a new product. But resources are scarce—just you and a keyboard. In seconds, a cinematic ad video materializes with just a prompt. Yes, it's generative AI. Two years ago, this was just a phantom thought. Generative AI is a subset of deep learning within artificial intelligence (AI). It creates new content or data, such as images, videos, music, and even 3D models, without human effort. Generative models learn patterns from large datasets and generate new examples similar to the training data. For instance: text-to-text, text-to-video, text-to-music. When CHAT-GPT was launched in late 2022, it awakened the world to the transformative potential of generative AI. Will Smith's viral spaghetti videos of 2023 and 2024 showcase this evolution? OpenAI's SORA, though not yet publicly available, has already made waves with its groundbreaking trailer videos. Last year, 'Avengers' Director Joe Russo predicted that AI could be making movies in two years: it will engineer and change storytelling. That's where technology is advancing. This also means that many jobs across different industries like film, video production, advertising, and marketing could be at risk. But on the other hand, these fields are becoming more accessible to the public due to fierce competition among tech giants. Now an IT employee can also be a filmmaker. A musician can produce music videos without spending much. The rapid development of generative AI can understandably raise concerns; a coordinated international framework for regulation is essential. Governments must act swiftly to ensure the safe evolution of this technology and unlock its transformative potential.

SRI H BALAJI

6TH SEM, CSE DEPARTMENT

The Canvas of Creation: Generative AI Paints a New Reality

Imagine a world where technology doesn't just react, it invents. Where the boundaries between creation and consumption blur. This is the promise of generative AI, a revolutionary brushstroke on the canvas of technology. Gone are the days of simply feeding data into a machine. Generative AI takes the reins, learning the language of the world to craft entirely new realities. It dreams up never-before-seen molecules for medical breakthroughs, conjures music that stirs the soul, or paints landscapes that transport us to alien vistas. This isn't mere imitation; it's a collaboration between human vision and machine ingenuity. We provide the spark, the theme, the melody, and generative AI responds with a symphony of possibilities. It's a tool for artists to unshackle their imaginations, for scientists to explore uncharted territories, and for humanity to push the boundaries of what's thought possible. The implications are vast. We can personalize experiences like never before, with AI crafting custom learning materials or composing music that reflects our deepest emotions. Generative AI holds the key to a future brimming with innovation, a future where technology isn't just a mirror reflecting our world, but a paintbrush creating entirely new ones. And last, I want to say that a wise man once said "Only art can describe the artist more than any person...". And the above-mentioned art is nothing but the work of the artist that we are discussing. That is how we can realize the new dimensions that can be drawn by Generative AI in the canvas of technology.

ATIK ALI

6TH SEM, CSE DEPARTMENT



Artineers Alley



POETRY

GENERATIVE AI

In minds of code, where circuits hum and spin,
Generative AI, a world within,
Engineered dreams, by logic designed,
Students' quests for knowledge refined.

Bytes and bits in digital dance,
Learning pathways, a coding trance,
Where algorithms map the unseen,
Innovating realms, where ideas convene.

Scholars' hands, algorithms they weave,
Sculpting futures, they dare to believe,
In this symphony of bytes and gears,
Generative AI, whispering in ears.

A tapestry woven with digital art,
Where engineering and minds impart,
A future built on lines of code,
Generative AI, our innovation ode.

-K AARYAN SVG
6TH SEM, ROBOTICS

Whispers of Dawn: Finding Peace in Nature

In the quiet of the morning mist
I find solace in the silence
A gentle breeze whispers secrets
Through the branches of the trees

Birds sing their morning songs
As the sun rises in the sky
I am filled with a sense of peace
And gratitude for this moment

Nature surrounds me with beauty
In the colors of the flowers
And the songs of the birds
I am reminded of the wonders of the world

I breathe in the freshness of the air
And feel the earth beneath my feet
In this moment, I am alive
And grateful for the gift of life.

-ChatGPT

FOUR-IER LIFE.

A new day and a new start, I reached my B. Tech life
Planned to enjoy the four years
But ended up learning Four-ier

The boys planned a trip to Goa
but ended up in the canteen as usual.
Girls planning for a night out but permission denied
Like our silly ideas dismissed by our teachers

Four years or Fourier series, all I wanted was a memorable life,
Not knowing the time flew before I could get a hold of it
I Will miss out on the fun spent with my buddies.
Lastly, finding out newbies screaming out four years
Who shall tell them they will end up with the Fourier series?
Hehe!!!!

-Abdul Khadar Samwan
6TH SEM, ME DEPARTMENT



Artineers Alley



Photography



Two phases in to each other- As kid we want to grow with our friends and then later we revisits the memories sitting with strangers.

- Atik Ali
6th sem, CSE



Just feeling like I'm top of the world.

- Adarsh S Betageri
6th sem ,ECE



Horses are like potato chips you can't just have

- Jijith CC
6th sem, ASE



Squirrels nature's acrobats

- Jijith CC
6th sem, ASE



Experience Xchange



DESIGN OF SOCCER ATTACKER BOT

Types of RC Cars

- Soccer goal-keeper bot
- Soccer attacker bot
- All-terrain bot
- Pick and place bot
- Race bot

All the above RC cars except pick and place and the soccer goalkeeper bot, have the same electronic circuit only change is its over body and coding Soccer goal keeper. For soccer, the bot should be a bit strong and fast so, we built the frame with metal rods.

We used wooden blocks to cover it and a metal rod extension attached to the frame cover with wood to hold the ball a radio frequency receiver to control the bot using a radio frequency transmitter, Arduino mega to program and control the wheels, normal 10cm diameter wheels with rubber grip for better traction, double H-bridge L298N motor driver to control the bot, Bread and jumper wires to assemble the electronic connections.

Components Used

- Radio-frequency receiver and transmitter
- Iron Solid Rods
- Wooden Blocks
- Bluetooth Module
- Arduino Mega (Arduino IDE for programming)
- Johnson 100 RPM Motors
- L298N Motor Driver
- Mecanum Wheels
- 10cm diameter wheels
- 5,000 mAh Battery
- Breadboard
- Jumper wires

Experience Xchange

Design and construction

The first step we followed was to make a rough drawing of how it looks with exact dimensions, then we created the outer body using metal rods, and wood and secured it with nuts and bolts, we created the code and built the electronics connection concerning the coding or vice versa. We test whether it works based on our requirements and then make the changes accordingly. And, finally, we combine the outer body with the electronic components and test it.

Control system

1. Arduino works as the control system whereas the transmitter sends the radio frequency and the receiver is used to radio frequency then this signal is interrupted by the Arduino mega which controls the motor.
2. Race car and all-terrain bots are also built the same as the soccer attacker bot
3. In all terrains we used the programming was very complex we made it work proper
4. even after it flips upside down, we can split the control between left and right
5. wheels with just a switch in the transmitter But we used acrylic sheets instead of metal and wood
6. Pick and place bot is also the same as above but it has an arm used to perform pick and place operation. Arm is done using 3d printing
7. Both the race bot and soccer attacker bot use the same code
8. To replicate it make the connection as mentioned in the code and connect the receiver signal pin to pin 19 in the Arduino mega
9. And give a power supply to the receiver from Arduino

* All the codes are mentioned in the below link

https://drive.google.com/drive/folders/1htoOA2m7wqkqFi6H_I02Zf-LYH8tIT3I

**BY RANJITH, ABHIJEETH U ACHAR, DHANUSH B M, ADITHI R
HARDIKAR, AARYAN., 3RD YEAR, ROBOTICS**



Kudos!!

MRS. VASANTHAVALLI S,
Assistant Professor, ECE
has completed the NPTEL Course on
BIOMEDICAL SIGNAL PROCESSING
offered by IIT Kharagpur with **88%** and
has been declared **Topper** of the Course
on **9th May 2024**



DR. VARUN D,
Assistant Professor, ECE
has Successfully Completed
IEEE AESS RADAR CHALLENGE
2024, RADARCONF'24
on **29th May 2024**



Mr. Satish Kumar KV and Mr. Parthsarthy
Senior lab Assistants, ECE Department
have secured
Runner-up position as a part of Team ICT in
Cricket event during Inter Faculty Sports
competition for staffs held
on **28th June 2024**



Kudos!!

In **May 2024** Rashmi S, under the mentorship of **Dr. B K Swathi Prasad** and **being part of Team ChandraYatrika** achieved an impressive milestone by qualifying in the first round of the **National-level ISRO Robotic Challenge 2024**. The team presented innovative concepts for a lunar rover designed to traverse the moon's surface, collect samples, and deposit them in specified locations.

Team Members

- Rashmi S (6th Sem ECE)
- Ranjith (5th Sem MME)
- Kowshik R (5th Sem AIML)
- Ayush Kumar Singh (5th Sem AIML)
- Daksha Subramanya (2nd Sem AIML)
- Tilatjabeen R Noorie (5th Sem ASE)
- Harshith R (3rd Sem AIML)
- Shuchi Makhija (2nd Sem MC)
- Karthik R P (3rd Sem ASE)
- Anirudh Maruti Killekar (3rd Sem ASE)



On 11th May 2024, Dileep Kumar M N, Muttu Awatageri, Sagar, and Sanjay Shilavantar (4th Year Students) received a project award for the project titled **Development of Vehicle Prototype and Implementation of Advanced Safety Features** under the guidance of **Dr. Sunil Y and Dr. Bharath Kumara**.



Kudos!!



BEST PROJECT AWARD 11TH MAY, 2024

Kruthika B S, Megha, Purvi Kolhar and Sindhu V (ECE, 4th year) have been awarded best project award for the project titled "**Development of Optimal Distance of Wireless Power Transfer for Dynamic Charging System**" under the mentorship of Dr. L S Praveen (Assistant Professor, ECE Department) and Dr. Anusha Vadde (Assistant Professor, EEE Department) .



COMPETING WITH 6 FRANCHISES TEAM **ABHIMANYU** HAS SECURED RUNNER UP POSITION IN **RAMAIAH KABADDI TEAM LEAGUE -1** HELD ON **4TH MARCH 2024**.

Team members:

Karthik V, Sudeep N, Sudeep M, Lohit R Vaidya, Adarsh, Rohit, Ravi Manmi, Shashank U, Prajwal R, Prajwal, Manikant, Uday Gowda



Inside Events



Students had an amazing experience attending the "Digital Image and Video Coding for Next Generation Multimedia Applications" workshop, organized by the Department of ECE in association with IEEE SB, Ramaiah University of Applied Sciences. The event was conducted between July 8th and 13th, 2024, and was taught by **Dr. Shreyanka S.**, Assistant Professor, Department of ECE, RUAS.

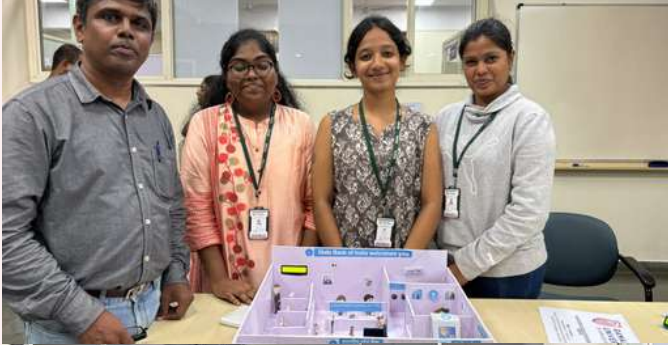


← **Industrial Visit to U R Rao Satellite Center, Bengaluru on 9th July 2024 with ECE 4th Semester Students.**

Industrial Visit to Master Control Facility, Hasan on 28th June 2024 with ECE 6th Semester Students.



Inside Events



As a part of Project-based Learning (PBL) on 17th June 2024, a mini project exhibition has been arranged for the 4th semester focusing on **Microprocessor and Microcontroller** project under the Guidance of **Mr. Vishwanath K, Assistant Professor, ECE, Department**



Dr. Christy Bobby, Dr. B R Karthikeyan, Mrs. Vasanthvalli S and Ms. Sushma visited IIT BHU, Biomedical Department, Varanasi to Discuss the ongoing **LSRB Project** and future collaborations from 4th to 6th July 2024.



Altruists



DR. HARIHARAN RAMASANGU
HEAD OF RESEARCH, RELECURA
TECHNOLOGIES



ABDUL KHADER SAMWAN
6TH SEM, MME



ATIK ALI
6TH SEM, CSE



K AARYAN SVG
6TH SEM, ROBOTICS



DAKSHA SUBRAMANYA
2ND SEM, AI & ML



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E-Mazine is A quarterly magazine from the Department of Electronics and Communication Engineering, MS Ramaiah University of Applied Sciences. It compiles thoughts about buzzing technologies. This also logs the events, achievements and successes of our Students, Faculties and Alumni.



“Of all things,
I liked books best.”

Nikola Tesla



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