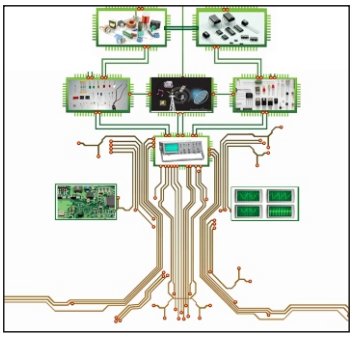
ELECTRONICA

Newsletter

Department of Electronics & Communication Engineering



Volume 8 | Issue 2 | Jan - Jun 2023

Vision and Mission of the Institute

Vision

- To be one of the premier Institutes of Engineering and Management education in the country

Mission

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

Objectives

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

Vision and Mission of the Department

Vision

- To be a renowned department for education in Electronics and Communication Engineering in Karnataka State, moulding students into professional engineers

Mission

- To provide teaching - learning process in Electronics and Communication Engineering that will make students competitive and innovative to adapt to needs of industry and higher learning
- To imbibe professional ethics, team spirit and leadership qualities to succeed in changing technological world
- To inculcate empathy for societal needs and concern for environment in engineering design and practice

Program Education Objectives

After 2 to 3 years of graduation, the students will have the ability to:

- Analyze, design and implement solutions in Electronics and Communication Engineering and adapt to changes in technology by self/continuous learning
- Engage in higher learning and contribute to technological innovations
- Work with professional ethics as an individual or as a team player to realize the goals of the project or the organization
- Work with respect for societal values and concern for environment in implementing engineering solutions

This edition of Electronica is dedicated to Pierre Agostini, Ferenc Krausz, and Anne L'Huillier who were jointly awarded the 2023 Nobel Prize in Physics for experimental methods that generate attosecond pulses of light for the study of Electron Dynamics in Matter.

What's inside…

B. N. M. Institute of Technology

An Autonomous Institution under VTU. Approved by AICTE.

Post box No. 7087, 27th Cross, 12th Main, Banashankari 2nd Stage, Bengaluru- 560070, INDIA

Ph: 91-80- 26711780/81/82 Email: principal@bnmit.in, bnmitprincipal@gmail.com, www. bnmit.org

Vidyayāmruthamashnuthe

From the Editors' Desk

"Technology is best when it brings people together." – Matt Mullenweg

Dear Readers,

In the symphony of technology, we proudly unveil ELECTRONICA—Volume 8, Issue 2, January- June 2023. A hearty welcome to our esteemed contributors, whose passion and insights have shaped this edition and our cherished readers without whom this journey would be incomplete.

This edition is more than a collection of articles; it celebrates the belief that technology unites us. Our students, the heartbeat of innovation, delve into the intricate realms of Electronics and Communication Engineering, sharing their discoveries and sparking conversations that transcend boundaries. To our contributors, your dedication is the pulse that propels this tapestry forward. Thank you for enriching the narrative with your invaluable perspectives.

ELECTRONICA serves as a platform for expression and exploration, empowering our students to pioneer the future of technology. As we navigate the dynamic landscape of Electronics and Communication Engineering, we invite you to join us on this transformative journey.

Amidst these pages, you'll discover the accomplishments and milestones of our community. From groundbreaking research to collaborative events, the Department of Electronics and Communication Engineering at BNMIT continues to be a crucible of innovation. These endeavors are not merely occurrences but collaborative spaces where ideas converge and knowledge flourishes.

To our readers, your unwavering support fuels our commitment to exceed expectations. Your enthusiasm inspires us to deliver content that transcends the ordinary. We invite you to immerse yourselves in this edition, where unity, innovation, and community take center stage.

Editorial Team

About the Department

The Department of Electronics and Communication Engineering started in the year 2001. The department runs two programs: B.E. and M.Tech. (VLSI Design and Embedded Systems), affiliated to VTU. The department also has a VTU-recognized Research Centre and offers a Ph.D. program. Many researchers pursue their doctoral programs here and presently there are seven registered candidates. The department has a team of highly qualified and dedicated staff with teaching, research, and industrial experience. Well-equipped laboratories with state-of-the-art infrastructure and classrooms with LED projectors provide an enhanced learning environment to cater to the needs of the prodigious engineers of tomorrow. Most of the lectures and practicals are video recorded and are made available to the students through an online platform, the BNMIT VROOK Learning Management System.

Our students have performed excellently in academics and hence secured twenty-two university ranks since 2005. The students undertake innovative projects, internship training in industries, and academic projects in reputed organisations. They regularly participate in inter-college and intra-college technical, cultural, and sports events and have regularly brought laurels for the department. The students participate in hackathons, workshops, webinars, and quizzes, present papers at reputed conferences, and publish papers in reputed journals. Faculty Development Programs, Workshops, Skill Development Programs, Seminars, and Invited Talks for students and staff are organized for continuous learning and periodic updation of knowledge and skills.

Dr. P. A. Vijaya
Professor & Head, Dept. of ECE

TECHNICAL ARTICLES

Breaking New Ground: The Power of Real-Time SLAM for Autonomous Systems

Real-time SLAM (Simultaneous Localization and Mapping) technology is propelling the field of robotics and autonomous systems to new heights of navigation efficiency. This advanced computational algorithm is a game-changer that enables autonomous robots to accurately map their surroundings and pinpoint their location in real-time, allowing them to operate efficiently and safely in unpredictable and dynamic environments. In industries such as logistics and manufacturing, speed, precision, and productivity are critical factors. Real-time SLAM technology provides accurate and real-time location information, allowing autonomous systems to optimize their routes, avoid obstacles, and make rapid decisions based on changing environmental conditions. This capability is essential for ensuring maximum efficiency and productivity in these industries.

Real-time SLAM algorithms utilize advanced sensor processing techniques to create a real-time map of the environment and track the robot's position within it. Multiple sensors, including cameras, LIDAR, RADAR, and IMUs, provide data that is fused to accurately estimate the robot's position and orientation in real-time. However, processing this large amount of sensor data in real-time poses a significant challenge. Advanced techniques, such as feature extraction, image segmentation, and data fusion, are employed to extract relevant information and filter out noise and errors from the sensor data. Real-time SLAM technology is a game-changer for autonomous robotics, enabling safe and efficient navigation in dynamic and unpredictable environments. Its continuous updates of the robot's position and environment mapping allow for rapid response to environmental changes and obstacle avoidance. Applications range from warehouse automation and logistics to healthcare and emergency response, making it a critical technology for the advancement of robotics and autonomous systems.

Implementing real-time SLAM in robotics and autonomous systems poses several challenges that need to be addressed. One significant obstacle is the need for processing power to handle the massive amounts of data generated by multiple sensors. This necessitates the use of advanced hardware and software solutions, such as parallel processing and GPUs, to enable real-time processing of sensor data. Ensuring the accuracy and reliability of the sensor data is another challenge. Real-time SLAM algorithms must filter out noise and errors in the sensor data to ensure precise mapping and positioning of the robot. Advanced techniques, such as simultaneous localization and mapping (SLAM), sensor fusion, and Kalman filtering, are utilized to enhance the accuracy and reliability of the sensor data. Additionally, real-time SLAM algorithms must be adaptable to environmental changes, such as moving obstacles or varying lighting conditions. This necessitates the use of advanced algorithms that can rapidly update the robot's position and environment mapping in real-time.

Real-time SLAM technology is a versatile technology with numerous applications across various industries. In logistics and warehousing, it can enable autonomous robots to navigate through complex environments quickly and efficiently, improving the efficiency of warehouse operations, reducing costs, and increasing safety by reducing the need for human intervention. In manufacturing, real-time SLAM can help autonomous robots navigate through complex assembly lines, enhancing efficiency and accuracy. It can also facilitate quality control robots in quickly and accurately detecting defects in products, thus improving overall production quality. It can enable autonomous robots to navigate through hospitals, deliver medications and supplies, and assist with patient care. Moreover, real-time SLAM can be used to help robots perform surgeries with higher accuracy and precision, reducing the risk of human error.

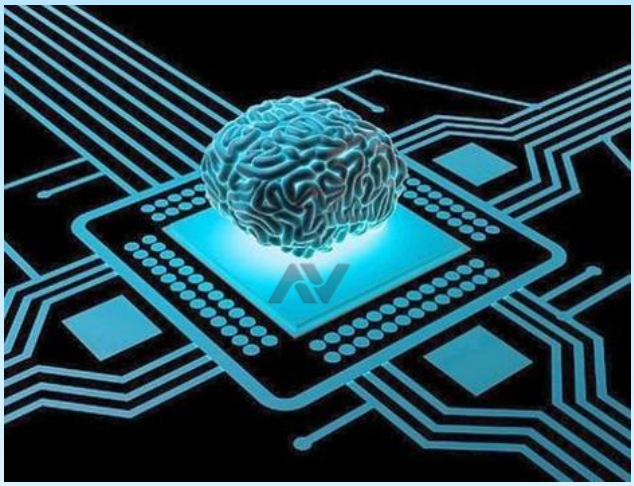
Real-time SLAM technology has opened up new frontiers in the field of robotics and autonomous systems, revolutionizing the way we navigate complex environments. Real-time SLAM technology integrates advanced sensors and machine learning, enabling robots to adapt and make real-time decisions. Improved mapping algorithms provide a better understanding of the environment, crucial for industries such as logistics, manufacturing, and healthcare. In the realm of collaborative robotics, real-time SLAM technology is a key player, facilitating seamless communication and data sharing among multiple robots in real-time.

References

Alif Ridzuan Khairuddin, Mohamad Shukor Talib, Habibollah Haron, “Review on simultaneous localization and mapping [SLAM]”, IEEE International Conference on Control System, Computing and Engineering [ICCSCE], 2015

Anaghaa R
III ECE A

Neuromorphic Computing



Neuromorphic computing, drawing inspiration from biological entities such as neural pathways and synapses, has implemented the theory of human brain modelling by connecting feigned neurons and synapses to reveal new neuroscience concepts. Neuro-inspired models, algorithms, learning approaches, operation systems for the exploration of the neuromorphic system, etc are the brainchildren of many researchers attempting to apply this dynamic model in their corresponding fields. Neuromorphic systems administer a more unique and novel approach when it comes to solutions to the artificial intelligence discipline as opposed to traditional models. This article presents a brief overview of Neuromorphic computing and its scope.

The behaviour of the network's artificial neurons is fashioned after that of biological neurons. Each neuron in the network gets input from other neurons, analyses that information, and then transmits output to the rest of the network's neurons. The potency of neural connections is modified based on the input and output patterns, thus allowing the network to learn and acclimate over time. Neuromorphic computing can process information in ways that mundane computer systems cannot. Data is processed linearly in classical computer systems, with each step dependent on the result of the preceding phase. Neuromorphic computing systems, on the other hand, process data in a highly parallel manner, with several separate calculations taking place at the same time. Additionally, since the neural network can be resistant to noise and faults, it proves to be a viable gateway for analog implementation. Neuromorphic models have been actualized, thanks to an algorithm called the Hopfield algorithm.

The Hopfield algorithm is a type of math problem that tries to help computers remember things, like how we remember things in our brains. Think of it like a puzzle that a computer needs to solve. Imagine you have a bunch of puzzle pieces with different shapes and colours, and you need to figure out how to fit them together to make a coherent finished puzzle. The Hopfield algorithm is like a special set of rules that the computer uses to try and solve the puzzle. The computer looks at each puzzle piece and tries to discern its position based on its characteristics. It then tries to fit it together with the other puzzle pieces, like how we fit memories together in our brains, which is guided by this algorithm.

Speaking from a hardware-oriented perspective, logic gates are an indispensable part of neuromorphic computing. For example, you might use an AND gate and a NOT gate together to create a circuit that only outputs a signal if one input is on but the other is off. Likewise, latches are used to store information and allow for the creation of more complex circuits. They are often used in combination with logic gates and other circuit elements to create networks of neurons and synapses, which bequeaths the neuromorphic system with the power of parallel processing.

This parallel processing capability allows neuromorphic computing systems to perform tasks with greater competency and accuracy as opposed to traditional computing systems. For example, a neuromorphic computing system can recognize patterns in an image with greater accuracy in contrast to a traditional image recognition system, because it can process the image in a highly parallel fashion.

While neuromorphic computing is still in its pupillage, it has already shown great promise in several applications, and researchers are advancing to reconnoitre its potential for a wide range of fields. For example, researchers are using neuromorphic computing to develop robots that can learn and adapt to their environment and to ameliorate image recognition and speech recognition systems. It has proven to be more than propitious in shaping the futures of autonomous vehicles, medical diagnosis, natural language processing, decision-making, and drug discovery, to name a few.

In a nutshell, neuromorphic computing is a type of computing that is based on the structure and function of the human brain. It consists of a synapse, which is a bridge between two different parts of the network. It helps electrical signals move from one place to another. Another important part of a neuromorphic network is a neuron. Neurons are like little cells in our brains that help us think and feel. In a neuromorphic network, they help process information and make decisions.

Finally, a neuromorphic network needs a special type of computer chip that's designed to work like our brains. These chips are called neuromorphic chips, and they are built to be very efficient at processing information. It uses artificial neural networks to process information in a highly parallel fashion, allowing it to perform complex tasks with greater efficiency and accuracy than traditional computing systems. It is safe, therefore to conclude that the field of Neuromorphic computing shows great promise and could be the future of Artificial Intelligence.

References:

[1] Z. Yu, A. M. Abdulghani, A. Zahid, H. Heidari, M. A. Imran and Q. H. Abbasi, "An Overview of Neuromorphic Computing for Artificial Intelligence Enabled Hardware-Based Hopfield Neural Network," in IEEE Access, vol. 8, pp. 67085-67099, 2020.

[2] Hitesh Dureja, Yash Garg, Bhavya Kumar, and Dr. Rishu Chaujar, "Review Research Paper Neuromorphic Computing and Applications", in IRJMETS, vol 3, issue 11

Anuradha Shenoy
III ECE A

STAFF ACHIVEMENTS

Awards and Recognition

- **Dr. Yasha Jyothi Shirur** was an Expert Committee Member of the Electronics & Telecommunication Engineering Division at The Institution of Engineers (India), Karnataka State Centre, Bengaluru for the year 2022-2023.
- **Mrs. Ashwini S Savanth, Mrs. Priya R Sankpal, Mrs. Keerthi Kulkarni, Mrs. Vrunda Kusunur,** and **Mr. N Sheshaprasad,** faculties from the Department of ECE were awarded PhD degrees in the VTU Convocation held on 24th February 2023.
- **Dr. Chaitra N**, Associate Professor, Department of ECE was felicitated by the Institution of Engineers on "International Women's Day" held on 8th March 2023. She was conferred with the "Eminent Woman Engineer" award by The Institution of Engineers (India), Karnataka State Centre, Bengaluru.
- **Dr. P A Vijaya** received the Women Achievers Award conducted by the Confederation of Indian MSME in Electronics System Design and Manufacturing & IT, Women Cyber Security Cell, and GOCYBEX on 25th March 2023.
- **Dr. Jyothi R Munavalli** was awarded Gurukul's Bharat Gaurav Puruskar-2023 as "Best Researcher in Technology in Healthcare" organized by J.S. University, Shikohabad and ISRHECT, Uttar Pradesh on 1st April 2023.
- **Mrs. Rashmi Bhaskar**, Assistant Professor, Department of ECE defended her PhD thesis titled "Design of 4S for UEM - A Smart Sensor Surveillance System for Urban Environment Monitoring" on 4th March 2023.
- **Dr. Yasha Jyothi Shirur** was the Technical Program Chair at the 12th IEEE International Conference on Communication Systems and Network Technologies (CSNT-2023) held on 8th -9th April 2023 at the Technocrats Institute of Technology (Excellence), Bhopal, Madhya Pradesh.

Patents and Copyrights

- **Dr. Bindu S**, and Dr. Prathibha B S, filed a patent titled "A Volatile Components Collection Unit with Incineration of Crude Plant Materials" Application No: 202341001510, 07-01-2023.
- **Dr. Bindu S**, Dr. Prathibha B S, Reetha G P, Jayalakshmi D G, Shaik Riyaz Ur Roshan, Mohammed Ishaq Sharieff filed a patent titled "Preparation Method of Water Filter Cartridge using Corncob Active Carbon and Water Filter Cartridge thereof" Application No: 202341001641, Reference No: TEMP/E-1/1584/2023- CHE, 8-01-2023.
- **Dr. Bindu S**, Sri Mohan Kishore D, Dr. N K Manjunath, **Dr. Jyoti R Munavalli,** Dr L Vijayashree filed a copyright for "Smart yoga instructor program/code for estimating and correcting yoga posture in real-time (Quadrant Based Correction) using Python" with Registration Number SW-15954/2023, 2-2-2023.
- Dr. Prathibha B S, **Dr. Bindu**, and Shwethashree B filed a design patent titled "A Smart IoT Based Solar Assisted Water Purification System for Purifying Borewell Water using Solar" on 22nd March 2023.

Journal Publications

- D. Mohan Kishore, S. **Bindu S**, and Nandi Krishnamurthy Manjunath published a paper titled "Smart Yoga Instructor for Guiding and Correcting Yoga Postures in Real Time" in International Journal of Yoga, Volume 15, Issue 3, 16th January 2023 (Web of Science).
- Ganesh-Babu B Subburaman, **Jyoti R Munavalli**, Thulasiraj R, Helen Mertens, Carroll Webers, Shyam Vasudeva Rao, Frits Van Merode published a paper titled "Managing Outpatient Cycle Times in Hospitals Using Integrated Closed-Loop Approaches", in Health Services Insights, Volume 16, January 2023. (Scopus & Web of Science indexed)
- **Sunitha S V**, Shivaputra, S Soundeswaran published a paper titled "Comparative Landmark Detection on Stops of Dysarthric Speech" in Elsevier: Biomedical Signal Processing and Control Journal (BSPC), Vol.No:79, January 2023
- **Keerti Kulkarni, Dr. PA Vijaya** published a paper titled "A Majority Voting Ensemble Approach for LULC Classification of Satellite Images" in Journal of The Institution of Engineers (India): Series B, 104, 327-333, February 2023, (Q3) https://doi.org/10.1007/s40031-023-00865-4
- Bharathi M, **Dr. Yasha Jyothi M** published a paper titled "Distributed Arithmetic Mechanization of Multiply and Accumulate Core for DSP Applications" in Journal of Survey in Fisheries Sciences, Scopus indexed Q3 Rated journal 10(2S) 595-603, March 2023.
- Mrs. Supriya P, Dr. Parveen Kumar, **Dr. D Bhuvana Suganthi** published a paper titled "Green House Monitoring and Control Using IoT" in the Indian Patent Journal Publication, Application No.202321016741 A, 31st March 2023.
- **Sujaya B L, Rashmi S Bhaskar and Vrunda Kusanur** published a paper titled "Study of Modeling Techniques in Intrabody Communication" in the International Journal of Creative Research Thoughts (IJCRT), volume 11, Issue 6, June 2023, ISSN: 2320-2882.
- **Rashmi S Bhaskar, Sujaya B L and Vrunda Kusanur** published a paper titled "Smart and Secure Urban Environment Monitoring Using Wireless Sensor Networks" in the International Journal of Creative Research

Paper Publications at Conferences

- M Bharathi, **Dr. Yasha Jyothi M Shirur** published a paper titled "VLSI Synthesis of Multiply and Accumulate Structures Using Distributed Arithmetic" at the International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics (ICIITCEE-2023) 27th - 28th January 2023 pp. 166-169, doi: 10.1109/IITCEE57236.2023.10091002 and got published in IEEE Xplore Digital Library. https://ieeexplore.ieee.org/document/10091002
- **Bindu S, Shesha Prasad N, Kiran K N,** and **P A Vijaya** presented a paper titled "Detection of Human Brain Tumors using a UWB patch Antenna at 28GHz" at an International Conference on Intelligent and Innovative Technologies in Computing, Electrical, and Electronics held on 27-28th January 2023.
- **Bindu S, Priyadarshini K. Desai** presented a paper titled "Impact of Dielectric substrate on the performance of microstrip patch antenna at millimetre wave frequency" at the International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held on 27-28th January 2023
- **Dr. Chaitra N** and Murali Mohan D presented a paper titled "Nonlinear Prediction of Speech Signal using Short Term Forecasting Algorithm," at an International Conference on Intelligent and Innovative Technologies in Computing, Electrical, and Electronics, organised by BNM Institute of Technology on 27-28th January 2023.
- M Sreenath, **Dr. P. A. Vijaya** published a paper titled "Comparative Study of Scheduling Algorithms for Multiprocessor System" at the International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics IEEE Conference ICIITCEE, held on 27-28th Jan 2023.

- **Dr.Bhuvana Suganthi**, M.Shivaramaih, et al. presented a paper titled "Design of 64-bit Floating-Point Arithmetic and Logical Complex Operation for High-Speed Processing", at the IEEE International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics, January 2023.
- M Bharathi, C H Vinay, C Sandhya Rani, A Uday Kiran, G Lakshmi Chaithanya, **Dr. Yasha Jyothi M Shirur** presented a paper titled "UVM Verification Platform-based Distributed Arithmetic ALU" at the International Conference on Computational Sciences and Sustainable Technologies (ICCSST -2023) held on 8th and 9th May 2023 organized by the Department of Computer Science CHRIST (Deemed to be University), Bangalore, India and Modern College of Business and Science Muscat, OMAN. Published in Springer.
- **Anuradha J.P, Vyasaraj T, and Sudarshan** published a paper titled "EmoCop: Crowd Emotion Analyser" at the International Conference on Advances in Engineering and Technology for Intelligent Systems ICAETTS held from 16th to 18th May 2023, organized by Department of Electronics and Telecommunication Engineering, DSCE, Bangalore
- **Sunitha S V,** Shivaputra. S, Soundeswaran published a paper titled "Enhancing the intelligibility of Dysarthric Speech" at the International Conference on Advances in Engineering and Technology for Intelligent Systems ICAETTS-held from 16th to 18th May 2023, organized by the Department of Electronics and Telecommunication Engineering, DSCE, Bangalore (Scopus Indexed)
- **Keerti Kulkarni, Dr. P. A. Vijaya** presented a paper titled "Analysis of the Measurement Matrices for Compressive Sensing of Signals" in (IEEE Conference) 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), Salem, India, 2023, pp. 1463-1466, doi: 10.1109/ICAAIC56838.2023.10140737.

Books and Book Chapters

- **Dr. D. Bhuvana Suganthi**, Dr Vidyalakshmi M K, and Dr. Punitha A. published a book chapter on "A Review on Transdisciplinary Approach and Challenges on Wearable Technology" in Recent Progress in Science and Technology, Volume 7, BP International Publisher, March 2023. https://doi.org/10.9734/bpi/rpst/v7/5851A
- **Priya R Sankpal** and **P. A. Vijaya** published a book chapter on "Specific Security Mechanisms for Information Protection and Transmission Over Open Networks", in Advancements in Cybercrime Investigation and Digital Forensics, Apple Academic Press, Taylor & Francis, ISBN: 9781774913031, April 2023.
- **Munavalli, J. R., Bindu S., Shirur, Y. J**. published a book chapter titled "Applications of Internet of Things with Deep Learning" In T. Kavitha, G. Senbagavalli, D. Koundal, Y. Guo, & D. Jain (Ed.), Convergence of Deep Learning and Internet of Things: Computing and Technology (pp. 285-307). 2023 IGI Global. https://doi.org/10.4018/978-1-6684-6275-1.ch014.
- **Munavalli, J. R., Sankpal, P. R., Sumathi, A.**, and Jayashree M. Oli published a book chapter titled "Introduction to Brain–Computer Interface Applications and Challenges." In M.G. Sumithra, Rajesh Kumar Dhanaraj, Mariofanna Milanova, Balamurugan Balusamy, Chandran Venkatesan (Eds), Brain-Computer Interface: Using Deep Learning Applications. (pp. 1-24) (2023). Wiley-Scrivener Publishing LLC. https://doi.org/10.1002/9781119857655.ch1
- **Dr.Bhuvana Suganthi**, et.al., published a book chapter titled "Secure Communication using Distributed Caching Techniques", in Novel Research Aspects in Mathematical and Computer Science Vol. 6/ Chapter No. 5/ DOI: 10.9734/bpi/nramcs/v6/3327, BP publications, 2023

STUDENT ACHIVEMENTS

Awards and Recognition

- Students of UG and PG from the Department of ECE bagged five University Ranks in VTU Convocation held on 24th February 2023. The rank holders are B.E (ECE): **Karthik Bharadwaj** (2nd Rank), **Merlin Andriana Lobo** (3rd Rank), Archana C M (9th Rank). MTech (VLSI & ES): **Roopa E** (1st Rank), **Meghana M** (6th Rank).
- NCC cadets were recognized for their hard work, dedication, and passion at the Republic Day camp. JUO **Srinidhi** brought home the bronze medal for being the best cadet overall in India, while CPL **Pournashri** shined with a silver medal in the group dance competition. They were also awarded the Deputy Directorate General Commendation.

Publications in Journals

- **Raksha S, Samhitha Bhat M, Varsha M, and Prof. Sudarshan** published a paper titled "DRISHTI – A Portable Prototype for Visually Impaired" in the International Research Journal of Engineering and Technology (IRJET) Volume: 10 Issue: 02, Feb 2023 www.irjet.net p-ISSN: 2395-0072, e-ISSN: 2395-0056
- **Indhu G, Lakshmi P, Sai Harshitha D., Bhuvana Suganthi D** published a paper titled "Design and Implementation of Low Power Counters Using Reversible Logic Gates" in TIJER ISSN 2349-9249 May 2023 Volume 1.0, Issue 5, doi: https://www.tijer.org/papers/TIJER2305203.pdf
- **N Shesha Prasad, Nikhil Sharma, Puneeth Shenoy, and Sumit Kumar Shukla** published a paper titled "Skin cancer detection using microstrip antenna" in the International Journal of Scientific Research in Engineering and Management (IJSREM), May 2023.
- **Sujaya B L, Rohan S, Suhas R Vittal, and Prajwal Anand** published a paper titled "Enhancing Privacy in Edge Devices using Federated Learning" in the IOSR Journal of Computer Engineering, IOSR-JCE, Volume 25, Issue 3, pp 46-49, June 2023.

Paper publications in Conferences

- **Dr.Yasha Jyothi M Shirur, Nithin Iyer K S, Sujay K S, Uday V N** presented a paper titled "Design and Implementation of Synthesizable Two-Level Cryptosystem for High-Security Enabled Applications" in the International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics. (ICIITCEE-2023) held during 27th and 28th January 2023 pp. 922-926, doi: 10.1109/IITCEE57236.2023.10091066
- **Gayatri S, Challa Bhavya, Esha S, Dr. Yasha Jyothi M Shirur** presented a paper titled "Design and Implementation of Arithmetic Based FIR Filters for DSP Application" at the International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics (ICIITCEE-2023) Organized by B N M Institute of Technology during 27th and 28th January 2023, pp. 782-787, doi: 10.1109/IITCEE57236.2023.10090953.
- **Rekha P, Sumathi, Shisheer S Kaushik, Kiran B, and Chidananda S P** presented a paper titled "Wearable Antenna for Remote Health Monitoring" at the 2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held during the 27-28th January 2023 (ICIITCEE-2023).
- **Srinivasan R, Sachith S S, Vrunda Kusanur, Nandish B V, and Pavan Kumar Shetty** presented a paper titled "Deep Learning Based Brain Tumor Detection and Recommendation System" in 2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held during 27-28th January 2023 (ICIITCEE-2023). doi:10.1109/IITCEE57236.2023.10091009 (Scopus)
- **Adithya B. R, Amit. S. Kadam, A. Kulkarni, and Priya R. Sankpal** presented a paper titled "IoT-based Smart Water Meter for Water Management" at the 2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held during the 27-28th January 2023 (ICIITCEE-2023), pp. 674-678, doi: 0.1109/IITCEE57236.2023.10091019 (Web of Science).
- **Kavipriya M, Neha M Harapanhalli, Ishwari Jigajinni, and Kiran K N** presented a paper titled "Hydrocapsule: Water Generation using Peltier and electricity generation by electrolysis of water" at the 2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held during 27-28th January 2023 (ICIITCEE-2023). Date added to IEEE Explore: 10 April 2023.
- **Hamsini U, Hemanth Prasad N, Kathyayani Bhatta, Lakshmi Bhaskar** presented a paper titled "Automated Awning System" in 2023 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held during 27-28th January 2023 (ICIITCEE-2023), pp. 674-678, doi:10.1109/IITCEE57236.2023.10090905
- **Shreyas G. S., Thrupthi N., and Priya R. Sankpal** presented a paper titled "Quad Copter Based Autonomous Aerial Medical Assistance Using GPS Tracker" at the 4th International Conference on Multidisciplinary Innovation in Academic Research (IFERP) – 2023 organized by Institute for Engineering Research and Publication Tamil Nadu Section, 17th – 18th March 2023, Chennai, India (Web of Science).

- **M. Bharathi, G Amrutha, B Divya, Bharadwaj Karthik, B Uday Kiran, Dr.Yasha Jyothi M Shirur** presented a paper titled "Designing 64-bit LUT Based FFT Structure for High-Speed DSP Applications" in 12th IEEE International Conference on Communication Systems and Network Technologies (CSNY-2023) organized by Technocrats Institute of Technology (Excellence) Bhopal, Madhya Pradesh section Flagship Conference during 8th and 9th of April 2023.
- **Tejas S Koundinya, Shreyas Sudhanva, Shashank C S, Suguna Chandrasekar, and Jyoti R Munavalli** presented a paper titled "Congenital Heart Disease Detection using Spectral Analysis and CNN" at the 4th IEEE International Conference for Emerging Technology (INCET), Belgaum, India, May 2023, (Scopus).
- **Srikar M, Suhaas Sastry, Sampreeth S, Priya R. Sankpal** presented a paper titled "Frequency Based Pest Detection User Interface using Neural Networks" at the 4th IEEE International Conference for Emerging Technology (INCET), Belgaum, India, May 2023, (Scopus indexed).
- **Tejas S Koundinya, S Brinda, S Nikhil, Meenakshi Aishwarya Thelapurath, R Chinmayee, Jyoti R Munavalli** presented a paper titled "A Comparative Study of Joint and Bolt Structures with and without Edge Detection using CNN" in 2023 International Conference for Advancement in Technology (ICONAT), Goa, India, 2023, pp. 1-3 doi: 10.1109/ICONAT57137.2023.10080329. (Scopus).

Book Chapters

- **Roopa, E., Shirur, Y.J.M.** published a book chapter titled "Design and Implementation of Highly Secured Nano AES Cryptographic Algorithm for Internet of Things." In: Hemanth, J., Pelusi, D., Chen, J.IZ. (eds) Intelligent Cyber-Physical Systems and Internet of Things. ICoICI 2022. Engineering Cyber-Physical Systems and Critical Infrastructures, vol 3. Springer, Cham. https://doi.org/10.1007/978-3-031-18497-0_47 ISSN: 978-3-031-18497-0, 4 Feb 2023.
- **Madhumitha, S.S., Sailesh, R., Sirish, A., Munavalli, J.R.** published a book chapter titled "AutoNav: A Lane and Object Detection Model for Self-Driving Cars." In: Asari, V.K., Singh, V., Rajasekaran, R., Patel, R.B. (eds) Computational Methods and Data Engineering. Lecture Notes on Data Engineering and Communications Technologies, vol 139. Springer, Singapore. 2023. https://doi.org/10.1007/978-981-19-3015-7_17.

Departmental Events

The Institution of Engineers (India) Students Chapter – ECE, BNMIT organized a technical talk on **"Entrepreneurship Skill, Attitude and Behaviour"** for the students of the 3rd Sem on 8th February 2023. The guest speaker was **Dr. Pious Thomas,** Associate Professor in Economics and Human Resource Manager.

Did You Know

Plants don't have any memory, but they have the ability to recognize their close relatives and upon doing so, they will work along side each other to grow stronger.

The Institution of Engineers (India) Students Chapter – ECE, BNMIT organized a technical talk on "**Industry 4.0" by Mr. A. Subash**, Senior Automation Engineer, Innovaskill Technologies Private Limited, Bengaluru for students of 3rd Sem ECE on 9th February 2023.

Department of Electronics & Communication Engineering under **The Institution of Engineers (India) Students Chapter – ECE, BNMIT** in association with the **Institution's Innovation Council** organized a Workshop on "**Research Proposals, Process Design & Development**" on 18th April 2023 for students and faculty of BNMIT. The resource persons for the workshop were Dr. Abhishek Appaji Head R&D BMSCE, Maastricht University, IEEE Bangalore Section, and Dr. Jyoti R Munavalli, Associate Professor, Department of ECE, BNMIT, Bangalore.

Did You Know

Ants are capable of carrying objects 50 times their own body weight. Relative to their size, ant muscles are thicker than those of larger animals of even humans. This ratio enables them to produce more force and carry larger objects.

The Department of Electronics and Communication Engineering in association with **ISTE students Chapter-BNMIT** organized an Invited talk on "**DevSecOps**" by **Mr. Sivaprakasam Rajappan**, Senior Principal Software Engineer and Senior DevOps Architect, Dell Technologies, on 2nd May 2023 followed by the Distribution of Mementos to FCD Students of 5th & 7th Semester ECE.

The speaker highlighted how DevOps influences the application lifecycle throughout its plan, development, delivery, and operation phases The speaker emphasized the challenge of cultivating a DevOps culture and deep changes in the way people work and collaborate. The speaker shared tips with students to build their profile to fit into the industry, how to sharpen their skills, conceptualize the ideas, and parameters to be looked into while building their resume, and the hiring principles involved.

The Department of Electronics and Communication Engineering in association with the **IEEE-BNMIT Student Branch** organized an Industrial visit to Bharat Electronics Limited (BEL) on 3rd May 2023. Forty-two students with four faculty members participated in the industrial visit.

The industrial visit to BEL Bangalore proved to be an enriching experience for the participants. They gained insights into the defense electronics industry and had the opportunity to witness BEL's products and ongoing projects. The visit contributed to the understanding of advanced electronic devices used in defense applications and showcased the innovative work carried out by BEL in various research areas.

The Department of Electronics and Communication Engineering in association with **IEEE CASS Bangalore Section organised the Institution to Industry Forum II Edition** along with **IEEE YP Bangalore Section, IEEE CAS BNMIT Student Branch** from 27th May 2023 to 3rd June 2023. Staff coordinator Mrs. Prabhavathi P. and the volunteers Mr. Daksh Patel, Mr. Dhanush, Mr. Manu Kumar, and Mr. Rajshekhar V from 6th Sem ECE and Mr. Sriniket, Mr. Kiran Kumar of Intel and IEEE CASS Bangalore Section Execom Members and Dr. Shylashree V, Secretary, IEEE CASS Bangalore Section maneuvered the event.

The second edition of the 'Institution to Industry' forum consisted of twelve sessions on various topics of VLSI Design and Embedded Systems and two sessions on HR-related topics. Out of twelve technical sessions, six were online, and an equal number of sessions in a physical event. Hiring Managers and key technical experts covered different aspects of an interview. The technical resource persons were ***K Padmanaban****, Intel Technologies Pvt. Ltd.,* ***Ramapriya C G****, Intel Technologies Pvt. Ltd.,* ***Joemol Joseph****, IBM,* ***Prabhat Maurya****, IBM,* ***Narasimha Babu****, Synopsys, and* ***Hariprasad Bhat****, Lekha Wireless.*

Department of ECE, BNMIT signed an **MoU with Renalyx Health Pvt. Ltd.** to start the Center of Excellence in Healthcare on 7th June 2023 and was inaugurated on 11th August 2023.

Student Experiences…..

The journey of a thousand miles begins with one step, and the initial stride I took towards fulfilling my dream was the Republic Day Camp (RDC). Republic Day Camp not only hones your performance skills, but also aids in developing self-confidence, personality, and various talents. RDC serves as an extensive platform to showcase your abilities on a national level. This camp comprised of seventeen Directorates, each competing in categories such as Drill, Cultural, Best Cadets, Flag Area, Line Area, and Ship Modelling. I was part of the Cultural category, participating in Group Song, Group Dance, Ballet, and the National Integration Awareness Program (NIAP). The RDC journey spans for four months, with selections commencing at the Annual Training Camp in August 2022, where I was chosen among 50 thousand cadets. Remarkably, I was the only girl cadet selected from my battalion, based solely on my proficiency in Drill. The selection process continued at the Battalion level, with three consecutive camps lasting one month. Following these, competitions unfolded among different Districts, encompassing cadets from Bangalore 'A', Bangalore 'B', Mangalore, Mysore, Ballari, and Belagavi. A hundred and eleven cadets were ultimately chosen at the district level, standing out among one lakh cadets based on merit, qualifying to represent Karnataka and Goa at the National level. I was selected as the lead singer and cultural head for the Karnataka and Goa Directorate. The Directorate-level selection extended over one month, requiring attendance at three continuous camps. On December 28, 2022, we departed from Bangalore to Delhi for the one-month Republic Day Camp. There, we had the privilege of performing in front of esteemed personalities, including the Defence Ministry, the Director General of NCC, the Defence Secretary, the Chiefs of the Army, Navy, and Air Force, and the Chief Ministers of Delhi and Assam. Additionally, we were granted the rare opportunity to visit the residences of the President, Vice President, and Prime Minister of India. Our efforts earned us 2nd place in the all-India Group Dance competition and a DDG Commendation. Upon our return, we had the honor of meeting and performing in front of Karnataka's Chief Minister and Governor. It was indeed a memorable and fulfilling event in my life.

Puornausri R L D
IV Sem B

From Alumni's Desk

Alumni Speaks…..

BNMIT has been instrumental in helping me acquire the knowledge and skills essential for a successful career as an engineer. Over the past four years, I have had the privilege of learning from some of the most highly qualified and knowledgeable teachers. Their expertise and friendly approach have made my educational journey both enriching and enjoyable.

I owe a special debt of gratitude to the teachers in the Electronics and Communication Department. Their dedication to teaching goes beyond the classroom; they have generously shared their wisdom and real-world experiences, enabling me to solve complex problems that extend beyond the realms of the textbook. Their guidance has been invaluable in developing my critical thinking and problem-solving skills, which are crucial for any engineer.

In addition to the exceptional academic support, BNMIT's placement department has played a pivotal role in preparing me for the professional world. Their comprehensive training programs and unwavering support were instrumental in helping me secure a position at a reputable product company. The placement team's efforts in organizing workshops, mock interviews, and career counseling sessions have been incredibly beneficial in honing my interview skills and boosting my confidence.

In conclusion, my four years at BNMIT have been transformative, laying a strong foundation for my future as an engineer. The combination of excellent academic guidance, practical problem-solving training, and robust placement support has made my experience here truly remarkable. I am proud to be a part of the BNMIT community and will always cherish the memories and lessons learned during my time here.

Vinay Kumar J
(Batch: 2017-21)
Software Engineer,
NXP Semiconductors, Bangalore

Editorial Team

Faculty Members

Smt. Ashwini S Savanth
Asst. Professor, Dept. of ECE

Dr. Payal Mukherjee
Asst. Professor, Dept. of Humanities

Reviewers

Dr. Yasha Jyothi M Shirur
Professor, Dept. of ECE

Dr. Bindu S
Professor, Dept. of ECE

Students

Neha M Harapanhalli, VIII ECE A
Daksh Pankaj Patel, VI ECE A
Ruthva L, VI ECE B
Maaz Hussain, IV ECE A

Compiling & Data Entry **Sri. Sathish B G,** Instructor, ECE