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THE OFFICIAL MAGAZINE OF ENTC

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ENTC CAREER FAIR 2023



Captured by Namitha Wasinga 10.10.2023



UNIVERSITY CATEGORY

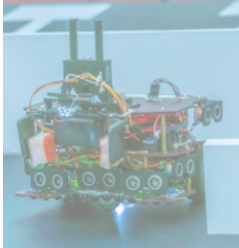


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AGM 2023

ENTC



UNIVERSITY CATEGORY - DAY 2



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TECHNICAL



ISAC-RIS

"Integrated Sensing and Communications with Reconfigurable Intelligent Surfaces (ISAC-RIS)" is a wireless technology that enhances signal propagation and efficiency using programmable surfaces.

GENERATIVE AI

Generative AI is a type of artificial intelligence technology that broadly describes machine learning systems capable of generating text, images, code or other types of content, often in response to a prompt entered by a user



NEWS

DVCON INDIA 2023

Team Byte Brigade Shines as the 1st Runners-Up in DVCon India 2023 RISC-V Processor Design Challenge



ABHINA

Abhina '23: A vibrant showcase of talent and creativity, uniting students and staff under the theme of 'Thovil', with memorable performances that captivated all

SPOTLIGHT



A STUDENT TO SHINE

"Always dream big, and push yourself to the limits. You will find yourself surrounded by like-minded friends who go the distance with you."

A Chat with Alumni

by Sanjana Kapukotuwa



Introducing **Mr. Upul Ekanayaka**, a distinguished alumnus of the Department of Electronic and Telecommunication Engineering. Currently serving as the Head of Hardware Acceleration at ACCELRL, he specializes in digital system design, high-performance computing, and parallel computing. His expertise and passion have made him a driving force in the industry, and we were lucky enough to have a chat with him, where he shared a lot of valuable advice.

1. Every outstanding ENTC undergraduate says that the department played a pivotal role in shaping their lives. Could you share your experience as an undergraduate with us?

My time as an undergraduate at the university was one of the greatest chapters of my life. I had the opportunity to enhance my technical skills, develop teamwork abilities, and establish valuable networks while interacting with talented individuals from diverse backgrounds, both within the university and the industry. Despite my initial shyness and limited knowledge of electronics and telecommunication, the department helped me grow both personally and academically.

2. After your time as an undergraduate, you also worked as a research assistant on Hardware implementation of Complex Event Processors and Hardware acceleration on Cloud Computing Architectures at the University of Moratuwa. What was this experience like?

My time as a research assistant at the University of Moratuwa was a challenging yet rewarding journey. In my final year of undergraduate studies, I decided to pursue higher education and delve deeper into research. Dr. Ajith Pasqual, recognizing my potential, invited me to join the state-of-the-art research activities he led at the time.

These years tested my independence socially and financially, yet my enthusiasm for my research kept me motivated. Looking back, I view this period as a significant investment in my future. What made this experience truly invaluable was the opportunity to address real-world problems through my research efforts. I am deeply grateful to Dr. Pasqual, whose dedication ensured access to the latest equipment, enhancing our research activities significantly.

3. Though we have given a brief description of you in the beginning, the readers would be thrilled to know what you do in your own words. Could you tell us a bit about what you do as the Head of Hardware Acceleration at ACCELRL?

In my role as the Head of Hardware Acceleration at ACCELRL, I lead a dedicated team specializing in FPGA-based hardware acceleration. ACCELRL is one of the few digital electronic-focused companies in the country. My experience comes from consulting for Silicon Valley companies, where I worked as both a hardware and software engineer.

Right now, we're building a specialized team for VLSI design and verification, something not commonly found in Sri Lanka. Our projects mainly involve high-throughput, low-latency hardware acceleration, pushing the boundaries of digital electronics innovation.

4. Given the diversity of the specialization areas in ENTC, students sometimes struggle to find their area of interest after completing the first few semesters in the department. Back in the day, how did you discover your passion?

Throughout my undergraduate years, I had the chance to engage in projects across various domains, such as analog electronics, digital electronics, computer architecture, robotics, and wireless communications.

However, by the time I progressed to my final year, I had to ask myself where my true passion lay within this vast field. After careful consideration and self-reflection, I realized that my heart was in the digital electronics domain.

Instead of just going with the flow, pursue a path that genuinely resonates with your interests. Passion, not trends, should guide your choices. It's the secret ingredient to a fulfilling journey in any field.

5. It sounds exciting to have worked in some of Silicon Valley's premium startups. Can you tell us about where you worked, what you did, and what the experience was like? How did you land these opportunities?

My journey into Silicon Valley's premium startups began after my research years when my supervisor, Dr. Pasqual, invited me to join his team as an engineer, working directly with a startup called Wave Computing, marking my first industrial experience. Wave Computing was pioneering a massively parallel processor architecture. In this role, I served as an application engineer, utilizing their proprietary simulators and compilers to develop applications for their processors. Following this experience, I transitioned to another Silicon Valley company, Bigstream, which focused on FPGA-based hardware acceleration for big data workloads using Spark applications. This opportunity provided me with invaluable insights into data center acceleration.

6. During the 15 years from your time as an undergraduate to the present, how have the fields of digital system design, high-performance computing, and parallel computing evolved?

Over the 15 years from my undergraduate years to the present, the fields of digital system design, high-performance computing, and parallel computing have undergone remarkable transformations. In the realm of high-performance computing, a diverse range of processing units has emerged, including CPUs, advanced CPUs, GPUs extensively used for neural network processing, FPGAs, and specialized ASIC accelerators. The capacity of CPUs has significantly increased. For instance, processors like Intel's Xeon can now support up to 120 parallel threads.

The demand for large language models like ChatGPT and deep neural networks has led to significant advancements in specific AI accelerators. The processing power required to train models like ChatGPT today would have been unachievable just five years ago. As the demand for such technologies continues to rise, the evolution of high-performance computing is poised to continue, promising further advancements in the future.

7. For someone planning to join the industry after the completion of their degree, what skills and qualities do you think would improve their chances of getting good opportunities?

A strong fundamental knowledge of core concepts is crucial. Make sure you know your basics well.

Pursue a career in a field that genuinely excites you. Being a passionate learner will make you more attractive to potential employers.

Develop excellent communication skills, both verbal and written. Learn how to express your ideas clearly and professionally, whether you are making a presentation or writing an email.

8. I am going to ask you a different question now. If you could go back to your undergraduate days, what is one thing that you would like to change?

Self-learning, without a doubt. Back then, we didn't realize the vast amount of knowledge available at our fingertips. If I had known better, I would have taken full advantage of those resources to improve my skills and understanding.

9. As an alumnus of the Department of Electronic and Telecommunication Engineering, what advice would you give specifically to an undergraduate in ENTC?

Absolutely, my advice to any undergraduate in ENTC would be this: You are still not late. Whether you're in your first or final year, there's always time to make a difference.

First and foremost, make the most of your time in college. Don't try to do everything alone; collaborate with your peers. Teamwork is key.

Engage in numerous projects and research opportunities. There are a number of online courses, videos, and projects available, many of them for free. Hands-on experience is invaluable, so work on practical projects whenever you can.

Stay curious. Technology evolves rapidly, so always keep an eye on the latest trends and updates. Being up-to-date is crucial in our field.

But remember, it's not just about technical skills and good grades. Participate in extracurricular activities. I owe a lot of who I am today to these extracurricular activities – they've shaped my overall skills and abilities in ways that my classes alone couldn't. So, balance is key. Enjoy your studies, but also dive into the plethora of opportunities beyond the classroom.





ENVOYAGE

by Dr. Ranga Rodrigo

Envoyage serves as a platform where students and academic staff come together with industry professionals and alumni to learn, collaborate, and strategize, shaping the trajectory of our department for the coming years. Through Envoyage, we aim to tap into the invaluable insights of our industry partners, dedicating the majority of the time to this enriching exchange.

The Department of Electronic and Telecommunication Engineering has benefitted much from the industry engagement. In the new curriculum, based on the input of many in the industry, we have strengthened the project-based education, hands-on electronic-telecom-and-biomedical design, soft skills, professional software tool usage, software development knowledge, and artificial intelligence modules. For example, engineering design project, robot design and competition, biomedical device design, communication design project, digital systems design, and digital IC design orient students for engineering design and implementation while keeping the fundamentals, the key trait, strong. We have introduced ten pathways, electronic product design, IC design, reconfigurable electronics, embedded systems, IoT, communications, networking, systems theory and engineering, computer vision and pattern recognition, and robotics and automation. If a student, for example, goes through the pattern recognition pathway, there will be six modules on pattern recognition (artificial intelligence, more generally), making it one of the most comprehensive tracks in the region. These improvements were, more often than not, based on the industry feedback.

The department believes in continuous industry engagement. This is why most of our final-year projects have an industry collaborator. We also showcase at Envoyage five out of the approximately 30 projects we undertake each year and our achievements in the international arena. The industry supports us to train our students: Synopsys conducted an advanced course on C++. LSEG conducted a similar advanced course, and we had the closing ceremony at LSEG. There was a System Verilog course conducted in collaboration with Synopsys using industry-standard software tools. A scientist with Google is teaching a vision course right now. Dialog laboratory, K. K. Y. W. Perera laboratory, carrying out four self-driving projects done with the support of Creative Software are examples of collaborations. We visit industry often, for example, we visited TeeJay Lanka and ADL a few days ago. We are very thankful to the industry for providing internships and hiring our students as employees. We have 100% employment, contributing to the service and manufacturing industry. With the industry, support some have contributed to designing advanced products, obtaining patents, and FDA approval for products. Some have secured coveted positions with universities such as UC Berkeley, Harvard, Princeton, and Southern California and joined high-tech companies such as Meta. The department thanks the industry for continuous engagement.

Our students have won many international awards: IEEEExtreme world championship in 2009 is an early example. 2021 world championship in the IEEE Signal Processing Cup, winning IEEE ICAS championship in 2021, winning the silver award in InnovateFPGA competition in the US, winning the first place in IEEE R10 Robotics Competition 2022 and publishing in world's finest journals and conferences like IEEE Transactions on Information Theory and IEEE/CVF Conference on Computer Vision and Pattern Recognition are recent achievements. Our most recent achievement is winning the second place in the RISC-V Processor Design and Verification contest held in India last month.

The department and industry can further strengthen the ties. The industry can engage with our staff, who can offer their expertise through consultations, contractual engagements, and other avenues, thereby adding value to the organizations. Collaboratively offering modules, sponsoring or collaboratively supervising final-year projects, offering internships, facilitating industry visits, encouraging employees to read for higher degrees with the department are mutually rewarding means of collaboration.

The journey of the Department of Electronic and Telecommunication Engineering, as showcased through Envoyage, is a testament to the power of collaboration. As we move forward, the valuable relationship between the department and industry will continue to shape the future of technology, producing skilled professionals, groundbreaking innovations, and transformative solutions.

Integrated Sensing And Communications With Reconfigurable Intelligent Surfaces

by Vishagar Arunan

Telecommunication ever has been as one of the hottest research areas, with a wide range of topics being investigated. As the standardization of 5G solidifies, the field is on the verge of a major technological revolution on speculating beyond 5G (B5G) and 6G. On the cusp of a new era, one in which sensing plays a significant role than ever before, we are ready to embrace the new sensing functionality as a key feature which will be considered as the integral part of the new 6G systems. Indeed, radio sensing and communication (S&C) systems are both evolving towards higher frequency bands and on larger antenna arrays. Thanks to the research community for exploring mm-wave and terahertz communication for opening a gateway for new emerging technologies.

Integrated sensing and communications (ISAC) has been envisaged to be an integral part of the future communication and wireless networks, especially when operating in the millimeter-wave and terahertz (THz) range frequency bands. Sensing collects and extracts information from noisy observations, while communication focuses on transferring information via specifically tailored signals and recovering it from the noisy environment. The ultimate goal of ISAC is to unify these two operations and to pursue direct trade-offs between them as well as mutual performance gains. This is approached by utilizing the same signal for both sensing and communication by multiplexing techniques. Orthogonal frequency-division multiplexing is one of the known multiplexing techniques, which divides the signal into a number of subcarriers and each subcarrier can be used for either communication or sensing depending on the needs of the application.

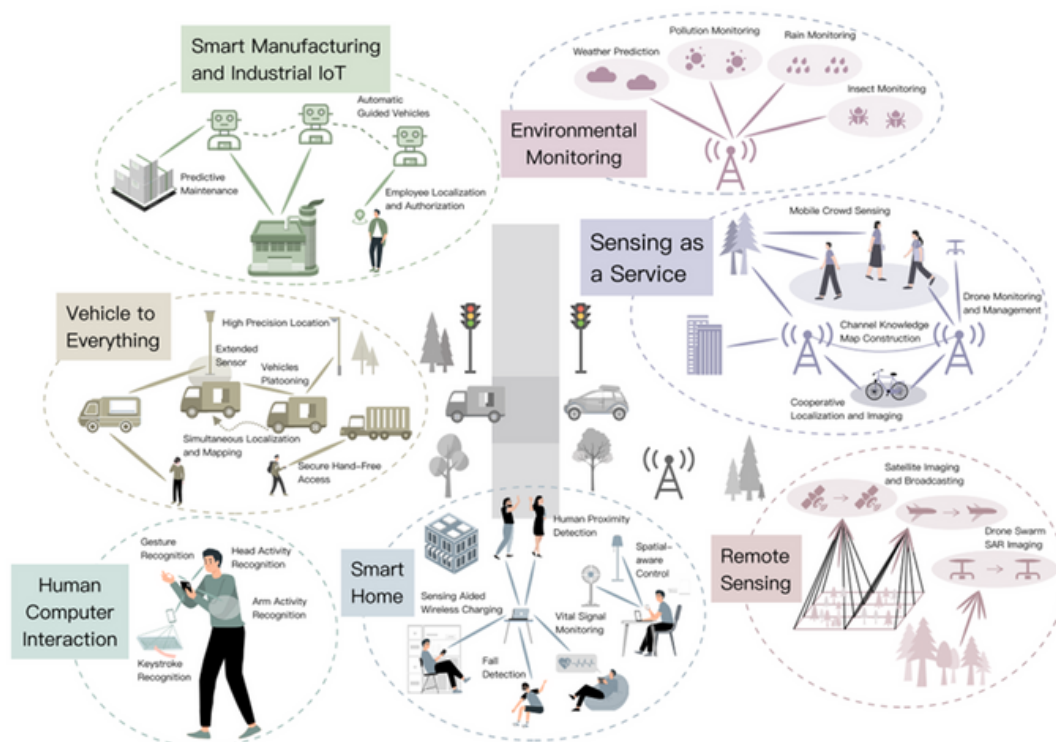


Figure 1: Image is adapted from "Integrated Sensing and Communications: Toward Dual-Functional Wireless Networks for 6G and Beyond" by Fan Liu, Yuanhao Cui, Christos Masouros, Jie Xu, Tony Xiao Han, Yonina C. Eldar and Stefano Buzzi

Navigating towards higher frequency bands with ISAC raises notable concerns. Path loss, the diminishing of signal strength during transmission, is directly proportional to signal frequency. Consequently limiting reliable communication to a reduced radius. Additionally, the heightened susceptibility of RF signals to blockage exacerbates challenges in line of sight. Beam blocking leads to substantial signal attenuation, potentially culminating in data losses. Addressing these challenges underscores the imperative for a novel system to fortify ISAC and surmount these obstacles effectively.

A further emerging technology for next generation (NextG) wireless systems is reconfigurable intelligent surfaces (RIS) which are hardware-efficient planar structures capable of handling and modifying harsh propagation environments. As stated earlier establishing wireless connections at these higher frequencies is quite challenging due to higher path loss and ensuring reliable communication services. In the context of 6G and NextG wireless systems, there is a growing need for ISAC assisted with the use of RIS to enhance and optimize wireless communication in these high frequency bands.

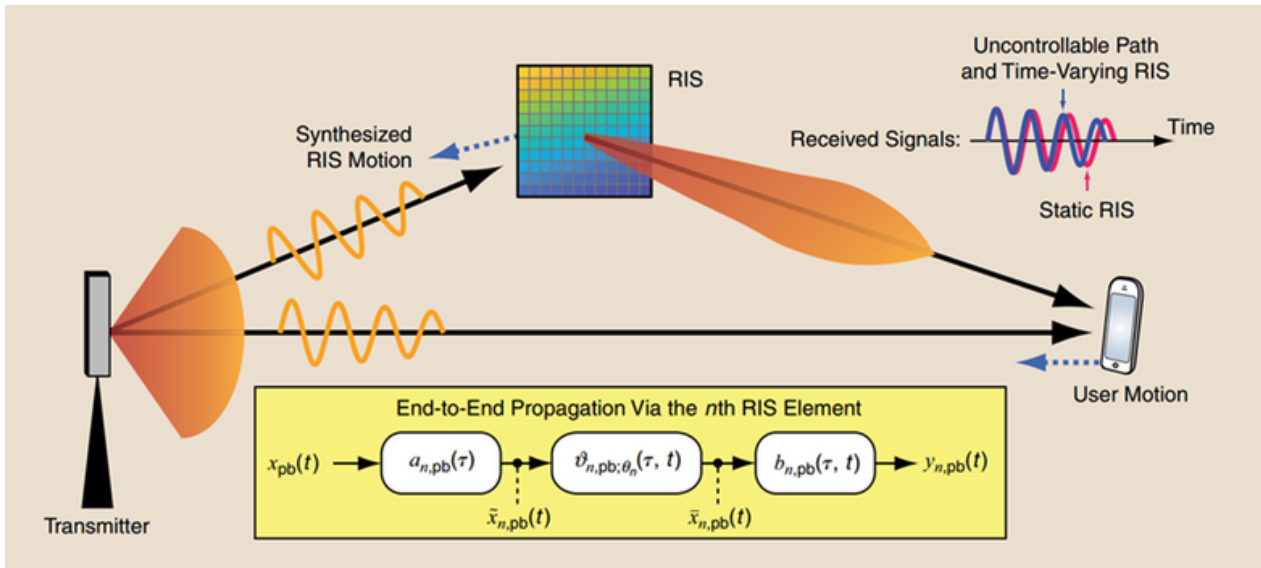


Figure 2: Image is adapted from "Reconfigurable Intelligent Surfaces: A Signal Processing Perspective With Wireless Applications" by Emil Björnson, Henk Wymeersch, Bho Matthiesen, Petar Popovski, Luca Sanguinetti, and Elisabeth de Carvalho

RIS are comprising controllable electromagnetic elements. They can be passive reflecting signals with configured patterns, or incorporate sensing capabilities. Meta-surfaces, 2D arrays of programmable artificial elements like graphene and common for RIS implementation. These elements densely packed on a substrate, prevent energy leakages. RIS can have flexible shapes and thicknesses for versatile deployment. In architectures detecting signals, the substrate may be replaced with a waveguide. Dynamic signal propagation modification is achieved through dedicated control circuitry. RIS, nearly passive, consumes less power than active transmitters, making them efficient. Common treatment of RIS considers 2D arrays whose elements can be tuned independently to generate desirable reflection patterns in a nearly passive fashion, without utilizing active radio frequency (RF) chains to process the impinging signals. The core benefits of RIS stem from their ability to shape the propagation profile of information bearing electromagnetic waves in a flexible, low cost and energy efficient manner.

As we mentioned earlier, beam blockage is one of the biggest drawbacks in ISAC. Beamforming is a technique used to focus the transmission of radio waves in a specific direction. This can be done by using an array of antennas and controlling the phase and amplitude of the signal transmitted from each antenna. Although RIS evolved exclusively for communication to alleviate the above stated issue in ISAC we can improvise by implementing beamforming through RIS.

When considering the capabilities of this technology, it's evident that RIS operates in a full-duplex fashion, increasing spectral efficiency and facilitating deployment in urban settings. Their limited control circuitry and simple fabrication make them cost-effective. However, RIS requires an external device, such as a base station or a dedicated controller, to configure their reflection pattern and control wireless propagation. RIS should be deployed with a dedicated control link, relying on real-time optimization and signal processing. The phase-shifting model of RIS may not accurately reflect their operation, as phase profiles are often coupled with attenuation and incident angle. Multipath propagation also complicates the ability of RIS to shape the propagation environment. Despite these limitations, RIS aided wireless communications and sensing systems offer significant potential gains.

The integration of these two innovations to form RIS-empowered ISAC systems is a nascent research domain. In our examination, we offer a glimpse into the potential advantages stemming from the synergistic combination of these emerging technologies. Notably, these benefits result in incremental extensions of established findings in the literature on RIS-empowered wireless communications which could be a remarkable candidate for the next generation. Even though this article is a brief review and hasn't gone through a deep analysis of RIS and ISAC. It pointed out some key factors which could stand out from the current technology and power up a new gateway for new technologies. Interested readers can refer to the below attached references.

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According to McKinsey's report titled **"The Economic Potential of Generative AI: The Next Productivity Frontier"**, Generative AI applications such as ChatGPT, GitHub Copilot, and Stable Diffusion have gained worldwide attention due to their versatility. These applications are unique because they enable almost anyone to take part in creative activities and engage in natural conversations. Generative AI's capability to generate written content, compose music, and create digital art has not only made headlines worldwide but has also sparked the interest of millions of users. This encourages them to explore this technology.

Image and video generation is one of the most dynamic and thrilling fields of Generative AI. Models such as GANs, VAEs, and diffusion models can create a wide variety of realistic and diverse images of faces, landscapes, animals, and more. These models have numerous applications in computer vision, computer graphics, and entertainment.

Generative Adversarial Networks (GANs) are a type of deep learning model that can learn complex representations without requiring extensive annotated training data. They accomplish this by using a competitive process that involves two networks and backpropagation signals.

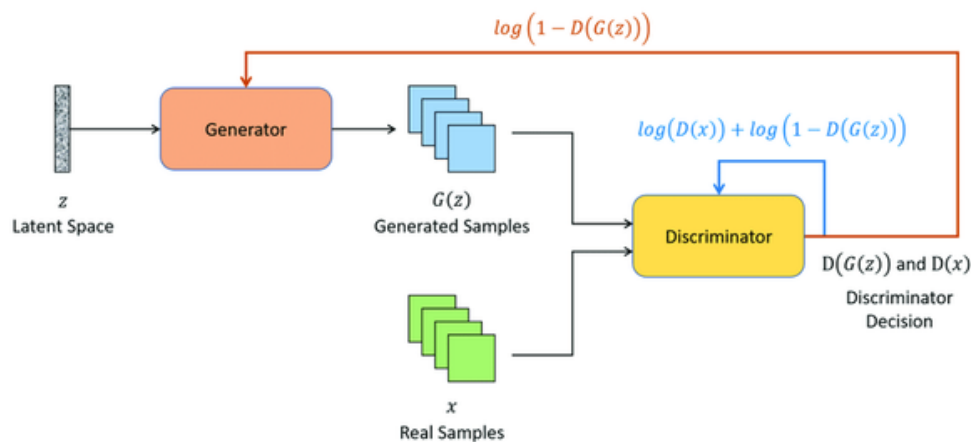


Figure 1: Image is adapted from "Automatic Target Recognition for Low Resolution Foliage Penetrating SAR Images Using CNNs and GANs" by David Vint, Matthew Anderson, Yuhao Yang, Christos Illioudis, Gaetano Di Caterina, Carmine Clemente

The generator and discriminator networks in GANs are usually implemented using multi-layer networks consisting of convolutional and/ or fully-connected layers. These networks must be differentiable, but it is not necessary for them to be directly invertible. If we consider the generator network as mapping from a latent space to the space of the data (in this case, images), we can express this more formally as $G : G(z) \rightarrow R|x|$, where $z \in R|z|$ is a sample from the latent space, $x \in R|x|$ is an image, and $|\cdot|$ denotes the number of dimensions. In a basic GAN, the discriminator network D can be characterized as a function that maps from image data to a probability that the image is from the real data distribution, rather than the generator distribution: $D : D(x) \rightarrow (0, 1)$. For a fixed generator G , the discriminator D can be trained to classify images as either being from the training data (real, close to 1) or from a fixed generator (fake, close to 0). When the discriminator is optimal, it may be frozen and the generator G may continue to be trained so as to lower the accuracy of the discriminator. If the generator distribution is able to match the real data distribution perfectly, then the discriminator will be maximally confused, predicting 0.5 for all inputs. In practice, the discriminator might not be trained until it is optimal.

Autoencoder is a type of neural network that compresses input into a meaningful representation and then decodes it back to a similar version of the original input. **Variational Autoencoders (VAEs)** have significantly improved the representation capabilities of autoencoders. VAEs are generative models that describe data generation through a probabilistic distribution by following Variational Bayes (VB) inference.

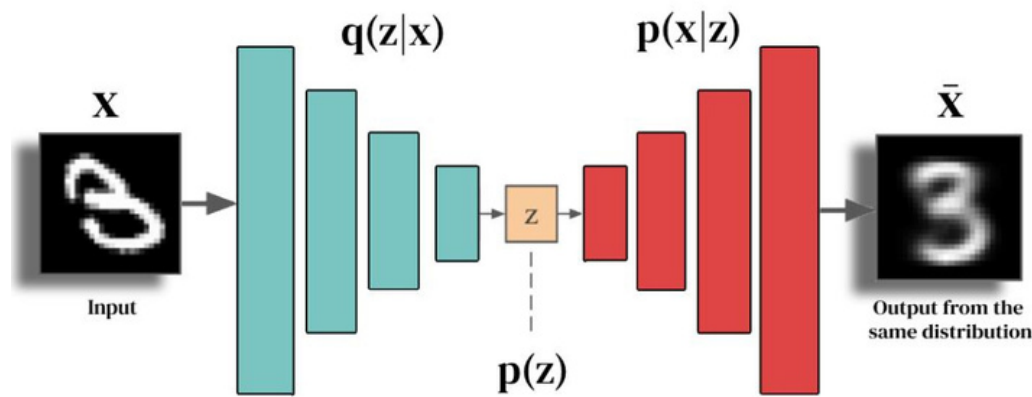


Figure 2: Image is adapted from “Variational Autoencoders: A Vanilla Implementation” by Hesham Ali

Diffusion models are a type of probabilistic generative model that destruct data progressively by injecting noise and then learn to reverse this process for sample generation. In other words, diffusion models add noise to data smoothly and then reverse this process to generate new data from noise. Each denoising step in the reverse process typically requires estimating the score function, which is a gradient pointing to the directions of data with higher likelihood and less noise.

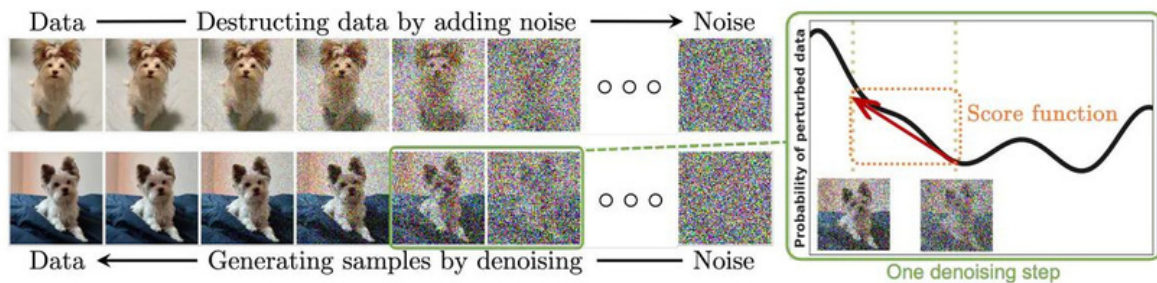


Figure 3: Image is adapted from “Diffusion Models: A Comprehensive Survey of Methods and Applications” by Ling Yang, Zhilong Zhang, Yang Song, Shenda Hong, Runsheng Xu, Yue Zhao, Wentao Zhang, Bin Cui and Ming-Hsuan Yang

In the forward process, noise is slowly added to data until all structures are lost. To generate new data samples, an unstructured noise vector is first generated from the prior distribution (which is typically easy to obtain) and then noise is gradually removed by running a learnable Markov chain in the reverse time direction. Specifically, the reverse Markov chain is parameterized by a prior distribution and a learnable transition kernel.

Generative AI models such as GANs, VAEs and diffusion models have a wide range of applications in various fields. These models are mainly used for image generation and manipulation, texture synthesis for virtual environments and video games, drug discovery and designing new molecules, style transfer and content creation for art and design, data augmentation, text generation and many more.

This article delivered a very brief overview on three main generative AI models widely used in the field of machine vision and natural language processing and the key concepts of their approaches. There are many opportunities for developments in theory and algorithms and with the power of these deep networks, there are vast opportunities for new applications.

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IoT Product Design Unleashed: Unlocking the World of Opportunities

by Devnith Wijesinghe

The Internet of Things (IoT) is fundamentally transforming our everyday existence, as it interconnects billions of devices, sparking a revolution in various industries and unveiling uncharted opportunities. Mastery of the intricacies of IoT product design and development is paramount to harness this potential and establish a promising career path. The Embedded Product Design for IoT offered by the Department of Electronic and Telecommunications Engineering is a comprehensive course offering holistic guidance, leading you from conceptualization to realization.

Top 5 Reasons Why You Should Learn IoT Product Design

1. Flourishing Industry and Opportunities:

The IoT market is on an exponential growth trajectory, with a projected market value of \$1.1 trillion by 2026. As more industries and companies try to integrate IoT technologies, the demand for proficient IoT product designers is soaring. Acquiring these skills makes you an invaluable asset in this thriving landscape.

2. High End Salaries for IoT Engineers:

The demand for IoT engineers is red hot, and their salaries mirror this demand. Recent data reveals that the average salary for an IoT engineer in the United States ranges from \$95,000 to \$130,000 annually. By mastering IoT product design, you can position yourself for a financially rewarding career.

3. Versatile Applications Across Industries:

IoT is a transformative force touching various sectors, from healthcare and agriculture to manufacturing and transportation. Acquiring IoT product design skills equips you to work across a wide spectrum of industries, ensuring job flexibility and security.

4. Innovation and Impact:

IoT product designers play a pivotal role in driving innovation and creating real-world solutions. By mastering IoT product design, you gain the ability to develop groundbreaking products that can address critical challenges in various domains. Your work can have a tangible impact on improving efficiency, sustainability, and the overall quality of life, contributing to a sense of fulfillment and purpose in your career.

5. Entrepreneurial Opportunities:

IoT product design skills open doors to entrepreneurial ventures. As an IoT product designer, you can leverage your expertise to create and market your IoT-based products or services. This offers the exciting potential to establish your own startup, cater to niche markets, and scale your business, providing autonomy and the potential for substantial financial success. The entrepreneurial landscape within IoT is ripe with opportunities for those with the skills and vision to innovate.



Who can participate?

Anyone with an understanding of basic microcontroller programming (e.g., Arduino) can take part. Ideal for university undergraduates and fresh graduates in the industry.

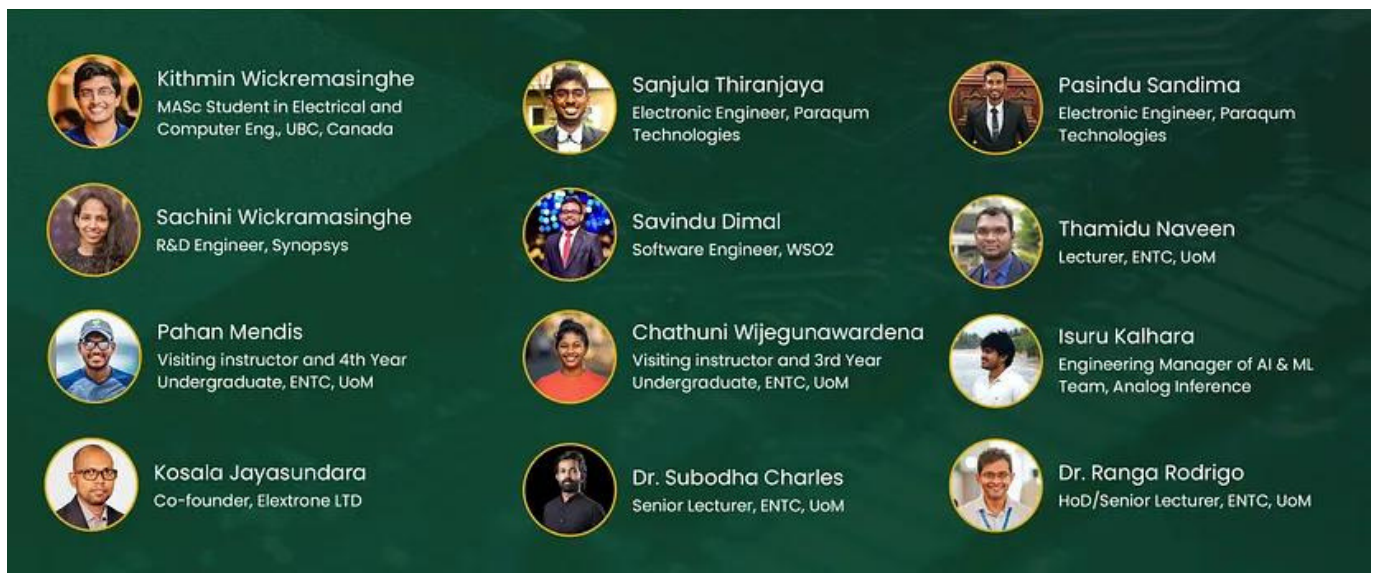
Course Outline:

- End-to-end product design lifecycle from conceptual model to commercializable product
- Advanced schematic and PCB layout design
- Embedded firmware development
- Cloud connectivity pipeline
- Enclosure design for IoT products
- Manufacturing techniques and best practices

Learn the concepts while working on real-world applications! Purchasing of required hardware will be facilitated by course administrators.

What You Will Learn in This Course

The successful completion of the course on IoT product design marked a significant milestone for each student who embarked on this educational journey. Throughout the program, participants delved into the intricate world of IoT, commencing with an introduction to product design and rapid prototyping. They honed their skills in feasibility analysis, mastering the art of conceptual modeling, and proceeded to develop a comprehensive understanding of IoT projects, emphasizing specification and component selection. The course provided a platform for aspiring engineers to advance their knowledge further, delving into advanced topics such as schematic and PCB layout design, embedded firmware development, and enclosure design tailored specifically for IoT products. As they progressed, students learned the essentials of end-to-end connectivity for web dashboards, delved into enclosure and PCB manufacturing techniques, and acquired hands-on experience in soldering, testing, and firmware deployment. Finally, by the course's conclusion, they had gained the expertise to bring all these elements together, resulting in the creation of fully functional IoT products. This accomplishment showcases their dedication and commitment to mastering this high-demand field, positioning them for successful careers in the dynamic realm of the Internet of Things.



The course features a team of expert lecturers and employs a hands-on teaching approach, providing an ideal opportunity to learn this cutting-edge technology and stay ahead in the game.

Visit bit.ly/entc-EPD-for-IoT for more details.

Team Byte Brigade Shines as the 1st Runners-Up in DVCon India 2023 RISC-V Processor Design Challenge

by Viyathma Vidumini

Team Byte Brigade, a team comprising three second-year undergraduates from the Department of Electronic and Telecommunication Engineering, University of Moratuwa-Thishakya Bandara, Janindu Leelananda, and Tharaka Kodithuwakku, achieved remarkable success in the DVCon India 2023-Global Design Contest on RISC-V Processor Design & Verification Challenge. This contest is open to undergraduate, master, and PhD. students and runs in parallel with the Design and Verification Conference India 2023. Team Byte Brigade was the sole representation from Sri Lanka to make it to the top 10 teams in the first stage of the competition.



In the initial phase of the competition, their task was to propose and validate suggestions for enhancing the performance of an existing system-on-chip (SoC) known as Pulpissimo, with a specific focus on improving its performance for the MobileNet1 machine learning application. Their efforts in this stage resulted in recognition among the top 10 teams, with Team Byte Brigade being the only team from Sri Lanka.

Advancing to the second stage, they were required to implement the proposed enhancements to the SoC and develop a method to verify the performance improvements. Their successful efforts in boosting the SoC's performance led to the team securing the first runners-up position in the competition.

The DVCon India 2023 competition was held from April to September 2023, and the award ceremony took place at the Radisson Blu, Marathahalli, Bangalore, where Team Byte Brigade was crowned as the 1st Runners-Up.

The journey of Team Byte Brigade in DVCon India 2023 is an example of tenacity, innovation, and excellence in the competitive world of technological challenges. Not only did they earn international recognition as the 1st runners-up, but they also brought recognition to Sri Lanka. The team's achievements serve as an example of the tangible outcomes that can be achieved through skill, dedication, and effective teamwork for aspiring engineers.



Electronic and Telecommunication Engineering Undergraduates Shine at ROBOFEST 2023

by Tharushi Karavita

The Department of Electronic and Telecommunication Engineering (ENTC) at University of Moratuwa achieved extraordinary success at ROBOFEST 2023 competition, organized by the Department of Electrical and Electronic Technology (SLIIT). The competition served as a Micro Mouse competition that challenges participants to design, build, and program a small autonomous mobile robot capable of navigating a maze in the shortest possible time. The robot must operate without any external control during the maze-solving process, and it should rely on its onboard sensors, actuators, and a pre-programmed algorithm to make decisions. The maze was a structure with walls and open passages that included dead ends, loops, and multiple paths to the goal.

ROBOFEST 2023 featured two fiercely contested categories: university category and school category, where the main sponsors for the event included PARAQUM as the Diamond Sponsor, Zone24x7 as the Gold Sponsor, and ACCELR as the Platform Sponsor. The competition commenced with an intense elimination round held at SLIIT Malabe on the 16th and 17th of September 2023. Out of the 16 teams that advanced to the final round, an impressive eight hailed from the University of Moratuwa. With a remarkable display of talent, students from ENTC clinched the top three awards in the university category.

The grand finale, held at SLIIT's main auditorium on the 25th of September 2023, was a display of technical ingenuity and innovative spirit. In a momentous achievement, the ENTC team "WARLOCKS" composed of Vidura Munasinghe, Chathushka Ranasinghe, Wikum Jayasanka, and Chamod Abewickrama became champions in the university category. The first runner-up was secured by team "ROBOTIC GEN" comprising Seniru Dissanayake, Namina Wijethunga, and Odil Janandith from ENTC. The second runner-up position was clinched by team "SINDib" which consists of Shanmugathashan Sanjith, Ishrath Ahamed, Nushad Nilabdeen, Biyon Fernando from ENTC, and Divakaran Varatharajan from the department of Electrical Engineering at University of Moratuwa. All three winning teams representing ENTC makes this achievement even more triumphant.

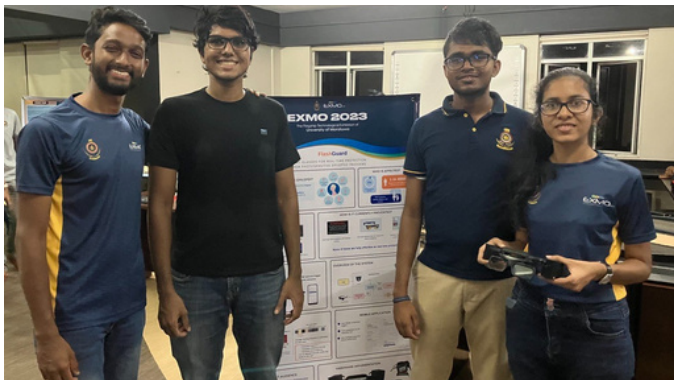
The resounding victory at Robofest 2023 not only brings honor to the Department of Electronic and Telecommunication Engineering but also reflects the dedication and brilliance of the students and support of staff, standing as proof of the excellent education and mentorship provided by the University of Moratuwa. This success is a source of immense pride for the university community and a testament to the exceptional talent and hard work of the students on a national stage.



FlashGuard: Smart Glasses for Epilepsy Patients Win Brainstorm 2023

The Brainstorm 2023 Healthcare Innovation Competition, organized by the IEEE EMBS Student Branch of the University of Moratuwa. The competition took place from April to May 2023 and welcomed university undergraduates from across Sri Lanka to develop medical products that meet industry standards. A team of University of Moratuwa undergraduates, including Anuki Pasqual (ENTC), Supun Kuruppu (ENTC), Damika Anupama (CSE), and Sasmitha Manathunga (CSE), secured the 1st place in this renowned competition with their product, FlashGuard.

FlashGuard is a pair of smart glasses for photosensitive epilepsy patients. It can detect photosensitive epileptic triggers in real-time and darken the lenses to protect the user from seizures caused by these triggers. This product is designed to ensure the safety and comfort of photosensitive epilepsy patients.



Meth-Exodus: Student Innovators Triumph at IEEE INSL and Microsoft Imagine Cup

by Erandee Jayathilaka

Meth-Exodus, a group of four remarkable undergraduates from the 19th batch of the Electronics and Telecommunication Engineering of the University of Moratuwa have achieved a string of significant accomplishments in two highly acclaimed competitions: the IEEE Innovation Nation Sri Lanka (INSL) and the Microsoft Imagine Cup 2023. We congratulate the team members, Chirantha Kurukulasuriya, Nima Wickramasinghe, Wikum Jayasanka, and Dinushika Chithrani on their success. They were advised by Prabhath Mannapperuma, who is a Partner Technology Strategist at Microsoft.

Their accomplishments are as follows,

1. IEEE INSL - Winners of Colombo South Provincial Competition,
2. Microsoft Imagine Cup 2023 - Placed within the top 12 teams of Southeast Asia (SEA) regional competition and received 2nd place in the Earth category.

The IEEE Innovation Nation Sri Lanka is a program that supports young entrepreneurs in Sri Lanka by providing them with training, mentorship, and financial assistance to turn their innovative ideas into successful businesses. Participants also have the opportunity to compete for seed funding, which helps them to kickstart their entrepreneurial ventures and connect with the global market. The competition was held on November 26, 2022 at the SLTC - Trace City Maradana.

Microsoft Imagine Cup is a global student tech competition hosted by Microsoft, where students innovate and create tech solutions for real-world challenges. It covers various categories, offers mentorship and resources, and provides a platform for aspiring tech entrepreneurs to turn their ideas into impactful solutions and potential startups. Microsoft Imagine Cup 2023 was held on March 02, 2023 as an International competition held online via Microsoft Teams.



Abhina

by Linuka Ratnayake

Abhina '23, one of the most awaited and prestigious events in the University of Moratuwa, was held successfully on the 10th of October 2023 at the Civil Engineering Auditorium. The event was organized by the Department of Electronic and Telecommunication Engineering, showcasing the aesthetic skills and talents of the students as well as the academic staff. This year, the event was based on the theme of the traditional Sri Lankan belief "Thovil". Accordingly, the decorations, backdrop, oil lamp, and almost everything were carefully designed to blend in with the theme.

Mr. Janak Premalal, a prominent actor in Sri Lanka, graced the event as the chief guest. In addition to him, the gathering was enriched by the presence of the academic staff of the department, alumni, industry representatives and students from the Department of Electronic and Telecommunication Engineering and students from across the entire university community. Abhina managed to retain its integrity with the content appropriate for the entire audience while preserving its humorous and entertaining nature.

All the three batches currently present in the department, namely 19th, 20th and 21st batches performed in Abhina. In addition to songs, musical and dance events, Abhina mainly focused on short dramas. The 19th batch premiered the main drama of Abhina '23, "*Doladuka.ai*", which completely captured the audience's attention. In summary, all the dramas, dances and other performances were exhilarating, providing the audience with an experience they will remember for a long while. The academic staff of the department also enhanced the beauty of the event with an amazing song performance. It is noteworthy that the entire event was broadcast live on social media.

In the speech by the chief guest, he mentioned the significance of the name "**Abhina**" and emphasized the need for more such aesthetic-related events for communities that primarily live in technical fields. Hence, the organization of Abhina was greatly appreciated by him, along with the exceptional performances of the students.

In conclusion, the success of this event and the unforgettable experience it provided for the audience can be attributed to the hard work of the ENTC crew. They created an opportunity for students to bring their hidden talents to light, talents that might have otherwise remained unnoticed. Furthermore, it created an environment where students could momentarily shift their focus from academics to entertainment. Abhina '23 once again proved that ENTC students are not only among the country's best minds, excelling in Math and Science, but they also possess a range of versatile skills, including singing, dancing, acting, and playing musical instruments.



Sri Lankan Robotics Challenge 2022/23

by Venuri Amarasinghe

From the 24th to 26th of March 2023, the Electronic Club of University of Moratuwa successfully organized the “Sri Lankan Robotics Challenge 2022/23”. This year’s theme was “Sherlock Holmes”, which added an exciting twist to the event. Backed by several notable companies and a theme resonating with many, the event attracted keen interest from students and tech professionals.

Paraqum Technologies led the sponsor lineup as the platinum partner. They were joined by gold partners SYNERGEN Technology Labs and Synopsys, silver partner AZENDTECH and gift partners ACCEL R and Magicbit. For the university competition, Creative Software stepped in as the event partner.

In the weeks leading up to the challenge, the organizers held educational workshops. School students participated in an eight-session virtual workshop, spread over two months. Additionally, there was a one-day advanced workshop on Robot Operating Systems(ROS) on the 28th of January 2023, catering to more experienced participants.

The competition was organized in two categories; school and university categories. A total of 45 teams from the school category and 15 teams from the university category, participated from various regions of the country, showcasing their innovative robotic designs and gaining invaluable experience. This competition served as a convergence point for robotics enthusiasts, providing a platform to exchange knowledge and draw inspiration from one another.

The school category competition was conducted on the 24th of March at ENTC1 hall, University of Moratuwa. The first place was secured by Team Future Tech from St. Sebastian’s College, Moratuwa. Team Galaxy from Wycherley International School clinched the 1st runner-up position, while the 2nd runner-up accolade was claimed by Team Alfa from Badulla Central College.

The university category was held on the 25th and 26th of March at the Civil Auditorium, University of Moratuwa. After a challenging first round, eight teams advanced to the finals. Team Servocity from the Institute of Technology, University of Moratuwa, emerged as the champions. Team Raspi Cap from the University of Moratuwa secured the 1st runner-up spot. Finally, the 2nd runner-up position was bestowed upon Team Spectro from the University of Moratuwa.

In recognition of their hard work and innovation, winners were awarded both cash prizes and valuable robotics-related learning materials. This gesture not only celebrated their achievements but also encouraged the continued pursuit of knowledge and excellence in the field.

The Sri Lankan Robotics Challenge 2022/23 showcased the impressive talent in the country, highlighting the bright future ahead in the field of robotics and technology.



EXMO 2023

EXMO 2023, one of the most highly anticipated events of the year at the University of Moratuwa, successfully concluded on the 29th of July, 2023. It is the flagship engineering exhibition at the University of Moratuwa, organized by the Faculty of Engineering in collaboration with all other faculties and the UoM Alumni Association. EXMO is a unique platform for our undergraduates and postgraduates to showcase their creative and innovative engineering designs and research. One of the key objectives of EXMO 2023 was to ignite the innovation and creativity of the next generation and motivate them to explore the frontiers of technological advancement.

EXMO 2023 commenced on the 27th of July, and the inaugural ceremony was held at the Civil Auditorium. The opening event was honored by the presence of the chief guest, Prof. Sampath Amarathunge, the Chairman of the University Grants Commission. From day one, lengthy queues formed at the university's entrance, with a significant portion of the attendees being school students, one of the primary target groups for EXMO 2023. Apart from exhibits, various boot camps and competitions with exciting prizes awaited them.

The Department of Electronic and Telecommunication Engineering was one of the major attractions of EXMO 2023, as evidenced by the long queues at its entrance. Inside the department, an impressive array of projects was on display. These included final-year projects, Spark projects, SLRC projects, biomedical engineering projects, and other innovative endeavors. In addition to these exhibits, ENTC hosted bootcamps related to machine learning (ML), Internet of Things (IoT), and Arduino. These bootcamps provided participants with in-depth knowledge and practical skills in an entertaining manner. The event also featured competitions that challenged participants' problem-solving and engineering skills, with winners receiving exciting prizes.

Attendees were taken on guided tours of Analog, Digital, Telecom, Mobitel, UAV, and Biomedical laboratories. During these tours, laboratory equipment and associated projects were showcased. The demonstrators offered explanations at different levels to ensure that attendees, ranging from school students to undergraduates, could easily comprehend the information. The feedback received from the participants was overwhelmingly positive, expressing their satisfaction with the event. After three successful days, EXMO 2023 concluded, recording over 50,000 participants, making it an unparalleled success.



Career Fair 2023

by Kumal Hewagamage

The ENTC Career Fair is an event that holds a prominent position in the department's yearly agenda. Since 2018, the E-club has consistently organized this event each year, aiming to serve as a gateway for engineering undergraduates into the industry. It is the official careers fair of the Department of Electronics and Telecommunication Engineering, providing ENTC undergraduates an opportunity to connect with key industry players, understand their objectives, and participate in interviews.

This year's ENTC Career Fair took place successfully on the 7th of March, 2023, at the department's premises. More than 110 undergraduates participated in this event to explore job opportunities, and many of the industry's leading companies attended in search of ideal candidates. The event was sponsored by AXIATA Digital Labs, NCINGA, Yaala Labs, and LSEG.

This year's career fair was organized into four main stages. The first stage involved an etiquette and grooming workshop held via Zoom on February 23rd. Undergraduates learned valuable etiquette and grooming tips that could give them an advantage in interviews. The second stage featured over 40 mock interview sessions, allowing students to become familiar with interview scenarios. In the third stage, information sessions were conducted by seven companies via Zoom, where they shared their vision, values, and goals. This helped undergraduates align their skills with the companies that best matched their aspirations.

The most anticipated stage, the recruitment day, took place on March 7th at the ENTC premises. Equipped with knowledge gained from the previous stages, many undergraduates successfully faced interviews. Their success was evident by the many job offers they received. Several exceptional individuals even received multiple job offers. The event received praise from many attendees for its thoughtful organization, demonstrating that the Electronic Club had effectively concluded another successful ENTC Career Fair.



Tronic Avurudu

by Javin Manatunge

The Sinhala and Tamil New Year, colloquially known as '**Avurudu**', is a time of profound joy, renewal, and heartwarming togetherness. Avurudu always reminds us of one thing: 'family', a place where we share our love and laughter, where we speak our hearts out and can yet be certain that we are heard. The ENTC family embraced this spirit wholeheartedly and was getting ready to celebrate Avurudu in its own way. Both lecturers and students from the 18th, 19th and 21st batches gathered to celebrate the occasion.

All the attendees were greeted by a beautiful **Kolam design** at the courtyard of the ENTC building, decorated by our Tamil friends, which showed the true unity of the cultures that brighten this festive event. There was a table, '**Avurudu Kema Mese**', filled with lots of traditional foods to treat everyone. Traditionally and colorfully dressed ENTC undergraduates started gathering around where everything was ready to fire the pot of milk to inaugurate the occasion.

What is the New Year festival without its games? It was the time for all our ENTC undergraduates to shine and showcase their hidden talents. It was a lineup of Avurudu games we all love. Then it was game time, and many who hadn't had breakfast got treated with buns. Some even got to taste sand. 'Pani Bambare', 'Water Balloon Pass', 'Balloon Dance', 'Aliyata Aha', 'Hande Dehi' and 'Thun Pa Diweema' were among some of the other Avurudu games.

As rain came pouring down, we couldn't hold all the games as planned. It was time to be creative and proceed with games as time permitted. Physical fitness and strength were put to the test through games like 'Gama Haraha Divima', 'Kotta Pora' and 'Kamba Adima'.

Every minute since the event's beginning to end had been packed with cheers and excitement. The day was skillfully planned by ENTC students, ranging from the games to decorations. Both students and academic staff displayed their passion, joy, and excitement in the festive spirit of the Sinhala and Tamil New Year.

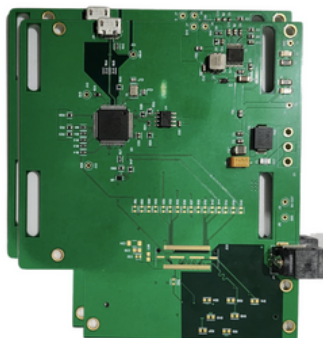
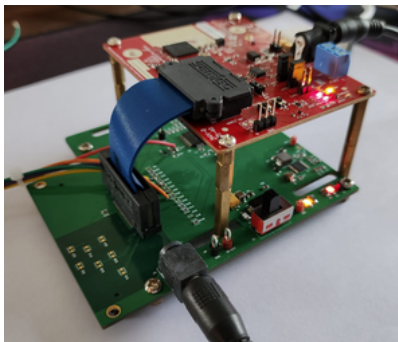
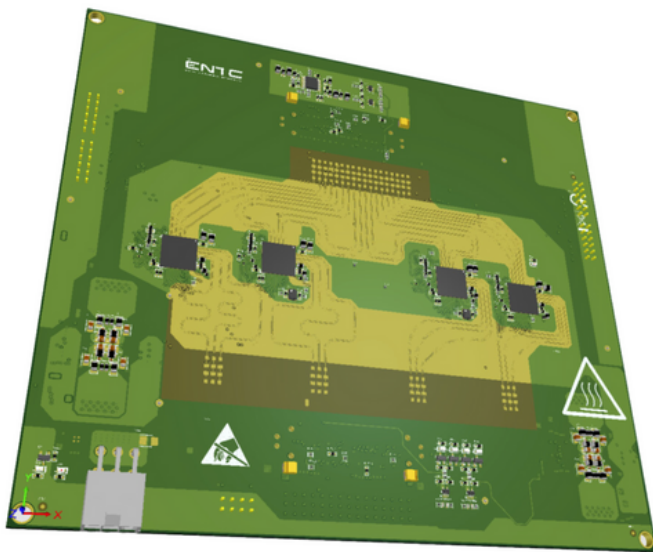
The day was bursting with energy, humor, and excitement, making it an unforgettable juncture of our journey.



by Kalinga Bandara

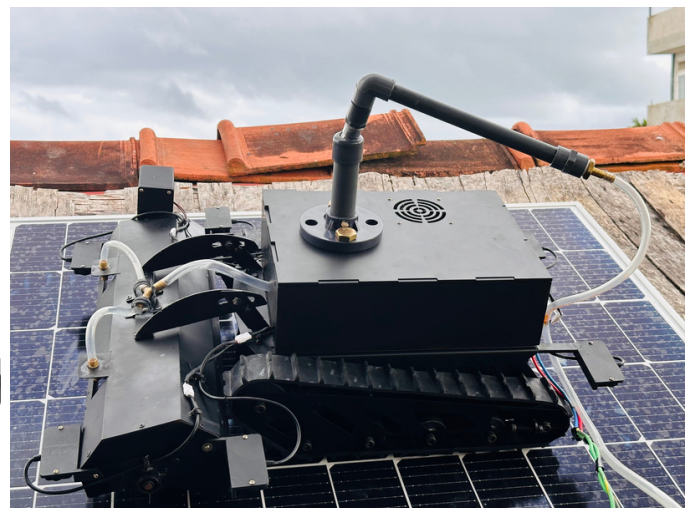
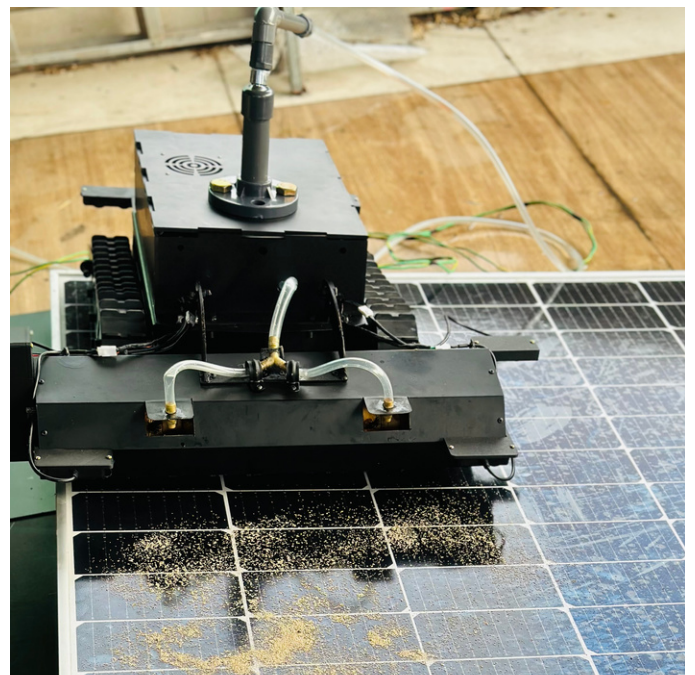
Scalable 77 GHz Digital Array for Autonomous Robotics in collaboration with Deep Silicon

As cars move towards advanced self-driving capabilities, they rely on radar, lidar, cameras, and ultrasound sensors to understand their surroundings. Radar, a key technology, works in all weather conditions and is compact, cost-effective, and low power. We need radars with longer detection ranges and detailed information. Current radars suffer from low range to accommodate a high-velocity resolution. In collaboration with Deep Silicon, a group of final-year students of the Department of Electronic and Telecommunication Engineering supervised by Dr. Chamira Edussooriya, Professor Arjuna Madanayake, Dr. Viduneth Ariyaratna, and Dr. Nilan Udayanga have taken on this challenge to address these issues. This project's scope revolves around developing a radar system with multibeam beamforming to increase the range beyond state-of-the-art radar specifications without deteriorating the velocity resolution. Deep Silicon played a significant role in this project by providing technical support throughout the project through the expertise of the members of Deep Silicon financial support for the hardware development. This initiative stands as a testament to the potential unlocked through industry-academia partnerships in shaping the future of technology in autonomous robotics.



Solar Panel Cleaning Robot in collaboration with Alta Vision Solar

Leveraging the advancements in Robotics to solve real world problems, the solar panel cleaning robot is a successful initiative of a group of final-year students of the Department of Electronic and Telecommunication Engineering supervised by Dr. Peshala Jayasekara in collaboration with the industry assistance of Alta Vision Solar, which offers customised solar energy systems to Sri Lankan homes and businesses seeking cost savings, reduced emissions, and energy independence. Keeping solar panels clean is crucial for their efficiency. They have successfully created an efficient mobile robot for cleaning solar panels, operating during daylight hours for safety, capable of adapting to different panel angles and gaps, offering user-friendly control via a mobile app with options for dry or wet cleaning, and providing real-time updates while alerting users to any panel issues, ultimately ensuring optimal solar panel performance with minimal user intervention.



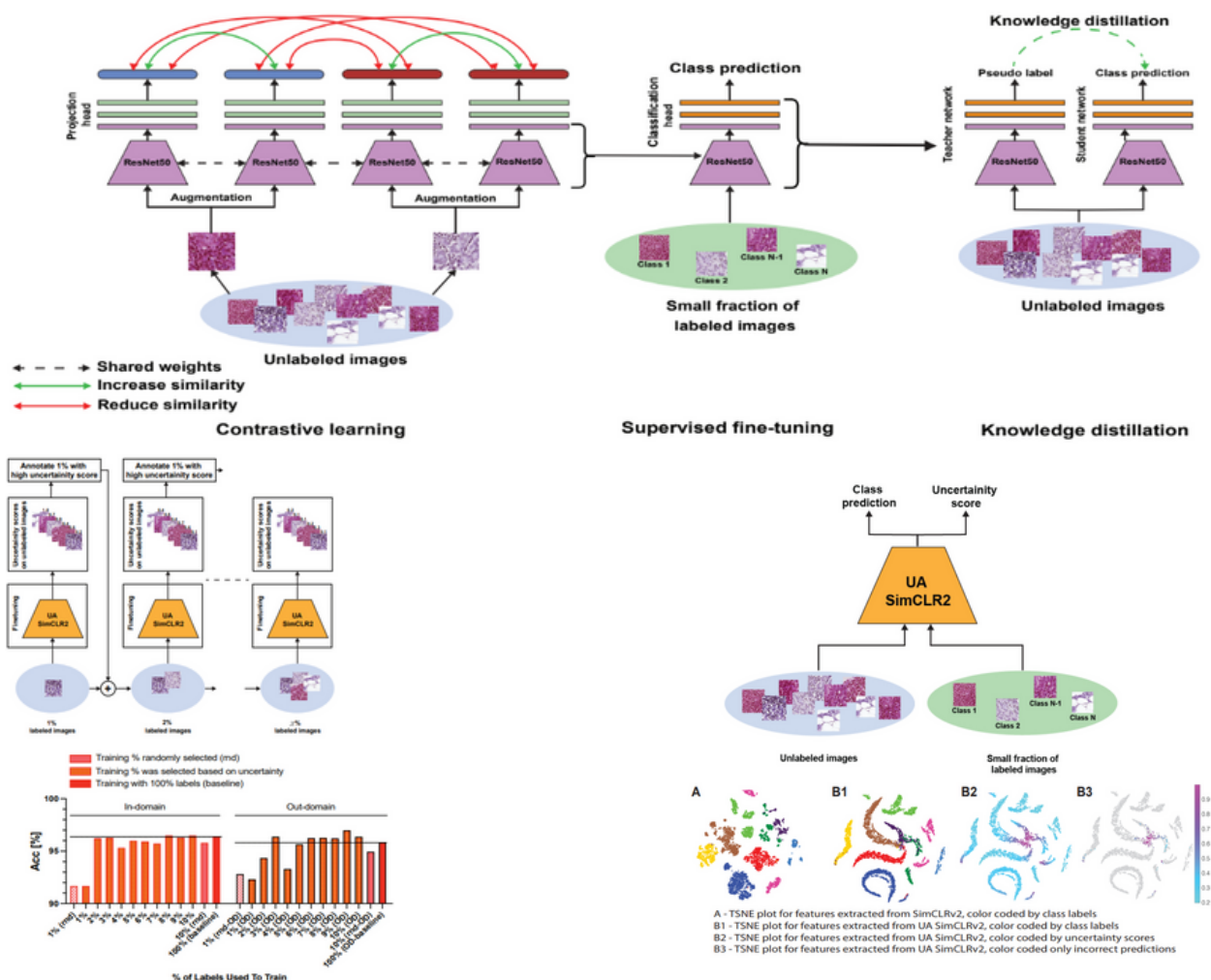
Contrastive Deep Encoding enables Uncertainty-Aware Machine-Learning-Assisted Histopathology in collaboration with John Harvard's Center for Advanced Imaging.

Computer-assisted histopathological diagnostics using deep learning is an emerging field that can potentially enhance multiple aspects of the clinical process including accuracy, analysis speed, and reproducibility. It has demonstrated its capability as a promising tool for clinical diagnosis, prognosis/survival prediction, treatment response forecasting, and the identification of regions of interest (ROIs) that exhibit substantial diagnostic value.

Though promising, deep learning in histopathology faces practical challenges in real-world clinical settings. Cancer-positive histopathology images often show small cancer areas amidst large sections of normal tissue. Above scenario means collecting enough diverse biopsies for training data can be difficult, especially for rare cancers, and privacy rules can limit data sharing. Additionally, marking large whole slide images is costly and time-consuming, requiring skilled pathologists to identify crucial patterns carefully. Furthermore, many computational pathology models aren't easy to understand, so the end user might not know how specific or uncertain the model is in its predictions, which could be a concern for making critical clinical decisions.

A group of final-year students of the Department of Electronic and Telecommunication Engineering supervised by Dr. Ranga Rodrigo and Dr. Chamira Edussooriya in collaboration with Dr. Dushan Nawoda Wadduwage, a John Harvard Distinguished Science Fellow at Harvard's Center for Advanced Imaging, Harvard University, attempted to tackle above challenges. They were provided with computation resources from Harvard computing resources and datasets. Further, Mr. Jathurshan Pradeepkumar and Mithunjha Anandakumar, Post Baccalaureate Fellows at Harvard University, provided guidance to complete the project successfully.

They introduced an uncertainty aware learning method for digital pathology based on the seminal SimCLRv2 self-supervised framework. First, annotation limitations were overcome by training an accurate model with minimal labelled training samples. Then, the model was established as a versatile framework capable of adapting to various clinical tasks. Finally, they quantified the uncertainty in model predictions which helps pathologists make better decisions.



The Journey of Spark Challenge in Fostering Project Management Skills and Sustainable Innovations

by Nisitha Maneesha

A project which was launched with the goal of creating a platform for the undergraduates at the Department of Electronic and Telecommunication Engineering to have a strong foundation in project management while adhering to the sustainable development goals of the United Nations and climate change Issues, Spark Challenge steered through some vital periods of its journey while establishing remarkable milestones.

Over the past few months, the second iteration of the Spark Challenge concluded by witnessing some impressive ideas aimed at addressing the pressing concerns of the modern world. As the culmination of a year-long project comprising eight different stages, the teams demonstrated their talent and capabilities by coming up with impressive and novel solutions for day-to-day issues, primarily based mostly on Sri Lankan communities. It was very challenging even for the judging panel to pick the top five contestants who should be sent from the preliminary rounds to the finale.

At the finale, held on the 11th of June 2023 at the Civil Auditorium, the top five competitors presented their final pitches. After an exciting final round, the winners were invited onto the stage. Team Spectro, who proposed a solution to the energy crisis where biological processes of green algae could be used to produce hydrogen power, emerged as the second runner-up of the challenge. Then the first runner-up award went to the team Techstatic, who implemented a product capable of warning the farmers about the fertilizing requirements after analyzing the soil condition. Finally, the winner was Team Pathfinders, who came up with a solution for picking up the right balance of chemical composition for different crops.

In parallel with the Spark Challenge, the Spark branch launched another vital project aimed at significantly helping Sri Lanka. In collaboration with the Education Ministry of Sri Lanka, the Spark branch conducted a **"Teacher Training" program**, focusing on providing Advanced-Level Information and Communication Technology teachers with machine learning knowledge, which will be highly beneficial for effective teaching practices. Throughout the project, teachers had the opportunity to learn fundamental machine learning concepts which will help them establish a strong foundation in this domain and expand upon it after successful completion. The program consisted of six sessions which spanned three days. Out of those six sessions, three were focused on providing theoretical knowledge and the other three were dedicated to offer hands-on experience within the scope. The theoretical sessions were conducted by the lecturers of the department. The practical sessions were headed by the final-year undergraduates. Upon completion of the three-day course, teachers were awarded with certificates as a token of appreciation.

After the successful completion of the second iteration of the Spark project, the **Spark Challenge 2023/24** officially commenced with the launch of the first session, which focused on students to explore themselves and gain a solid understanding of their teammates by sharing those insights. The second stage also took place recently, intending to help students pick a suitable problem scope for the remaining stages of the Spark Challenge. As final remarks, we can define the Spark project as a platform which will help the ENTC undergraduates prepare themselves to be technical leaders by being effective real-world problem solvers who are deeply connected with the realities of the world.



by Chehal Jayasuriya

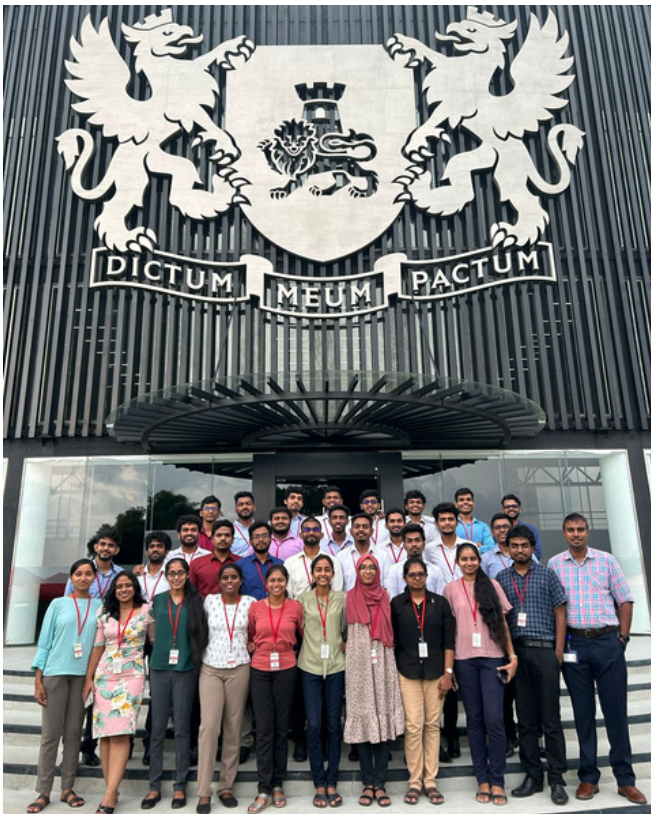
LSEG C++ Course

It is of vital importance that any engineer today is up-to-date with their coding skills. With this strong idea in mind, London Stock Exchange Group of Technology aided the second year undergraduates of our department with a challenging project.

The students were taught from Introduction to C++ to High Performance Computing with C++. Almost all the C++ programming concepts were covered in this programme with object oriented programming, SOLID principles and design patterns.

Finally the students were given a task to create a trading app for a flower retail business. The entire implementation was required to be done using C++ Programming Language, and well over 60+ undergraduates participated in this competitive project. The project was evaluated based on the design, coding practices, efficiency of the program and the speed of the program. The students were asked to present their projects, and the results were tested against a data set provided by the company. The final evaluation took place at the LSEG premises on the 27th of October with the selected finalists.

Overall, this challenging project not only enhanced the students' coding skills but also provided them with a practical understanding of how these skills can be applied in real-world scenarios, thereby preparing them for future success in their engineering careers.



Visual SLAM Webinar

Over the past few years, the Robotics Research Community has been exploring **Simultaneous Localization and Mapping (SLAM)** to help robots navigate autonomously in unfamiliar environments by generating the map and accurately localizing their location in the map. To address this task, various SLAM algorithms based on different sensors have been proposed, including classical methods and deep learning-based approaches.

Classical methods typically rely on handcrafted low-level features that tend to fail under challenging conditions, e.g., textureless regions. Deep learning based approaches mitigate such problems due to their ability to learn high-level features.

An online webinar on 'Visual SLAM' introducing how deep learning collaborates with SLAM and improves its accuracy and robustness, was held to eliminate the curiosity among robotic enthusiasts in Sri Lanka, especially for ENTC undergraduates. The webinar was conducted by Mr. Zhang Dongshuo, research associate at Nanyang Technological University, Singapore. The webinar took place on 7th September with 90+ participants via Zoom platform.

The webinar was a great opportunity for the participants to learn about the latest developments and applications of visual SLAM and deep learning. The speaker also answered the questions and doubts raised by the audience. The feedback from the participants was positive and encouraging, and they expressed their interest in learning more about this topic in the future.

WEBINAR ON

VISUAL SLAM

Navigating the world one pixel at a time

SPEAKER

Mr. ZHANG Dongshuo

Research Associate in Hardware and Embedded Systems Lab, Nanyang Technological University, Singapore

M.S. in Electronic Information Engineering from City University of Hong Kong

Developed EKF-based SLAM algorithms to efficiently deploy in DJI Mavic series drones and Robomaster S1 robots

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ENTC
Electronics and Telecommunication Engineering

Prof. Nuwan Dayananda



In August of 2021, our esteemed Dr. Nuwan Dayananda achieved a significant milestone in his career by being promoted to the rank of Professor in Biomedical Engineering. We extend our heartfelt congratulations on this well-deserved promotion, which serves as a testament to his unwavering dedication and commitment to his field.

Having been interested in electronics since childhood, Prof. Nuwan Dayananda pursued the field of Electronic and Telecommunication Engineering at the University of Moratuwa, obtaining his B.Sc. (Hons.) Engineering degree in 1999. He then went on to receive his Master's degree in Electrical & Computer Engineering (M.E.Sc.) and Ph.D. degree in Biomedical Engineering from the University of Western Ontario, Canada in 2003 and 2008 respectively. His PhD dissertation was on the topic "Nonrigid Registration of 3D Carotid Ultrasound and MR images".

Prof. Nuwan Dayananda has contributed immensely to research journals and top conferences covering multiple areas. Some of his contributions are "Increased Brain Volumetric Measurement Precision from Multi-Site 3D T1-weighted 3T Magnetic Resonance Imaging by Correcting Geometric Distortions", "In-Situ 4D Tomography Image Analysis Framework to Follow Sintering within 3D Printed Glass Scaffolds", "Abnormal Heart Sound Classification using Phonocardiography Signal" and "Comparison of Quality Control Methods for Automated Diffusion Tensor Imaging Analysis Pipelines". His research articles and journals have earned him many awards such as the award for Outstanding Research Performance by Academic Staff of University of Moratuwa for 8 years, the Research Excellence Award at the Institute of Circulatory and Respiratory Health of Canadian Institutes of Health Research Young Investigators Forum, Canada in 2008 and the Research Excellence Award at the Imaging Network Ontario (INO) 6th Annual Imaging Symposium in 2007.

In addition to his duties as a professor, Prof. Dayananda also serves as the Director of Undergraduate Studies and the Director of the Premium-UoM Research and Development Laboratory for Biomedical Technologies at the University of Moratuwa. He has previously served as the Head of the Department of Electronic and Telecommunication Engineering at the University of Moratuwa. He also served as a Scientific Associate at the Rotman Research Institute, Baycrest Health Sciences, Toronto, Canada and Research Associate at the Robarts Research Institute, Western University, London, Canada.

Prof. Dayananda has been a key contributor in the establishment of the Medical Technology stream at the Faculty of Medicine at the University of Moratuwa. He also played a pivotal role in introducing a new undergraduate specialization in Biomedical Engineering at the Department of Electronic and Telecommunication Engineering, University of Moratuwa.

As a professor and expert in biomedical engineering, Prof. Dayananda's influence is felt throughout the field. His story is a source of inspiration to students, peers and the academic community. We extend our warmest congratulations to Prof. Nuwan Dayananda for his achievements and look forward to the continued impact of his work in the field of biomedical engineering.

Professor Dileeka Dias

Professor Dileeka Dias, a cherished figure at the Department of Electronic and Telecommunication Engineering, started her academic journey with a Bachelor of Science from the same department. At the University of California, Davis, she pursued a Master of Science in Electrical Engineering and Computer Science, followed by a Ph.D. in Digital Mobile Communications. Since joining ENTC as a lecturer in 1985, Professor Dias has left an indelible mark on both the department and the field of Electronic and Telecommunication Engineering. She has been a Professor at the University of Moratuwa since 2003.

Her expertise and research interests span a vast area, including wireless sensing and positioning, location-based systems, wireless sensor networks, Internet of Things, and intelligent transportation systems. Prof. Dias has authored numerous publications that have achieved widespread recognition with over 800 citations.

During her career, Prof. Dias led the Department of Electronic and Telecommunication Engineering from 1999 to 2004 as the Head of the Department. She later held roles as the Dean of the Faculty of Information Technology for three years starting from 2007 and as the Dean of the Faculty of Graduate Studies for six years from 2015, demonstrating her unwavering commitment to academia. In addition to a co-authored book, "Essentials of Modern Telecommunications Systems", some of Prof. Dias's most popular publications include "Integration of fingerprinting and trilateration techniques for improved indoor localization" and "Database Correlation for GSM location in outdoor and indoor environments". Furthermore, her directorship of the Dialog-University of Moratuwa Mobile Communication Research Lab emphasizes her dedication to innovation. The Lab has played key roles in the first-ever smart energy meter network deployment and the largest industrial IoT installation to date in Sri Lanka. In Prof. Dias, we find a unique blend of academic excellence and personal connection. Beyond the field of academia, she is admired for her unwavering dedication and mentorship of her students. Her warm and welcoming demeanor, coupled with a genuine willingness to connect with her undergraduates, has captured the hearts of countless generations of students and alumni.



Dr. Prathapasinghe Dharmawansa



In the heart of the ENTC, you'll find a remarkable individual who has dedicated his life to pursuing knowledge and nurturing young talents. Dr. Prathapasinghe Dharmawansa, a senior lecturer at ENTC, is not just an educator but a beacon of excellence in academia and research.

Dr. Dharmawansa's academic journey began at the University of Moratuwa, where he earned his Bachelor's and Master's degrees from ENTC. His passion for knowledge and commitment to specialization led him to pursue a Doctor of Engineering in Information and Communication Technology at the Asian Institute of Technology. From 2007 to 2015, he held several post-doctoral research positions in a few prestigious universities in the world. His research career culminated with his research associateship at the Department of Statistics, Stanford University, CA. In 2015, Dr. Dharmawansa returned to his alma mater to share his interdisciplinary knowledge and expertise as a senior lecturer. He currently serves as the research coordinator of the department.

His research interests are as diverse as his academic journey, spanning communication theory, statistical signal processing, random matrix theory, wireless communication, and multivariate analysis.

However, Dr. Dharmawansa's journey does not stop there. He has achieved unprecedented success, resulting in three IEEE Transactions on Information Theory papers through undergraduate research studies conducted at ENTC. Such an achievement is exceptional in the history of ENTC and the entire university system of Sri Lanka.

In addition, Dr. Dharmawansa owns an impressive record of 17 first-author Q1 papers, considered as the most prestigious journals in the field. In particular, four of them were authored during his career at ENTC, a rare accomplishment among faculty members. Dr. Dharmawansa's impact goes beyond ENTC. He was a visiting lecturer at the Department of Statistics at Stanford University from 2016 to 2018, contributing to international academic communities. Moreover, he serves as an editor of the IEEE Wireless Communications Letters journal, a Q1 journal of the IEEE Communications Society. He also played a pivotal role in establishing the Business Faculty at the University of Moratuwa, crafting the curriculum for the financial analytics stream, demonstrating his dedication to academic growth. Additionally, he held the position of Quality Assurance Director at the Business Faculty of the University of Moratuwa in 2017.

Among his numerous accomplishments, supervising the grand prize-winning team at the IEEE SP CUP 21 at an international level stands out. Furthermore, him being awarded the IEEE ICC 2011 Best Paper Award in Communication Theory remains unmatched by any other Sri Lankan researcher to date. Dr. Dharmawansa's achievements are even more remarkable when considering the challenges and limitations faced by academics in Sri Lanka. His success shines as a beacon of hope for young Sri Lankan researchers. Dr. Dharmawansa is a valuable asset to the Sri Lankan academic community and the global quest for progress in a world that develops knowledge and innovation.

Mr. L. Tharindu Nirmal Wickremasinghe



**“Always dream big,
and push yourself
to the limits. You
will find yourself
surrounded by
like-minded
friends who go the
distance with you.”**

ENTC is renowned for producing some of the most brilliant minds in the world. Continuing this legacy here is a talented individual, a recent graduate from the 18th batch, Mr. Tharindu Wickremasinghe.

According to him, the secret ingredient for his success is to **‘Dream big and work hard’**. Tharindu started his academic journey at Nalanda College, Colombo, where he demonstrated his brilliance in both academics and many extracurricular activities. He has been a junior prefect, a scout, the debating team captain and the treasurer of the Astronomical society. Tharindu demonstrated exceptional skills in chess and badminton, as well as a notable talent in music. During his school years, he participated and won medals in many Olympiads and competitions in Mathematics, Earth sciences and Astronomy. He was awarded the **‘Most Outstanding Student’** of Nalanda College for his overall academic and extracurricular activities in his graduating class.

After completing his A/Ls, young Tharindu stepped into the Department of Electronic and Telecommunication Engineering at the University of Moratuwa. There, he performed exceptionally well, achieving a record-breaking GPA of 4.16 out of 4.2. While in the university, he participated in many competitions, leading to a multitude of awards. He was in the championship winning team of Decrypt 2019 - Product Innovation Ideathon, a finalist of Mora Xtreme 2019 and 2020, the runner-up of Datathon 2020, the champion of the Belt and Road Electricity Simulation Competition 2020, the Champion of Datathon 2022, the champion of Data Storm 2021 and the runner-up of Datathon 2023.

For his industrial training, he served as a Research Intern at the School of Computing, University of Sydney, Australia, where he worked on human motion prediction in virtual reality. His team published a paper titled ‘Hierarchical Graph Neural Networks for Outdoor Point Cloud Processing’ at the 26th International Conference on Pattern Recognition (ICPR 2022). In the IEEE Signal Processing Cup research competition, he was part of the team that engaged in ‘Real Time Configuration of Intelligent Reflecting Surfaces’, and was awarded the first place after defending their solution at ICASSP 2021. As a part of his undergraduate research, he worked on ‘Masked Optimisation with Selective Attention for Image Reconstruction’. He is currently interested in research in signal processing, parsimonious models and compressed sensing.

In all his brilliance he never forgot to give it back to society. He was the co-founder of the Danuma Yathra Foundation, volunteering in rural schools of Sri Lanka, teaching high school mathematics and science. Currently, he also works as a Visiting Instructor in the Department of Electronic and Telecommunication Engineering, teaching several modules.

Tharindu was awarded three gold medals from the university in his graduating class. Two awards for the **best academic performance in the Department of Electronic and Telecommunication Engineering and the Faculty of Engineering**; and the award for the **most outstanding graduand in the Faculty of Engineering**. We wish him good luck in his future endeavours.

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**“The strength
of the team is
each
individual
member. The
strength of
each member
is the team.”**

- PHIL JACKSON -

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Authors

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Vishagar Arunan
Didula Samaraweera
Devnith Wijesinghe
Viyathma Vidumini
Tharushi Karavita
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