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ComSpective

Enlightening perspectives on computing today and tomorrow

"Have long-term aspirations but take small, steady steps to progress"

- Hasith Yaggahavita

- Technologies & Trends
- Research & Applications
- Professional & Personal Development
- Perspectives on Computing
- Software Development Projects
- Interdisciplinary Topics
- Industry Perspectives
- Alumni Views
- News & Achievements

Faculty of Computing
Sabaragamuwa University of Sri Lanka

Sabaragamuwa University of Sri Lanka
IEEE Student Branch

Sabaragamuwa University of Sri Lanka
IEEE Student Branch

SOCS

Volume: 04 Issue: 01 September, 2024

Editor's Note

Dear Reader,

Computing technologies are the backbone of modern innovation, driving progress in fields ranging from healthcare and finance to education and environmental sustainability. By embracing these advancements, we empower ourselves to build more resilient systems, create smarter solutions, and improve the quality of life for people around the world.As we delve into emerging computing technologies, such as artificial intelligence, quantum computing, and blockchain, we unlock new possibilities that can transform industries, enhance efficiency, and solve complex global challenges.

In essence, as we explore and develop new computing technologies, we are actively shaping a future that is stronger, more successful, and better equipped to handle the challenges of tomorrow. This pursuit of technological excellence is key to ensuring a prosperous and sustainable future for all.

It is with great pride and enthusiasm that we present to you the latest edition of ComSpective, the bi-annual technical magazine of the Faculty of Computing at Sabaragamuwa University of Sri Lanka. This publication serves as a platform to share latest findings from Sri Lankan researchers and inventors with the global community. The ComSpective Volume 04 Issue 01 showcases innovative ideas, insights, experiments, and research findings from Sri Lankan technology professionals, researchers, and emerging inventors.

As we continue to navigate the ever-evolving landscape of technology, I encourage all readers to engage with the content of this magazine critically and creatively. Let ComSpective be a source of inspiration and a catalyst for further exploration in the exciting field of computing.

Thank you.

Subodhi Wasalthilaka
Editor-in-Chief

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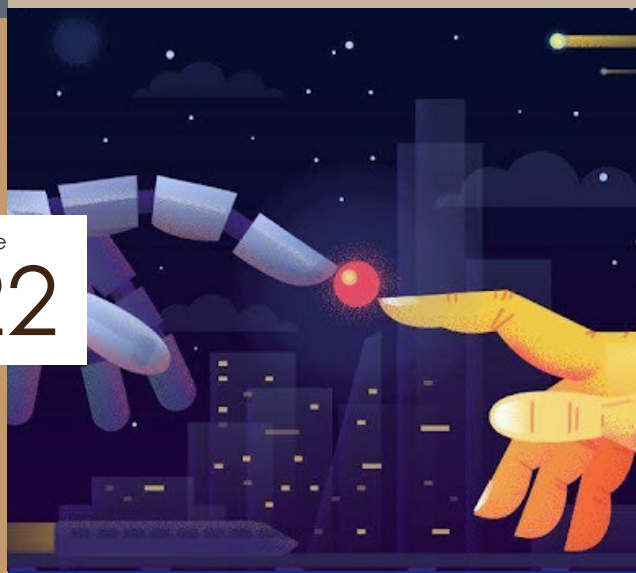
FEATURES



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The Faculty of Computing is pleased to present the 1st Issue of the Volume 04 of ComSpective, the bi-annual ICT magazine published by the Faculty of Computing.

We dedicate ourselves to making the world smarter, with each and every Issue of the Magazine, spanning a broad range of computing disciplines.

FACULTY OF COMPUTING

CELEBRATING THE FIRST ANNIVERSARY OF THE FACULTY OF COMPUTING, SABARAGAMUWA UNIVERSITY OF SRI LANKA

Composed by Dr. Sugeeswari Lekamge and Ms. Ashansa Wijerathne, Faculty of Computing, Sabaragamuwa University of Sri Lanka

Founded as the 9th Faculty of the Sabaragamuwa University of Sri Lanka (SUSL) under Section 27(1) in the Gazette Extraordinary 2312/14 on December 27, 2022, the Faculty of Computing officially began its journey with a House Warming Ceremony on January 2, 2023. This significant transformation from the Department of Computing and Information Systems within the Faculty of Applied Sciences to a dynamic and thriving independent Faculty symbolizes the progressive vision of SUSL.

A Year of Growth and Excellence

In its inaugural year, the Faculty of Computing has established a robust academic environment underpinned by a highly qualified panel of academic staff, including esteemed professors, senior lecturers, and dynamic young lecturers. The Faculty's strength is further augmented by eminent senior academics and industry professionals who contribute as visiting lecturers, ensuring a blend of theoretical knowledge and practical expertise for the students.

The Faculty continually seeks to strengthen its industry collaborations, aiming to provide students with early exposure to industrial environments and secure promising employment opportunities upon graduation.

Fostering Research and Knowledge Dissemination

The Faculty of Computing is at the forefront of research and knowledge dissemination, organizing numerous initiatives such as the International Conference on Advanced Research in Computing (ICARC), the Computing Undergraduate Research Symposium (ComURS), the Sabaragamuwa University Journal of Computer Science (SUJCS), and ComSpective, the Biannual ICT Technical Magazine. These platforms not only showcase the Faculty's research capabilities but also provide students with invaluable opportunities to present their work and engage with the global academic community.

A Vibrant Student Community

The Faculty's vibrant student community, represented by the Society of Computer Sciences (SOCS), the IEEE Student Branch of SUSL, and the WIE Affinity Group of SUSL, is actively involved in a plethora of extra-curricular activities. These groups play a crucial role in fostering a sense of community, leadership, and professional development among students.

Looking Ahead

As we celebrate this significant milestone, our main aim remains to produce highly qualified and well-trained graduates who are ready to meet the current and emerging needs of the Sri Lankan IT/BPM industry. We envision our graduates as individuals equipped with a perfect blend of theoretical knowledge, practical skills, and the dispositions necessary to excel in their chosen careers.

Under the dedicated leadership, guidance, and mentoring of our energetic academic staff, we have explored new computing disciplines, strengthened alumni support, and fostered enhanced collaboration with industry networks. Our students, hailing from every corner of Sri Lanka, are not only rich in computing talent but also possess diverse interests—from aesthetics to sports—and a deep sense of social responsibility, making our future incredibly promising.

Gratitude and Future Aspirations

As we celebrate this significant milestone, we extend our heartfelt gratitude to everyone who has contributed to shaping our collective experience at the Faculty of Computing. Your support has been instrumental in our journey, and we look forward to continued growth and success in the years to come.

Creative Graphics Editing: *Pabasara Ransinghe, Department of Computing and Information Systems, Faculty of Computing*

How Vision Transformers outperforms CNNs in Single Object Tracking

Dr. T. Kokul*(kokul@univ.jfn.ac.lk) Department of Computer Science, University of Jaffna.*

Dr. T. Kokul attached to the Department of Computer Science, University of Jaffna. His research interest includes Object Tracking, Deep Learning, Computer Vision and Human Computer Interaction.

Single Object Tracking (SOT) is a prominent research problem in computer vision, focused on locating an unidentified target object within a video sequence through specialized algorithms. In recent years, the demand for single object tracking algorithms has increased, driven by their widespread utilization across diverse domains such as video surveillance, and automated driving. Although numerous approaches have been proposed over the past three decades, object tracking remains challenging due to significant variations in the target's appearance between frames, the presence of similar object distractors, and background clutter. However, recent algorithms have shown remarkable performance improvements in tracking, particularly with the introduction of vision transformers. This article aims to elucidate the factors contributing to this notable enhancement.

SOT algorithms take the state (location and shape) of the target from the first frame of a video sequence as the only input and then locate the target in the subsequent frames. Most approaches extract the appearance features of the target from the first frame and then utilize a machine learning model to search for the target in subsequent frames. Prior to the emergence of deep learning, tracking methods relied on several hand-crafted features alongside conventional machine learning algorithms. However, the limited generalization of these hand-crafted features across various target objects severely constrained the tracking performance of these approaches.

Success of CNNs: After the emergence of deep learning, Convolutional Neural Network (CNN) based approaches have dominated the SOT community for the past ten years. In CNN-based methods, single object tracking is treated as a similarity matching problem, where the goal is to search for the similarity of

the target image from the first frame (known as the target template) within the remaining frames. In CNN-based trackers, object tracking is accomplished through two distinguishable stages: feature extraction and similarity matching. A two-branch CNN model, known as a Siamese network, is utilized for feature extraction. The target template and a search frame are inputted into the Siamese network, and their features are individually extracted using corresponding CNN branches. After the feature extraction, the similarity between the target template and search frame features is measured, and the target is located in the search frame based on the similarity score. The SiamFC tracker [1] is one of the well-known CNN-based trackers. Since CNN-based trackers learn to measure the similarity between images without requiring target-specific knowledge, they exhibit good generalization capability and consequently significantly outperform hand-crafted trackers while maintaining real-time tracking speed.

The Rise of Vision Transformers: Based on the remarkable success of Transformer models in Natural Language Processing (NLP) tasks, researchers began applying them to vision tasks starting in 2021, referring to them as vision Transformers [2]. Since Transformers can learn relationships between inputs in a sequence, vision Transformers divide an input image into a set of equally sized patches and consider them as a sequence based on their positional order. Transformers process data by simultaneously attending to all positions in an input sequence, and hence they can capture global information within an image effectively.

Transformer Tracking: Similar to other vision tasks, researchers have been employing vision Transformers in SOT for the past three years. In Transformer tracking approaches, the target template and a search frame are fed into a Transformer. As the first step, both images are divided into equally-sized patches, which are then concatenated together to form an input sequence. These concatenated patches are then fed to a set of encoder layers, and their attention features are extracted collectively. Finally, after the last encoder layer, the target is located based on the attention scores of the search patches. Experiments on Transformer trackers have demonstrated a remarkable increase in performance compared to CNN-based trackers on challenging datasets [3]. This improvement is observed in terms of tracking accuracy, robustness, and generalization across diverse datasets and scenarios.

Factors Contributing to the Performance Boost of Vision Transformers: In CNN-based approaches, feature extraction and similarity matching are performed sequentially, whereas these processes are executed simultaneously in Transformer tracking, enabling more accurate identification of the target's location in the search frame. Additionally, in CNN-based tracking, the features of the target template and search frame images are extracted individually, while in Transformer tracking, these features are extracted together, facilitating the extraction of more target-specific features in the search frame. Moreover, Transformers utilize self-attention mechanisms to capture global dependencies within the input image, while CNNs use local receptive fields to capture spatial information. Due to this capability, Transformer trackers can successfully locate the target even when it is occluded by other objects. Additionally, unlike CNNs, which may suffer from information loss over multiple layers, Vision Transformers maintain long-term memory through their self-attention mechanism, facilitating better temporal coherence in object tracking.

Challenges of Transformer Tracking: Although vision Transformers have demonstrated outstanding performances, compared to CNNs, the computational efficiency of Transformer trackers is poor due to their large number of parameters. Therefore, training a Transformer tracker takes more time and requires a massive amount of data, posing a challenge for many real-world lightweight applications.

References

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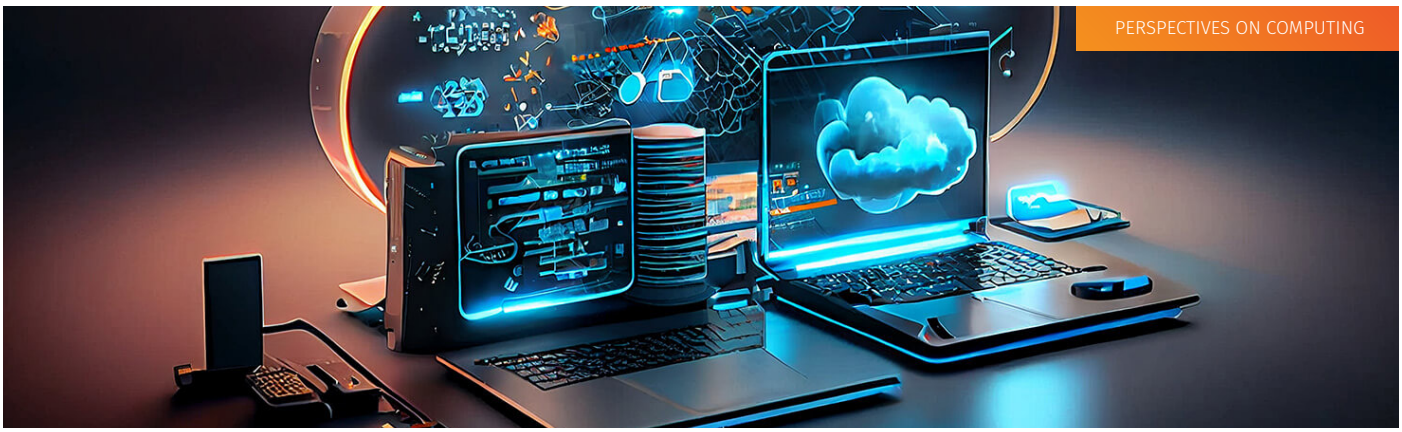

Modern Cloud Computing Solutions for Medicine and Surgery with Artificial Intelligence

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Cloud computing is a technology that eliminates the need to own or maintain p hysical infrastructure by enabling users to access and use computer resources (including servers, storage, databases, networking, software, and more) over the internet. Users can use cloud services offered by external companies instead of installing software or storing data on local personal computers or servers. Usually provided on a pay-as-you-go basis, these services allow consumers to scale resources up or down according to their needs. The benefits of cloud computing include cost-effectiveness, scalability, flexibility, and resource accessibility from any location with an internet connection.

The creation of computer systems that are capable of learning, reasoning, solving problems, perceiving, and interpreting language are examples of artificial intelligence (AI) in action. AI comprises a range of methods and strategies, such as robots, computer vision, natural language processing, deep learning, and machine learning. In machine learning, a branch of AI, algorithm are trained on data to identify patterns and make judgments or predictions without explicit programming. Applications for AI technologies can be found across various industries, including retail, healthcare, finance, and entertainment.

Cloud computing and AI integration combines the advanced analytical powers of AI algorithms with the scalable computing capacity of cloud infrastructure. Cloud platforms provide the infrastructure, storage, and computational power required to install and operate AI applications effectively. Without having to make a substantial upfro-

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nt investment in hardware or software infrastructure, enterprises may manage huge datasets, deploy AI models at scale, and access AI tools and frameworks by utilizing cloud services. This integration enables the development and implementation of AI-powered solutions across a range of industries, fostering innovation, efficiency, and competitiveness.

AI and cloud computing are reinventing corporate processes, products, and services, and transforming entire sectors. In the healthcare industry, AI systems operating on cloud platforms evaluate patient data, assist with diagnosis, customize treatment regimens, and enhance patient outcomes. In banking, fraud detection, investment optimization, and customer service automation are made possible by AI-powered analytics operating on cloud infrastructure. AI-driven predictive maintenance on cloud systems decreases downtime and increases equipment reliability in manufacturing. By integrating cloud computing and AI, organizations across various industries can gain new insights from data, automate tedious operations, improve decision-making, and create new avenues for innovation and expansion.

The exceptional scalability offered by cloud-based AI solutions allows businesses to efficiently process massive amounts of data without the limitations of local IT resources. Additionally, the cloud platform provides users with access to cutting-edge AI tools and libraries, facilitating rapid development and implementation of AI models without complex infrastructure setups. Cloud-based AI solutions also enable geographically dispersed teams to collaborate and share knowledge, driving innovation and accelerating AI-driven development across various industries.

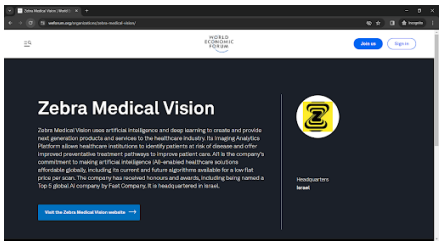
The following are five limitations of local or federated AI solutions compared to cloud-based AI solutions:

(1) Limited Scalability
(2) Resource Constraints
(3) Reduced Accessibility
(4) Data Silos
(5) Security and Privacy Concerns

The combination of AI and cloud computing has created a seismic shift in the rapidly evolving healthcare industry, completely transforming how medicine and surgery are practiced. This article explores the practical applications of these technologies, highlighting their significant impact on day-to-day operations in the healthcare sector. The following are major uses of cloud computing and AI in healthcare.

Medical Imaging Analysis

AI algorithms are used by cloud-based platforms to evaluate medical images, including CT, MRI, ultrasound, and X-ray imaging.



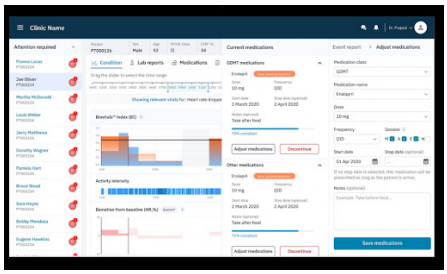
Source: https://www.weforum.org/organizations/zebra-medical-vision/

Figure 1: *An article on Zebra Medical Vision as per the World Economic Forum*

These tools assist radiologists in diagnosing patients more quickly and accurately by identifying anomalies and patterns. ***Aidoc, Zebra Medical Vision,*** and ***Google's DeepMind Health*** are a few examples of such platforms.

Remote Patient Monitoring

Vital signs and other health metrics can be continuously monitored in patients outside conventional clinical settings thanks to wearable technology and Internet of Things sensors. Real-time analysis of the gathered data by AI algorithms enables the early identification of health problems and implementation of preventative measures. Companies such as Current Health and Biofourmis provide cloud-based remote patient monitoring solutions.



Source: https://www.fiercebiotech.com/cro/biofourmis-rolls-out-expanded-digital-clinical-trial-platform

Figure 2: *A dashboard of Biofourmis*

Electronic Health Records (EHR) Management

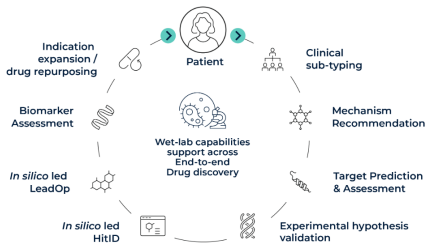
Healthcare professionals can securely store, view, and share patient medical records with one another thanks to cloud-based EHR systems. AI-powered tools assist with predictive analytics, decision assistance, and data entry to enhance patient outcomes and expedite administrative work. The EHR platform from Epic Systems and HealtheIntent from Cerner corporation are two examples.

Surgical Assistance and Planning

Surgeons can receive assistance with preoperative planning, intraoperative guidance, and postoperative monitoring from AI algorithms that are incorporated into cloud systems. In order to optimize surgical operations and lower complications, these technologies assess medical imaging data, patient-specific characteristics, and surgical guidelines. Cloud-based AI is used by medical companies such as Proximie and Stryker's Mako Medical System to aid with surgery.

Drug Discovery and Development

Large-scale data analysis and simulation for drug development and discovery procedures are made possible by cloud computing. AI algorithms examine genetic information, clinical trial data, and molecular structures to find possible medication candidates, predict drug interactions, and customize treatment plans. Cloud-based AI is used by businesses like ***BenevolentAI*** and ***Atomwise*** for drug discovery.



Source: https://www.benevolent.com/benevolent-platform/end-end-drug-discovery/

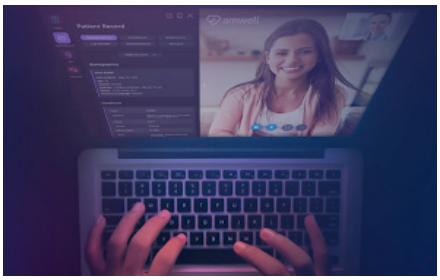
Figure 3: *End-to-end Drug discovery with AI in BenevolentAI*

Clinical Decision Support Systems (CDSS)

At the point of care, cloud-based CDSS offers evidence-based guidelines and suggestions to medical professionals. To help clinicians make well-informed judgments about diagnosis, treatment planning, and disease management, AI algorithms evaluate patient data, medical literature, and treatment protocols. ***VisualDx*** and ***IBM Watson Health*** are two examples.

Telemedicine and Virtual Care:

Cloud-based telemedicine technologies facilitate virtual visits, remote consultations, and patient telemonitoring. AI-driven features like chatbots for triage and natural language processing (NLP) for transcription increase the effectiveness and accessibility of virtual care services. Cloud-based telemedicine solutions are provided by businesses like ***Amwell*** and ***Teladoc Health***.



Source: https://business.amwell.com/converge-hybrid-care-platform

Figure 4: *The dashboard of the Amwell application*

Here are some key advantages of the integration of cloud computing and AI in the healthcare sector.

Enhanced Patient Experience:

Patients can obtain healthcare treatments remotely through cloud-based telemedicine solutions,eliminating the need for travel and shortening appointment wait times. AI-enabled chatbots and virtual assistants can improve patient satisfaction by answering questions, str-

eamlining administrative tasks, and offering round-the-clock care.

Predictive Analytics and Preventive Care:

AI algorithms running on cloud platforms can analyze patient data in real-time to identify patterns, predict disease progression, and stratify patient risk. This enables healthcare providers to implement proactive interventions, deliver targeted preventive care, and reduce hospital readmissions, ultimately improving patient outcomes and reducing healthcare costs.

Improved Diagnosis and Treatment

AI-driven medical imaging analysis algorithms can help physicians and radiologists interpret complicated images more quickly and accurately, as well as discover problems. This capability results in better patient outcomes from treatment, earlier disease identification, and more accurate diagnoses.

Data Security and Compliance

To secure sensitive patient data, cloud service providers employ strong security protocols and compliance regulations. By utilizing the knowledge and resources of cloud providers, healthcare organizations can guarantee patient privacy and reduce the risk of data breaches by adhering to laws like GDPR (General Data Protection Regulation) and HIPAA (Health Insurance Portability and Accountability Act)

Scalability

Healthcare companies can scale their infrastructure and resources in response to demand thanks to cloud computing. This flexibility allows healthcare systems to adapt to changes in patient loads, data storage requirements, and computational demands without large upfront expenditures in new hardware or infrastructure.

Conclusion:

The combination of artificial intelligence and modern cloud computing solutions in the fields of surgery and medicine is a revolutionary concept. Using cloud infrastructure, healthcare providers can easily access and analyze vast amounts of data to promote better-informed decision-making and individualized patient care. AI enhances these capabilities by enabling early detection of diseases, optimization of treatment plans, and extraction of information from large and complex medical information. As technologies advance, the combination of cloud computing and AI has the potential to completely transform healthcare delivery, improving accuracy, efficiency, and patient outcomes. Embracing these advances is essential to reshaping the fields of surgery and medicine in the future and ushering in an era of unprecedented progress and innovation.

ALUMINI VIEWS

Kasun Siyambalapitiya

Associate Technical Lead, WSO2

Hello Everyone,

I am Kasun Siyambalapitiya, currently serving as an Associate Technical Lead at WSO2, where I lead the team responsible for managing the platform for the creation and delivery of WSO2 product updates. It brings me great joy to extend my heartfelt congratulations on the remarkable growth and progress of our department over the years. As an alumnus of the fifth batch of Computing and Information Systems, I have witnessed the dedication and hard work of our department, staff, and students., Their efforts have culminated in the significant achievement of expanding our department to a faculty which now offers three degree programs.

To all those who have contributed to this milestone, I extend my warmest congratulations and best wishes. I firmly believe that the skills and knowledge imparted through these programs will equip students to tackle the challenges and opportunities of tomorrow, ultimately making a positive impact on our global community and further enhancing the reputation of our faculty and alma mater.

ICARC 2024

THE 4TH INTERNATIONAL CONFERENCE ON ADVANCED RESEARCH IN COMPUTING - ICARC 2024

Composed by Dr. Sugeeswari Lekamge and Mrs. Nirubikaa Ravikumar, Faculty of Computing, Sabaragamuwa University of Sri Lanka

The Faculty of Computing at Sabaragamuwa University of Sri Lanka proudly concluded the 4th International Conference on Advanced Research in Computing (ICARC 2024) on February 21st and 22nd, 2024. Centered around the theme "Smart and Innovative Trends in Next-Generation Computing Technologies," the conference brought together a vibrant community of researchers, academics, students, industry professionals, and policymakers, fostering a rich environment for the exchange of cutting-edge ideas and knowledge.

ICARC2024 featured an impressive lineup of keynote and plenary speakers. Notably, Prof. Saman Halgamuge from the University of Melbourne and Mrs. Jyotika Athavale, President of the IEEE Computer Society for 2024, delivered insightful presentations on AI, machine learning, and functional safety standardization. Their contributions set a high benchmark for the conference, providing invaluable perspectives that enriched the discourse.

The conference's diverse range of tracks ensured comprehensive coverage of the most pertinent topics in computing today. Pre-conference workshops, tutorials, and panel discussions created a dynamic platform for learning and collaboration. Participants had the opportunity to present their research, engage in meaningful discussions, and build connections that will drive future innovations.

ICARC2024 not only showcased the latest advancements in computing but also highlighted the transformative potential of these technologies in our society. As we look towards the future, the collaborations and ideas generated at this conference will undoubtedly play a pivotal role in shaping the next generation of computing technologies.

The Faculty of Computing extends its heartfelt gratitude to everyone who contributed in making the event a success and looks forward to continuing this tradition of research excellence in upcoming conferences.

Congratulations to Team 3WiTcHeS

(1st Runners Up of Code with WIE 2023)

Congratulations to Team 3WiTcHeS from the Faculty of Computing, Sabaragamuwa University of Sri Lanka for their remarkable achievement as the 1st Runners-Up at the Code with WIE 2023 which was organized by the IEEE WIE Sri Lanka Section.

The event took place on the 2nd December 2023 and Team3WiTcHeS demonstrated their exceptional skills, creativity, and innovation to secure this prestigious position.

We commend Team 3WiTcHeS lead by Kushana Senadheera, Hashini Wikramasinghe and Warushika Dahanayake for their dedication and hard work, and we are incredibly proud of their success!

Boosting Productivity Management with Modern Technologies

Mrs. R. Nirubikaa *(niru@foc.sab.ac.lk), Faculty of Computing, Sabaragamuwa University of Sri Lanka.*

Mrs. Nirubikaa Ravikumar is a Lecturer (Probationary) in Software Engineering attached to the Department of Software Engineering, Faculty of Computing, Sabaragamuwa University of Sri Lanka. Her research interests are Requirements Engineering, Requirements Engineering,Software Process, Data Mining, and Machine Learning.

In today's world, managing productivity effectively is vital for both personal and professional success. The advent of technology has completely transformed how we handle productivity, equipping us with a range of tools and systems that streamline tasks, foster collaboration and optimize our time use. This article explores technologies that can assist individuals and organisations in enhancing their productivity management efforts to achieve enhanced efficiency.

Tools for Project Management: Project management tools have become indispensable across organisations, empowering teams to plan, monitor progress, and execute projects efficiently. These tools offer an array of features, including task assignment progress tracking, file sharing and communication channels to ensure seamless coordination. Popular project management platforms such as Trello, Asana, and Basecamp facilitate team organisation while prioritising tasks and encouraging collaboration—ultimately leading to improved productivity and successful project outcomes.

Time Tracking and Time Management Solutions: Efficient time management maximises productivity. Time-tracking solutions like Toggl, Harvest, and Clockify enable individuals and teams to meticulously monitor the duration dedicated to tasks, providing insights into work patterns and areas for improvement. Furthermore, tools are available for managing time effectively, such as RescueTime and Focus@Will. These tools assist users in minimising distractions, optimising their work schedules, and making effective use of their time. By offering insights into time utilization, these tools empower individuals to make informed decisions about their work habits and ultimately improve productivity.

Collaboration and Communication Platforms: Effective collaboration and communication are paramount for teamwork. Platforms like Slack,

Microsoft Teams, and Google Workspace streamline team communication by integrating chat features, video conferencing capabilities, and file-sharing functionalities into a platform. This integration facilitates real-time collaboration while reducing the reliance on email exchanges, and eliminating communication barriers. By creating a connected and collaborative work environment, these platforms significantly contribute to increased productivity.

Cloud Storage and File Sharing Solutions: Cloud storage solutions like Dropbox, Google Drive, and OneDrive have revolutionised how we store, access, and share files. These services enable users to access their files from any device with an internet connection while facilitating collaboration through real-time file sharing. By centralising file storage and eliminating the need for storage devices, cloud storage solutions save time, minimise the risk of data loss incidents, and enhance overall productivity.

Automation and AI-Powered Tools: Automation and AI powered tools have the potential to transform productivity management completely. These AI-based virtual assistants can handle tasks such as scheduling meetings, managing emails, and performing basic administrative duties by taking on time-consuming tasks. This ultimately allows individuals to allocate more time to valuable work. Additionally, automation tools, like Zapier and IFTTT (If This That) further enhance efficiency in task execution**.**

Honoring Ms. H.U. Senevirathne's Achievement!

We take pride in congratulating Ms. H.U. Senevirathne from the 2017/ 2018 Batch of the Department of Computing and Information Systems, Faculty of Computing, on receiving a prestigious gold medal at the 28th University Day Celebrations of SUSL held on the 2nd of February 2024.

INSL'S 2024

WHISPERS OF INNOVATION: INSL'S ENTREPRENEURIAL VOYAGE AT SABARAGAMUWA UNIVERSITY

Composed by Mr. V. Abhishethvaramn (abishethvarman@gmail.com), IEEE Student Branch of Sabaragamuwa University of Sri Lanka

Innovation Nations Sri Lanka is a competition which is a catalyst for change, igniting the entrepreneurial spirit across the island nation and is conducted by IEEE Young Professional Sri Lanka. For that, the young minds of Sabaragamuwa University came up with over 120 initial registrations for the provincial competition, which is the second highest among provinces in Sri Lanka. From those initial registrations, 22 teams dared to dream big, submitting their ideas for the idea stage, while three teams took the leap into the business stage. Ten idea-stage teams were selected to compete in the provincial rounds through various tight filtering processes. These teams showcased the diversity and depth of talent in Sri Lanka's startup ecosystem as a glimpse.

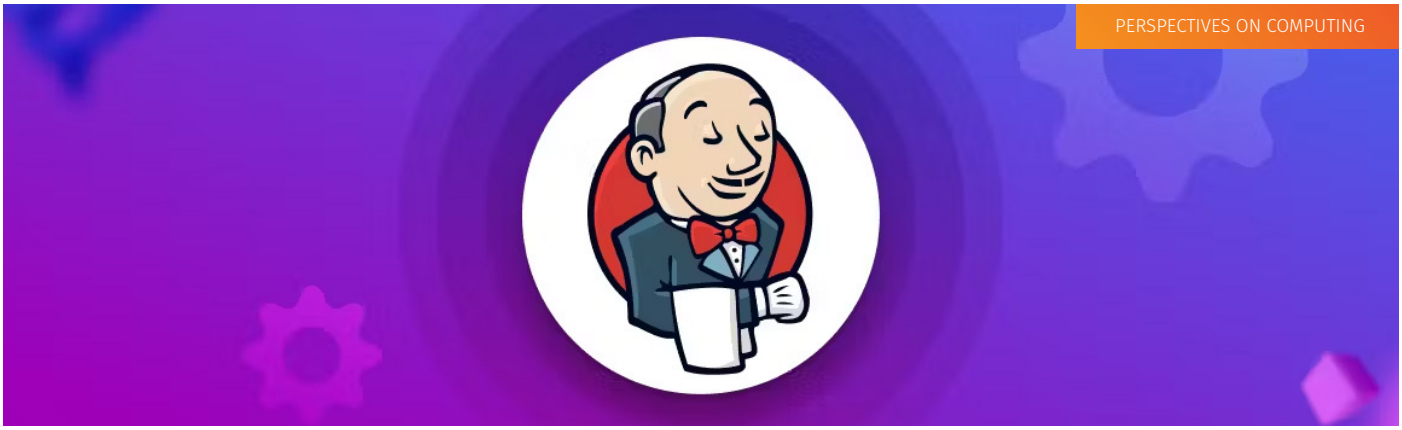
The provincial competition was led by a dedicated organizing committee along with the support of the IEEE student branch of SUSL. Awareness sessions and workshops were conducted successfully, spreading the gospel of entrepreneurship far and wide. For all the students who were curious about the INSL competition, an inspirational awareness session was conducted to introduce INSL, explain its procedure, highlight the benefits of engaging with INSL and rewards. Following this, two informative workshops were conducted successfully. The first workshop was about finding investable ideas, researching the Market and the industry, while the second one provided guidance to the young entrepreneurs on finding the right idea, team, and founders to have a successful entrepreneurial journey.

During these workshops, participants were treated to insights from industry experts like Lecturer Kavinda Ariyaratne, who delved into the essence of entrepreneurship, and Jayanthan Amalanathan, who shared his inspiring entrepreneurial journey. These sessions not only imparted knowledge but also fueled the participants' passion and determination to succeed.

INSL's journey culminated in the national competition, where the top three provincial teams, alongside the finalists from the business stage, showcased their innovations on a grand stage. It is not just about winning; it is about celebrating the entrepreneurial spirit and fostering a culture of innovation in Sri Lanka. This remarkable journey would not have been possible without the unwavering support of organizations like the IEEE Student Branch and dedicated counselors who have been instrumental in nurturing the next generation of entrepreneurs.

As INSL continues to pave the way for innovation and entrepreneurship in Sri Lanka, one thing is clear: the future is bright, and the possibilities are limitless. INSL is not just a competition; it is a movement thatis shaping the future of Sri Lanka, one startup at a time.

INSL 2023 Winners from the Faculty of Computing



Let's observe Jenkins …

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Software projects can benefit from Jenkins, an open-source automation server that makes continuous integration and delivery (CI/CD) easier. It enables teams to produce high-quality software more quickly by automating the building, testing, and deploying code change processes for developers. Jenkins operates by keeping an eye on source code repositories for modifications and initiating automatic build and test procedures each time a new commit is made. These procedures may involve deploying apps to different environments, executing unit tests, and generating code.

Jenkins has an extensive ecosystem of plugins that increase its capability and allow users to combine it with a wide variety of tools and technologies. This flexibility enables teams to tailor their CI/CD pipelines to meet their unique needs and processes. Jenkins facilitates team communication by offering a central dashboard for tracking builds and pipeline status. Overall, Jenkins is a strong solution that aids in streamlining the software development lifecycle, raising productivity, and improving the quality of software product.

Source: https://www.jenkins.io/

Figure 1: *Logo of Jenkins*

Java is the primary language used in the development of Jenkins, and Java servlets are used in its web interface. It utilizes several open-source libraries and frameworks, including Google Guava, Jetty, and Apache Commons, for its web server and core functionality. Jenkins also makes extensive use of XML for setup, job definition, and pipeline and build data storage. Jenkins's plugin architecture enables easy connection with a wide range of third-party tools and techallowing developers to extend t-

heir capabilities using Java or other programming languages like Groovy or Python. Overall, Jenkins uses a wide range of development tools to offer a stable, expandable, and intuitive platform for continuous integration and delivery

Here's a list and description of some key features:

Continuous Integration/Continuous Delivery (CI/CD): Jenkins streamlines the software development, testing, and deployment process, enabling teams to release updates more frequently and consistently.

Distributed Build Support: Jenkins supports distributed builds across several computers, allowing teams to effectively extend their continuous integration and delivery (CI/CD) infrastructure to accommodate massive workloads.

Extensibility with Plugins: Jenkins has an extensive ecosystem of plugins that increase its capability and enable integration with different build tools, deployment platforms, notification services, and version control systems.

Pipeline as Code: With the help of Jenkins' robust Pipeline plugin, teams can define and build pipelines as code, and manage and version control them in tandem with their application code.

Wide Range of Build Triggers: Jenkins may be used to start builds using a variety of triggers, such as time-based schedules, webhook alerts, code commits, and external events from other systems.

Customizable Build Steps: Jenkins allows users to define custom build-steps using shell scripts, batch files, or other scripting languages, providing flexibility in configuring build and test processes.

Integrated Testing Frameworks: Jenkins easily interfaces with well-known testing frameworks like Cucumber, JUnit, NUnit, and Selenium, allowing automated testing to be a part of the continuous integration and deployment process.

Rich Notification Mechanisms: Jenkins keeps team members updated on the status of their projects by notifying users via email, instant messaging, or other channels about build results and pipeline status.

Built-in Authentication and Authorization: Jenkins has built-in support for authorization and authentication systems, allowing administrators to manage user roles and permissions-based access control over Jenkins resources.

Monitoring and Reporting: Jenkins helps the continuous improvement of the CI/CD process by providing integrated dashboards and reporting tools for tracking build status, examining trends, and pinpointing performance bottlenecks.

Integration with Cloud Platforms: Cloud platforms like AWS, Azure, and Google Cloud may be seamlessly integrated with Jenkins to facilitate the deployment of applications to cloud infrastructure.

RESTful API: For programmatic interaction, Jenkins offers a RESTful API that enables the automation of numerous administrative chores and system integration.

Security implication of Jenkins

Jenkins prioritizes security with several features designed to protect pipeline integrity and its resources. Jenkins's authentication systems support multiple approaches, including username/password, LDAP, Active Directory, and OAuth, to provide flexible user access control. By assigning roles and rights to users or groups, administrators can establish fine-grained authorization policies, ensuring that only authorized users can access particular Jenkins features and perform specific tasks. Jenkins also uses project-based matrix authorization techniques, which strengthen security further by allowing administrators to customize access permissions based on user roles and groups at the project or pipeline level.

Additionally, Jenkins also prioritizes secure credential management by offering a separate credential store for the safekeeping of private data, including SSH keys, API keys, and passwords. The encryption of these login credentials enhances the security of vital resources by preventing unauthorized access. Jenkins' audit logging features give administrators the ability to monitor user activity and system events, providing insight into who used Jenkins, what actions they performed, and when. To safeguard the integrity of Jenkins operations, Jenkins also employs Cross-Site Request Forgery (CSRF) security against malevolent attacks that take advantage of user sessions. Jenkins supports enterprises in maintaining the availability, confidentiality, and integrity of their CI/CD infrastructure by putting these extensive security mechanisms in place.

SOCS

THE SOCIETY OF COMPUTER SCIENCE (SOCS), SABARAGAMUWA UNIVERSITY OF SRI LANKA

Composed by Ms. Ashansa Wijerathna (ashansa@foc.sab.ac.lk), and Mr. Nipun Wimalasooriya (gggrsnwimalasooriya@std.appsc.sab.ac.lk), Sabaragamuwa University of Sri Lanka

Established in 2012 by students from the Department of Computing and Information Systems, now the Faculty of Computing, the Society of Computer Sciences (SOCS) has become a cornerstone in enhancing the understanding of information technology among undergraduates. Through collaborative efforts across the university, SOCS orchestrates a multitude of events aimed at fostering computer literacy among students, both within and beyond the campus.

LetMeHack, the brainchild of SOCS in collaboration with the Department of Computing and Information Systems, has emerged as a trailblazer in the tech community. This pioneering hackathon series, starting with LetmeHack v1.0 in February 2018, introduced an eco-friendly, product-oriented approach, attracting students from various universities to showcase their coding skills and creativity. LetmeHack v2.0, building on the success of its predecessor, renewed its focus on eco-conscious innovation in February 2020. Both versions provide a platform for participants to innovate, collaborate, and tackle real-world problems in the realm of technology, solidifying SOCS's commitment to nurturing the next generation of tech leaders.

SOCS's commitment to knowledge exchange and community building is evident in events like the Fortnight Meetup and Virtual Rival. The Fortnight Meetup, a recurring gathering, serves as a beacon of knowledge and collaboration in the tech community. Its recent 30th edition, concluded on September 7th, 2023, continues to foster an environment of learning and networking, drawing together esteemed speakers and enthusiastic participants to enrich the university's tech eco system.

Meanwhile, Virtual Rival, an annual gaming competition organized in collaboration with the Faculty of Computing Studennts' Union, goes beyond gaming to promote unity and collaboration among undergraduates. The most recent edition in 2023 showcased thrilling challenges, solidifying Virtual Rival as a hallmark of excellence and community spirit.

Vidunaena is a program designed to give Advanced Level students the opportunity to gain knowledge and skills in some of the most important and complicated chapters of their ICT curriculum. The program will be delivered as a series of webinars featuring quick theory recovery sessions as well as exam-related question discussions on selected 8 units from the curriculum. The event will be organized by the Society of Computer Sciences in collaboration with the IEEE student branch and the WIE affinity group.Together, these initiatives highlight SOCS's dedication to empowering tech enthusiasts and shaping the future of technology education and innovation.

Kudos to Ms. M.S. Hewage on Her Remarkable Achievement!

We take immense pride in congratulating Ms. M.S. Hewage from the 2019/ 2020 Batch of the Department of Software Engineering, Faculty of Computing, on receiving a prestigious gold medal at the 28th University Day Celebrations of SUSL held on the 2nd of February 2024.

A Contribution-First Mindset: The Path to Leadership

Mr. Hasith Yaggahavita's journey to the top of 99x is a testament to the power of a contribution-first mindset. From the beginning of his career, he focused on making a positive impact on the organization and the people around him. Early leadership opportunities allowed him to understand team dynamics and organizational impact, while a commitment to continuous learning kept him adaptable amidst industry changes. These experiences helped him build trust and respect among his colleagues, ultimately paving the way to his current role as CEO.

Running a large company like 99x has taught Mr. Hasith several valuable lessons. One of the most important is leading by example by demonstrating the values and work ethic he wants to see in his team. Clear communication is also crucial, ensuring that everyone is aligned and motivated towards common goals. Additionally, fostering a culture of innovation and continuous improvement is vital, encouraging employees to push boundaries and think creatively. These lessons have been instrumental in guiding 99x towards success.

Fostering a Supportive Workplace Culture

99x is not just a place where great work happens; it's a great place to work. The company's culture is built around the idea that the workplace should be both challenging and rewarding. The complexity and excitement of building digital products for global markets keep engineers motivated, while customers treat employees as integral collaborators, fostering mutual respect. This environment, filled with passionate and talented individuals, creates a dynamic atmosphere where everyone is encouraged to contribute their best, leading to exceptional outcomes.

Building and Maintaining Customer Trust

Customer trust is paramount at 99x, and the company has a proven track record of delivering high-quality digital products that often exceed expectations. This reliability reassures customers that they can depend on 99x to deliver results, no matter how complex the challenge. Transparency and business ethics also play a crucial role in maintaining trust. By prioritizing open communication, 99x ensures that customers are always informed about project progress, potential challenges, and strategic decisions, eliminating uncertainties and building confidence in their approach.

Advice for Aspiring Professionals

For those aspiring to make a difference, Mr. Hasith emphasizes the importance of developing empathy to understand others' problems deeply. This empathy guides the creation of relevant and impactful solutions. He also advises young people to take small, steady steps towards their goals, as consistent skill development is more effective than expecting rapid progress. This approach has been key to his own success and is invaluable advice for anyone looking to succeed in the software industry.

Mr. Hasith Yaggahavita provided a fascinating glimpse into the journey and vision of a leader who has significantly shaped 99x's success. His contribution-first mindset, commitment to continuous learning, and dedication to fostering a supportive workplace culture have been instrumental in his career and the company's achievements. As 99x continues to grow and innovate, it remains a shining example of excellence in the software industry, guided by a leader who truly understands the value of empathy, trust, and collaboration.

Collaboration with Academic Institutions

99x values its long-standing collaboration with Sabaragamuwa University, supporting talent acquisition, internships, and research initiatives. Mr. Hasith encourages undergraduates to engage in projects that drive social and economic advancements, aiming to solve real problems beyond course requirements. 99x offers support and guidance for these projects, fostering a mutually beneficial relationship that helps both the company and the institution grow.

Future Aspirations for 99x

Looking ahead, Mr. Hasith envisions 99x continuing its growth both organically and through acquisitions, positioning itself as a global leader in digital engineering. With subsidiaries in Norway, Brazil, Portugal, Malaysia, and Sri Lanka, the company's expansion reflects its innovative processes and dedicated employees. Mr. Hasith's goal is to maintain this momentum, driving 99x towards new heights in agile product engineering and technology innovation.

Industry Challenges and Opportunities

The software industry is rapidly evolving, and Mr. Hasith recognizes both the challenges and opportunities this presents. In Sri Lanka, he notes a gap in the contribution mindset among young professionals, who often focus more on acquiring skills than on how they can contribute to their company or society. To capitalize on emerging opportunities in fields like artificial intelligence, IoT, cybersecurity, and edge computing, young professionals must engage in innovative projects and industry initiatives. By focusing on meaningful contributions, they can drive the industry forward and pave the way for successful, impactful careers.

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worklenz

Brand lenz

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OUR ACHIEVEMENTS

2018

E-Swabhimani
2018
ICTA

Digital Social Impact Award
Omi - the card game

2021

National Ingenuity Awards
2021
SLASSCOM

Best Product Innovation Category
Uva Province
Ceydigital Solutions (Pvt) Ltd.

2023

National Industry
Excellence Award 2023
IDB

Digital Technology & Industry Solutions
Bronz Award
Ceydigital Solutions (Pvt) Ltd.

2022

National Ingenuity Awards
2022
SLASSCOM

Best Startup
Uva Province
Sahasa

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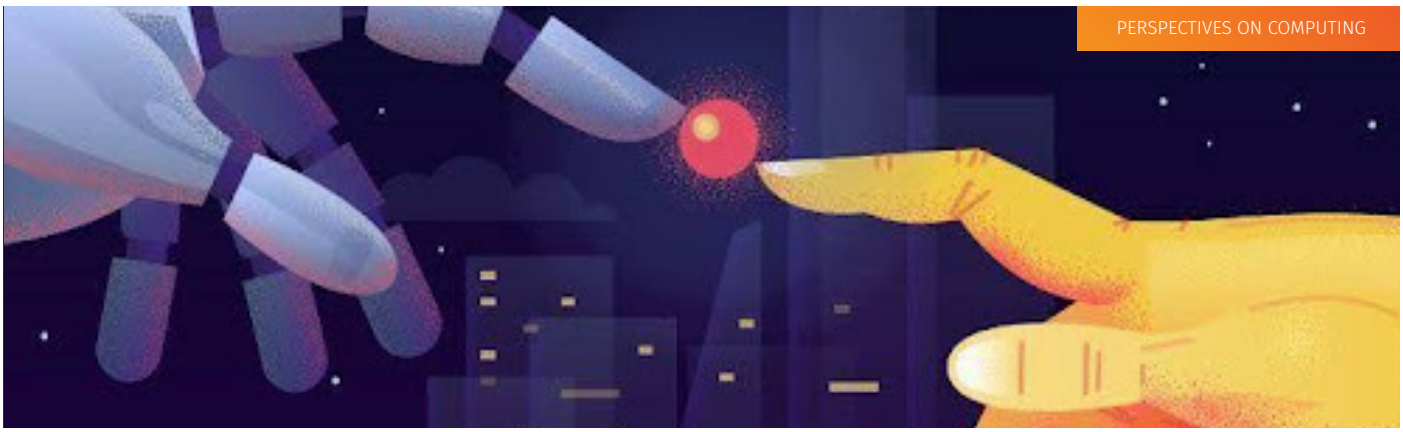

Emotional intelligence in industrial design: Building emotional connections.

Ms. Asalya Gunarathne *(ict20044@std.uwu.ac.lk), Department of Information and Communication Technology, Faculty of Technological Studies, Uva Wellassa University of Sri Lanka, Badulla.*

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Emotional Flexibility in User Interface Design

The way we interact with digital networks is evolving due to the integration of emotional intelligence concepts into an ever-changing technological world. Designers are now focusing on sensory technologies that, beyond basic functions, understand, respond to, and predict human emotions. This paradigm shift aims to strengthen the relationship between people and technology rather than focusing solely on the user interface.

Utilizing Emotional Intelligence in Engineering

Industrial design uses emotional intelligence, a trait often associated with human interaction. This includes the technology's ability to detect, understand and respond to human emotions, thereby enhancing users' enjoyment and experience. This understanding extends beyond basic input and output; it's about designing technology that can adjust to the user's subtle emotional states.

The Way Emotional Connections Appeal to Our Senses

Imagine a virtual assistant that adjusts its messages based on your intentions, or one that can detect anger in your voice and respond with a calmer tone. These are several examples of emotional connections that work. Designers incorporate sensory cues into the algorithms that drive these systems, resulting in a more convenient and intuitive user experience.

Balancing Boundaries and Bytes

The exciting area of combining emotional intelligence with technology poses several challenges as well as ethical issues. Data security, privacy concerns, and the possibility of sensory manipulation are all issues that require careful consideration. The rational development of sensory interfaces necessitates achieving a

balance between user protection and optimization.

Changing Emotional Connections to Promote Well-Being

The ultimate goal is to incorporate emotional intelligence into technology design to enhance user well-being. Emotional engagement can improve many aspects of our lives, from educational sessions that adjust their direction based on emotional state to learning materials and individual engagement levels to psychiatric assessments.

A Case Study of Emotion Recognition Tools

Several important case studies have demonstrated the successful application of emotional intelligence principles in engineering design. Explore scenarios where chatbots engage in empathic discussion, wearables show stress levels that aid in faster healing, and virtual therapists provide emotional support These explore highlight the versatility and benefits of emotional connections.

Considering the Next Frontier of Cognitive Engineering

As technology advances, the ability to incorporate emotional intelligence concepts is increasing. Future developments include AI-powered partners that adapt to users' emotional needs over time, wearable technology that helps those struggling with social anxiety, and interactive interventions that respond strongly to users' emotional states.

Future Growth as Technology Understands People

The future of user-friendly interfaces signals a shift in technology design. Our ability to recognize and respond to human emotions helps create more flexible systems and strengthens the relationship between humans and technology. We need to emphasize responsible technology design that truly understands and cares about users while also considering ethical issues as we cross this new frontier.

Congratulations to Team Regex Native

(2nd Runners Up of Code with WIE 2023)

Congratulations to Team Regex Native from the Faculty of Computing, Sabaragamuwa University of Sri Lanka for their remarkable achievement as the 2nd Runners-Up at the Code with WIE 2023 which was organized by the IEEE WIE Sri Lanka Section.

The event took place on the 2nd December 2023 and Team Regex Native demonstrated their exceptional skills, creativity, and innovation to secure this prestigious position.

We commend Team Regex Native lead by Minuri Hewage and Disara Mapalagama for their dedication and hard work, and we are incredibly proud of their success!

WIE

ADVANCING WOMEN IN TECHNOLOGY - A TRIUMPH BY THE WIE STUDENT BRANCH AFFINITY GROUP

Composed by Ms. Tharushi Wijethunga (tharushiwijethunga999@gmail.com), IEEE WIE Student Branch Affinity Group of Sabaragamuwa University of Sri Lanka

PearlHack 2.0, meticulously organized by the Women in Engineering (WIE) student branch affinity group of Sabaragamuwa University of Sri Lanka, stands as a significant milestone in the realm of technological innovation. This hackathon festival embodied the group's commitment to fostering a vibrant space where creativity and problem-solving skills could flourish.

At its core, PearlHack 2.0 was conceived as a proactive response to the observed underrepresentation of women in STEM outreach activities. Motivated by the imperative to encourage greater female participation in science, technology, engineering, and mathematics (STEM), the WIE group embarked on a mission to cultivate an inclusive platform conducive to the advancement of women in these fields.

With diligent planning and unwavering dedication, the WIE group orchestrated a multifaceted event that transcended conventional hackathons. PearlHack 2.0 emerged as more than a mere gathering of technologically inclined individuals; it epitomized a collective endeavor towards gender parity and innovation. By structuring the event to encompass both an ideathon and a designathon, the organizers ensured inclusivity, allowing participants to explore their passions and unleash their creative potential in a supportive environment.

The collaboration with ICARC 2024, the esteemed International Conference on Advanced Research in Computing, added a prestigious dimension to PearlHack 2.0. This partnership not only elevated the hackathon's profile but also facilitated invaluable opportunities for knowledge exchange and networking among aspiring female technologists.

What truly set PearlHack 2.0 apart was its steadfast commitment to driving tangible impact. Through strategic alliances with industry stakeholders and unwavering support for local businesses, the event catalyzed economic growth within the community while simultaneously empowering women in STEM. PearlHack 2.0 served as a catalyst for fostering diversity, inclusivity, and innovation, thereby paving the way for a more equitable and forward-thinking future in technology.

At the helm of PearlHack 2.0 was the WIE student branch affinity group, exemplifying leadership, resilience, and u-

nwavering dedication to its cause. Their vision and passion inspired not only participants but also stakeholders across academia, industry, and society at large.

In the aftermath of PearlHack 2.0, the enduring impact of the event continues to resonate. Participants departed equipped with newfound skills, confidence, and industry connections, poised to make meaningful contributions to the technological landscape. The efforts of the WIE group have empowered women and ignited a movement towards greater equality and opportunity in STEM.

In conclusion, PearlHack 2.0 stands as a beacon of hope and progress in the journey towards gender equality in technology. Led by the visionary WIE student branch affinity group, this hackathon festival has empowered women while also reshaping perceptions and shattering barriers in the pursuit of innovation and excellence.

Congratulations to the Winners

(SLASSCOM National Ingenuity Award 2024)

The Faculty of Computing takes pride in congratulating its undergraduates; Disara Mapalagama, Minuri Hewage, and Dushyantha Thilakarathne for being the regional winner in the category 'Best Innovative Product/ Project - University - Sabaragamuwa Province' for the Project "SHOPSENSE" at the SLASSCOM National Ingenuity Awards - 2024.

The event which was hosted by the Sri Lanka Association of Software Services Companies (SLASSCOM) in collaboration with Macksons Solar with the aim of recognizing and celebrating innovation in the IT/BPM sector of the country was held on 19th June, 2024 at Shangri-La Hotel, Colombo.

Best Practices for End-User Security: A Novice's Guide

Mr. T A D R P Chandrarathna *(tadrpchandrarathna@std.appsc.sab.ac.lk), Department of Software Engineering, Faculty of Computing, Sabaragamuwa University of Sri Lanka*

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Have you ever scrolled through social media only to see a friend's account suddenly spewing gibberish, promoting shady weight loss scams, or even declaring their undying love for a pet rock? No, they haven't gone off the deep end. This, my friends, is the chilling reality of a compromised digital identity. With a few clicks on a malicious link and a weak password falling into the wrong hands, your online life becomes a playground for bad actors.

This isn't just a dystopian movie plot anymore. As IT students, we are at the forefront of a digital revolution, building the very tools and platforms that shape our online world. But with great power comes great responsibility. We have a duty to understand the intricate layers of security and privacy that underpin our digital interactions, not just for ourselves, but for everyone who entrusts us with their data and online experiences.

So, strap yourselves in, fellow digital travelers, as we embark on a journey through the labyrinthine world of end-user security best practices. Forget dusty textbooks and jargon-filled lectures; we'll navigate this terrain with relatable scenarios, bite-sized explanations, and a healthy dose of real-world experiences.

Unveiling the Digital Guards: Passwords, 2FA, and Secure Browsing

Imagine your home as a virtual fortress. The first line of defense? A sturdy, unbreakable lock your password. But let's face it, we've all been guilty of using "Password123" at some point. Newsflash: that's like leaving your gate wide open! To truly fortify your digital castle, you need strong, unique passwords for every account. Think of them as personalized codes, a mix of uppercase and lowercase letters, numbers, and symbols, as complex as a dragon's hoard. And just as you wouldn't trust a single flimsy lock, secure your tre-

treasure trove with two-factor authentication (2FA). Think of it as an extra guard, demanding a secret code sent to your phone before anyone can breach your door. Remember, passwords should ideally be at least 8 characters long, but longer is better for added security.

Navigating the vast digital ocean also requires a trusty ship; a secure browser. Ditch the shady, uncharted waters and stick to established, reputable browsers with built-in security features. These browsers act like protective shields, scanning websites for hidden malware and phishing traps, ensuring your online voyage is smooth and safe.

Threats: Phishing, Malware, and Identity Theft

But our digital journey isn't without its perils. Lurking in the shadows are cunning monsters like phishing scams, disguised as enticing emails or messages promising free puppies or lottery wins. Don't let their sugar-coated lies tempt you! These are wolves in sheep's clothing, aiming to steal your personal information or infect your devices with malware – nasty digital viruses that can wreak havoc on your system. Malware can be like a chameleon, hiding in seemingly harmless downloads or websites, waiting to steal your data, spy on your activities, or even hold your files hostage.

And then there's the ultimate digital nightmare – identity theft. Imagine waking up to find your bank account drained, your credit score in tatters, and your life turned upside down because someone else is masquerading as you online. This is why guarding your personal information; name, address, social security number is like protecting the crown jewels. Share them only with trusted entities, and be wary of online quizzes or surveys that request sensitive details. Remember, if it seems too good to be true, it probably is.

Best Practices: Your Digital Armor

Now, we wouldn't send a knight into battle without armor, would we? So, let's equip ourselves with the best practices for online security and privacy. Software updates are like shining your armor, patching up vulnerabilities and keeping your defenses strong. Secure networks are your trusty shield; always choose encrypted connections whenever possible, especially on public Wi-Fi, a digital no-man's-land teeming with potential dangers. Speaking of public Wi-Fi, think of it like a dark alley full of lurking pickpockets. Avoid conducting sensitive transactions or entering personal information while connected to it.

Remember, knowledge is power, and continuous learning is our secret weapon. Stay informed about emerging threats, new scams, and the latest security trends. Follow reputable cybersecurity news sources, attend workshops and seminars, and don't be afraid to ask questions. There are no silly questions in the quest for digital security.

But this digital landscape is constantly evolving, presenting new challenges and exciting possibilities. Biometrics, like fingerprint or facial recognition, are emerging as futuristic guardians, potentially replacing . those pesky passwords. Artificial intelligence (AI) is learning to sniff out cyber threats with superhuman precision, acting as a vigilant sentinel in the digital realm.

Keeping Your Personal Info Safe: Shielding Your Online Self

In today's digital world, our personal information is like treasure, sought after by sneaky folks wanting to use it for their own gain. So, it's super important to protect it! Here are some easy ways to do that:

1. Lock Down Your Social Media: Think of social media as your virtual hangout spot. Just like you'd only invite close pals to your house party, make sure you're picky about who can see your stuff online. Adjust your settings on platforms like Facebook, Twitter, and Instagram so only trusted friends can see your posts and personal details. Also, avoid sharing super private information, such as your full birthday or home address, where everyone can see it.

2. Be Smart Online: When you're surfing the web or filling out forms, don't give away too much information . Stick to sharing only what's necessary, and always question if a website or request seems legit before sharing any personal details. Once information is out there, it's hard to put the genie back in the bottle!

3. Use Safe Ways to Chat: If you need to share sensitive stuff like bank details or personal documents s, use apps like Signal or WhatsApp that keep your messages private with encryption. For emails, set up encryption in your email app to keep your

messages safe from prying eyes. Avoid sharing sensitive stuff over sketchy Wi-Fi networks or unencrypted channels, as hackers could snatch it up.

4. Add Extra Security: Ever heard of double-locking your door? Well, you can do something similar online with identity verification and multi-factor authentication (MFA). Use tools that ask for more than just a password, like fingerprints or special codes sent to your phone. This makes it way harder for hackers to break it in!

5. Keep an Eye Out: Just like you'd check your front door for signs of a break-in, keep an eye on your online accounts for any weird activity. Look out for things like strange logins, changes to your settings, or transactions you didn't make. Set up alerts so you'll know right away if something suspicious is going on, and report any issues immediately.

By following these simple steps and being careful about what you share online, you can build a sturdy shield around your digital self and keep hackers and snoops at bay. Remember, it's all about staying savvy and keeping your guard up in the ever-changing world of online security!

Congratulations to Mr. T.K.R.S Dharmadasa on His Prestigious Award!

Heartfelt congratulations to Mr. T.K.R.S Dharmadasa from the 2018/2019 Batch of the Department of Computing and Information Systems, Faculty of Computing! We take pride in announcing that Mr. T.K.R.S Dharmadasa has been awarded with a prestigious gold medal at the 28th University Day Celebrations of SUSL, held on the 2nd of February 2024.

ACADEMIC RESEARCH PUBLICATION

Journal

01. ***G.A.C.A. Herath, B.T.G.S. Kumara, U.A.P. Ishanka,*** *and R. Rathnayaka, "Computer-Assisted Career Guidance Tools for Students' Career Path Planning: A Review on Enabling Technologies and Applications", Journal of Information Technology Education: Research, vol. 23, p. 006, 2024.*

02. *M. Silva, R. Rupasingha, and* ***B.T.G.S. Kumara,*** *"Identifying complex causal patterns in students' performance using machine learning", Technology, Pedagogy and Education, pp. 1-17, 2023.*

03. *K. Banujan,* ***B.T.G.S. Kumara,*** *S. Prasanth, and* ***N. Ravikumar,*** *"Revolutionising Educational Assessment: Automated Question Classification using Bloom's Taxonomy and Deep Learning Techniques--A Case Study on Undergraduate Examination Questions", International Journal of Education & Development using Information & Communication Technology, vol. 19, 2023.*

04. ***H.M.K.T. Gunawardhana, B.T.G.S. Kumara,*** *K. Rathnayake, and P. Jayaweera, "Online counterfeiting in the e-commerce of luxury goods and the role of business intelligence: A systematic mapping study", 2024.*

05. *B. Kuhaneswaran, S. Sandagiri,* ***B.T.G.S. Kumara,*** *and Z. Li, "Twitter as a Lens for Crime Analysis: A Comprehensive 4W Model for Identifying Crime Patterns and Insights", 2023.*

Book Chapter

01. ***A.K. Wijeratne, N. Ravikumar,*** *P. M. Bandara, and B. Kuhaneswaran, "Prognostication of Crime Using Bagging Regression Model: A Case Study of London", in Handbook of Research on Technological Advances of Library and Information Science in Industry 5.0, ed: IGI Global, 2023, pp. 462-478.*

Full Paper

01. *S. Karunarathne,* ***S. Vasanthapriyan,*** *and* ***K.G.L. Chathumini,*** *"Utilizing Ensemble Learning in Detecting Parkinson's Disease with Reduced Facial Expressions and Hand-Written Drawings", in 2023 7th SLAAI International Conference on Artificial Intelligence (SLAAI-ICAI), 2023, pp. 1-6.*

02. *K. Mahesha,* ***B.T.G.S. Kumara,*** *and K. Banujan, "Movie Recommendation System Based on User Ratings and Critique", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 218-222.*

03. *H. Senevirathne,* ***B.T.G.S. Kumara,*** *and K. Banujan, "YouTube Video Categorization Based on Closed Captions", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 212-217.*

04. *P. Dharmakeerthi, R. Rupasingha, and **B.T.G.S. Kumara,** "CNN-Based Deep Learning Approach for Prioritization of Bug Reports", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 31-36.*

05. *M. Shamalka, K. Banujan, and **B.T.G.S. Kumara,** "Blockchain and Smart Contract Based Approach to Mitigate Software Piracy", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 247-252.*

06. *R. Ajikaran, A. I. Hewarathna, **P. Vigneshwaran,** C. Joseph, and S. Thuseethan, "An Image Analysis-Based Automated Method using Deep Learning for Grain Counting", in 2023 IEEE 17th International Conference on Industrial and Information Systems (ICIIS), 2023, pp. 25-30.*

07. *D. Pamod, J. Charles, A. I. Hewarathna, **P. Vigneshwaran,** S. Lekamge, and S. Thuseethan, "Hybrid Transfer Learning Approach for Emotion Analysis of Occluded Facial Expressions", in International Conference on Recent Trends in Image Processing and Pattern Recognition, 2023, pp. 387-402.*

08. ***W.V.S.K. Wasalthilaka,** C Samarajeewa and T Kartheeswaran "Automated Physical Fitness Recommendation System for Driving License", in 5th International Conference on Advancements in Computing (ICAC),2023 798-803*

09. *S. P. Puviskar, **W.V.S.K. Wasalthilaka,** and **B.T.G.S. Kumara,** "Performance Evaluation of Clustering Algorithms for Enhancing Test Case Prioritization in Regression Testing", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 300-305.*

10. *T. Priyadarshani, K. Banujan, and **B.T.G.S. Kumara,** "Classifying Team Players in Software Industry Based on Personality Traits: An Expert-Guided Machine Learning Approach", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 67-72.*

11. *H. Nirmani and **U. Kudagamage,** "Ensemble Approach for Early Prediction of Malnutrition Level of Children: A Case Study on Children Under Five Years Old", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 91-96.*

12. *T. Perera, R. Rupasingha, and **B.T.G.S. Kumara,** "Deep Learning-Based Ensemble Model for Predicting the Lifestyle Status of a Person", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 25-30.*

Abstract

01. *R.U.N. Roopasinghe, **S. Vasanthapriyan, K.G.L. Chathumini**, "Incremental Learning for Tomato Leaf Disease Detection", in Computing Undergraduate Research Symposium (ComURS), 2024.*

02. *K.Mahesha, **B.T.G.S. Kumara,** and K. Banujan, "Movie Recommendation System using NLP: Based on Critiques and Ratings", in Computing Undergraduate Research Symposium (ComURS), 2024.*

03. *P.G.S.M.Dharmakeerthi, R.A.H.M. Rupasingha, **B.T.G.S. Kumara,** "Ensemble Approach for Predicting Bug Priority Level Using Deep Learning Algorithms", in Ruhuna International Science and Technology Conference (RISTCON), 24 Jan. 2024.*

04. *Mahendran. T, **B.T.G.S. Kumara,** K. Banujan, and Dr. S. Achchuthan, "Exploring Factors Influencing Technological Adaptability in Software Industries: A Structural Equation Modeling Approach", in Computing Undergraduate Research Symposium (ComURS), 2024.*

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12. *H.U Senevirathne, **B.T.G.S Kumara,** and K. Banujan, "BART Summarization for Closed Captions to Generate YouTube Video Titles", in 01st Computing Undergraduate Research Symposium (ComURS), 2024.*

PERSPECTIVES ON COMPUTING

Microsoft Fabric

Delving into the Enigmatic World of Microsoft Fabric

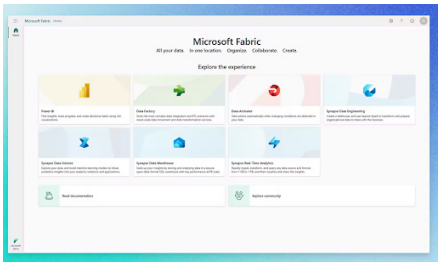
Mr. W.M.I.T.U. Kithulwaththa *(i.tharukaumayanga@gmail.com), Faculty of Computing, Sri Lanka Institute of Information Technology (SLIIT).*

Mr. W.M.I.T.U. Kithulwaththa(i.tharukaumayanga@gmail.com) is an undergraduate of the Faculty of Computing, Sri Lanka Institute of Information Technology (SLIIT).

Microsoft Fabric is an all-inclusive design framework designed to deliver a consistent and aesthetically pleasing user experience across a range of Microsoft platforms and products. Formerly known as the Fluent Design System, Fabric prioritizes elements such as depth, motion, substance, and light to produce interfaces that are not just engaging and intuitive but also functional. Microsoft aims to standardize the design language throughout its ecosystem with Fabric, providing consumers with a consistent and recognizable experience while fostering innovation and adaptability in application design.

Fundamentally, Microsoft Fabric offers a collection of standards, components, and resources that enable developers and designers to produce cutting-edge, responsive user experiences. These elements, intended to blend in smoothly with web and app interfaces, include buttons, menus, typography, icons, and navigation patterns. By following Fabric's guidelines and utilizing its resources, developers may expedite the design and development process, creating applications that not only look fantastic but also offer a consistent and user-friendly experience across all platforms and devices.

The following figure presents the interface for Microsoft Fabric:



Source: https://www.tridant.com/what-is-microsoft-fabric/

Figure 1: *Microsoft Fabric Dashboard*

The primary focus of Microsoft Fabric, especially when it was known as the Fluent Design System or Fabric UI, is on design concepts, guidelines, and user interface elements. Although direct security integration is not a fundamental component of t-

he Fabric design methodology itself, Microsoft does offer security standards and best practices for developers utilizing its platforms and services.

Nonetheless, developers can leverage Microsoft's extensive security features when integrating security into applications created with the Fluent Design System or Microsoft Fabric UI components. These features could include:

Authentication and Authorization Services: Developers can use Microsoft's best practices and standards for designing secure code when creating applications that use Fabric UI components. This encompasses secure communication, input validation, and defense against common vulnerabilities such as SQL injection and cross-site scripting (XSS).

Security Testing Tools: Microsoft offers a range of tools and services, including Azure Security Center and Microsoft Defender for Endpoint, for security testing and analysis. These tools enable developers to identify and remediate security vulnerabilities in applications created with Fabric UI components.

When developing applications for Microsoft platforms, designers and developers can benefit from Microsoft Fabric in several ways.

Consistency: Fabric offers a unified design language and collection of UI elements for use across various Microsoft platforms and products. Consistency between applications makes it easier for users to explore and interact with different programs.

Modern Look and Feel: Fabric incorporates modern design principles such as depth, motion, material, and light, resulting in visually appealing and engaging user interfaces. This modern aesthetic helps applications appear current and up-to-date, enhancing the overall user experience.

Flexibility: Fabric offers a set of standardized components while also allowing for flexibility and customization. The design system can be customized by developers to meet the particular requirements and branding of their applications, ensuring a distinctive appearance and feel while adhering to Microsoft's design standards.

Accessibility: Fabric prioritizes accessibility, making it easier for developers to create applications that are usable by people with diverse needs and abilities. The design system incorporates accessibility features and principles to ensure that applications created with Fabric UI components are inclusive and comply with accessibility standards.

Developer Productivity: Fabric offers a library of reusable parts, tools, and design resources to expedite the design and development process. This reduces development times, minimizes the need for custom design work, and allows developers to concentrate more on creating features and functionality.

Cross-Platform Compatibility: Fabric UI components are designed to function flawlessly across a variety of Microsoft platforms, including web, desktop, and mobile. Cross-platform compatibility enables developers to design applications that offer a uniform user experience on any platform or device.

Congratulations to the CodeSprinters

(Selected to the Top 10 Team at CodeSprint 8)

With immense pride, the Faculty of Computing at SUSL congratulates the Team "CodeSprinters" for being selected as one of the Top 10 teams at the CodeSprint 8 organized by the IEEE Student Branch of the Informatics Institute of Technology (IIT), Sri Lanka.

IEEE STUDENT BRANCH - SUSL

CELEBRATING 8 YEARS OF EXCELLENCE – THE JOURNEY OF IEEE STUDENT BRANCH AT SABARAGAMUWA UNIVERSITY OF SRI LANKA

Composed by Mrs. Lohara Chathumini(lohara@foc.sub.ac.lk) (Councellor), and Ms. Bimesha Perera (abtperera@std.appse.sub.ac.lk), IEEE Student Branch of Sabaragamuwa University of Sri Lanka

Introduction: A Beacon of Technological Advancement

Since its inception in 2016, the IEEE Student Branch of Sabaragamuwa University of Sri Lanka has played a pivotal role in driving technological innovation and fostering academic excellence. What began as a small initiative in the Department of Computing and Information Systems, Faculty of Applied Sciences, has grown into a dynamic force that now spans across multiple faculties. As the branch celebrates its 8th anniversary, we reflect on its achievements, growth, and the future of this student-led organization.

The Origins: Planting the Seeds of Innovation

The IEEE Student Branch at Sabaragamuwa University of Sri Lanka was established in 2016 within the Department of Computing and Information Systems, which was then part of the Faculty of Applied Sciences. This marked the beginning of a journey focused on bridging the gap between theoretical learning and practical application. In 2022, with the creation of the Faculty of Computing, the branch found a new home, further strengthening its identity and mission. Despite the challenges of a fledgling organization—limited resources and a small membership base—the branch steadily gained recognition, becoming a hub for technological development within the university.

Growth and Expansion: Broadening the Horizons

Over the years, the IEEE Student Branch expanded its reach beyond its initial domain. While rooted in the Faculty of Computing, it extended its activities to include students from the Faculty of Applied Sciences, Faculty of Social Sciences and Languages, and Faculty of Technology. This expansion was instrumental in promoting interdisciplinary collaboration, allowing the branch to tap into a wider range of skills and perspectives. Today, the branch is a beacon of innovation across the Sabaragamuwa University of Sri Lanka, fostering a culture of excellence and inclusion.

Milestones Achieved: A Chronicle of Success

The IEEE Student Branch at Sabaragamuwa University of Sri Lanka has achieved significant milestones throughout its journey. Remarkably, even just after its initiation, the branch hosted the IEEE Congress in 2017, an event that provided significant recognition within the IEEE Sri Lanka Section. This early success set the stage for the branch's continued growth and impact.

Among the notable collaborations are those with the Society of Computer Sciences (SoCS), which led to the organization of flagship events like ***LetMeHack v1.0*** *in 2018 and* ***LetMeHack v2.0*** *in 2020. These events have become staples in the university's calendar, drawing participants from across the country and offering students valuable exposure to real-world problem-solving.*

In addition to LetMeHack, the branch has played a key role in a variety of other events, including the ***Virtual Rival*** *Video gaming competition,* ***Fortnight Meetup****- technical discussion series, among others. These initiatives, along with numerous workshops, coding competitions, and guest lectures, have been designed to equip students with the skills necessary for success in the rapidly evolving tech landscape. The branch's commitment to fostering practical knowledge and industry connections has also led to partnerships with leading technology companies, providing students with mentorship, internships, and collaborative research opportunities.*

The 2023/2024 Term: A Year of Dynamic Initiatives

Under the leadership of the current executive committee for the 2023/2024 term, the IEEE Student Branch of Sabaragamuwa University of Sri Lanka continues to thrive. This term has seen the initiation of several impactful events that have further solidified the branch's reputation as a leader in technological education and innovation. Among these are ***IndustriX****, a virtual tech talk series that connects students with industry experts;* ***InspireIEEE 2024****, an awareness program designed to introduce students to the IEEE community and its benefits;* ***CareerForge 2024****, a career fair and career guidance program aimed at preparing students for the professional world; and* ***IEEE VesakVerse 2024****, a digital AI art competition that celebrates creativity and technological prowess.*

These initiatives cover a wide array of interests and attract a diverse audience, ensuring that the IEEE Student Branch at Sabaragamuwa University of Sri Lanka remains a central hub for students across the university. The success of these events highlights the branch's commitment to staying on track and advancing with a strong momentum.

A Glimpse into the Future: Approaching a Decade of Excellence

As the IEEE Student Branch of Sabaragamuwa University of Sri Lanka marks its 8th year, the journey so far has been nothing short of transformative. Our efforts have already made a considerable impact on the student community at Sabaragamuwa University of Sri Lanka, establishing a foundation of innovation, collaboration, and academic excellence. While we are still on the path, the progress we've made fills us with confidence that when we celebrate our 10th anniversary in 2026, it will indeed be a decade of excellence.

Our ongoing commitment to nurturing talent, fostering technological advancement, and expanding our reach ensures that the coming years will bring even greater achievements. The future holds promising milestones, and we are dedicated to making the IEEE Student Branch of Sabaragamuwa University of Sri Lanka a shining example of what determination and collective effort can achieve. As we look forward to 2026, we are excited to continue this journey of growth and success.

UNDERGRADUATE RESEARCH PUBLICATION

Full Paper

01. ***T. Kumarawadu*** *and R. Rupasingha, "Analyzing User's Sentiments Using Twitter Data on the Usage of Chat GPT", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 206-211.*

02. ***K. Mahesha****, B.T.G.S. Kumara, and K. Banujan, "Movie Recommendation System Based on User Ratings and Critique", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 218-222.*

03. ***P. Dharmakeerthi,*** *R. Rupasingha, and B.T.G.S. Kumara, "CNN-Based Deep Learning Approach for Prioritization of Bug Reports", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 31-36.*

04. ***M. Shamalka,*** *K. Banujan, and B.T.G.S. Kumara, "Blockchain and Smart Contract Based Approach to Mitigate Software Piracy", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 247-252.*

05. ***R. Ajikaran, A. I. Hewarathna,*** *P. Vigneshwaran, C. Joseph, and S. Thuseethan, "An Image Analysis-Based Automated Method using Deep Learning for Grain Counting", in 2023 IEEE 17th International Conference on Industrial and Information Systems (ICIIS), 2023, pp. 25-30.*

06. *D. Pamod, J. Charles,* ***A. I. Hewarathna,*** *P. Vigneshwaran, S. Lekamge, and S. Thuseethan, "Hybrid Transfer Learning Approach for Emotion Analysis of Occluded Facial Expressions", in International Conference on Recent Trends in Image Processing and Pattern Recognition, 2023, pp. 387-402.*

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09. ***H. Nirmani*** *and U. Kudagamage, "Ensemble Approach for Early Prediction of Malnutrition Level of Children: A Case Study on Children Under Five Years Old", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 91-96.*

10. ***A.G.D.S. Thennakoon,*** *P.M.A.K. Wijeratne, B.T.G.S. Kumara,"Machine Learning Source Code Recommendation System to Recommend the Source Codes Based on Design Patterns", in International Research Conference on Smart computing and System Engineering ,University of Kelaniya, 2024*

04. ***T. Perera,*** *R. Rupasingha, and B.T.G.S. Kumara, "Deep Learning-Based Ensemble Model for Predicting the Lifestyle Status of a Person", in 2024 4th International Conference on Advanced Research in Computing (I-CARC), 2024, pp. 25-30.*

05. ***H. Senevirathne,*** *B.T.G.S. Kumara, and K. Banujan, "YouTube Video Categorization Based on Closed Captions", in 2024 4th International Conference on Advanced Research in Computing (ICARC), 2024, pp. 212-217.*

06. ***S. Karunarathne,*** *S. Vasanthapriyan, and K. Chathumini, "Utilizing Ensemble Learning in Detecting Parkinson's Disease with Reduced Facial Expressions and Hand-Written Drawings", in 2023 7th SLAAI International Conference on Artificial Intelligence (SLAAI-ICAI), 2023, pp. 1-6.*

Abstract

01. ***T.E. Kumarawadu,*** *R.A.H.M Rupasingha, "Sentiment Analysis on ChatGPT: A Comparison of Different Algorithms Using Twitter Data", Ruhuna International Science and Technology Conference*

02. ***K.Mahesha,*** *B.T.G.S. Kumara, and K. Banujan, "Movie Recommendation System using NLP: Based on Critiques and Ratings", in 01st Computing Undergraduate Research Symposium (ComURS), 2024. (RISTCON) 2024.*

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05. ***W.G.N.Lakmali,*** *K.G.L. Chathumini, "Cyst Detection in Kidney Using Machine Learning Algorithm", in International Conference on Asia-Pacific Peace Research Association (APPRA) Conference, 2024*

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07. ***S. J. M. J. Nadesha*** *and W.V.S.K. Wasalthilaka, "Sri Lankan Sign Language Detection Approach for Deaf People Using Human Pose Estimation Technique", in Computing Undergraduate Research Symposium (ComURS), 2024.*

08. ***Chamaali Dilka, Sammi Ilangasinghe, Sumal Surendra, Disini Samaraweera, Malki Pamoda,*** *W.V.S.K. Wasalthilaka and Thisum Wickramasooriya, "Revolutionizing Tea Quality Measurement using Multi Method Approach: An Innovative Mobile Application Approach", in Computing Undergraduate Research Symposium (ComURS), 2024.*

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12. ***MAF. Saroth,*** *Ms. P.M.A.K. Wijerathne and B.T.G.S. Kumara, "18_Non- Functional Software Requirements Classification Using LSTM", in Computing Undergraduate Research Symposium (ComURS), 2024*

13. ***T.D.A.S. Priyadarshani,*** *K. Banujan, B.T.G.S. Kumara, "A Machine Learning Framework Guided by Expert Insight for Team Player Classification in the IT Industry", Computing Undergraduate Research Symposium (ComURS), 2024.*

14. ***W.G.N.Lakmali,*** *K.G.L.Chathumini, "Cyst Detection in Kidney Using Machine Learning Algorithm", in Computing Undergraduate Research Symposium (ComURS, 2024*

15. ***T.D.M Perera,*** *R.A.H.M Rupasingha, "Improving the Accuracy by Using Ensemble Based Predictive Model for Predicting Healthy Lifestyle Based on Lifestyle, Habits, and Behaviors, 11th Ruhuna International Science and Technology Conference (RISTCON), 2024.*

16. ***H.U Senevirathne,*** *B.T.G.S. Kumara, and K. Banujan, "BART Summarization for Closed Captions to Generate YouTube Video Titles", in 01st Computing Undergraduate Research Symposium (ComURS), 2024.*

STUDENT'S PROJECT

LET'S REVOLUTIONIZE FARMING WITH "AQUO"

Composed by Mr. U.H.D.D. Udawela (uhddudawela@std.appsc.sab.ac.lk), Mr. M.G.M.T.Malalgoda (mgmtmalalgoda@std.appsc.sab.ac.lk), and Mr. W.S. Chamika (wschamika@std.appsc.sab.ac.lk), Faculty of Computing, Sabaragamuwa University of Sri Lanka.

AQUO's Project Team

Supervisor: Dr. R.A.H.M. Rupasingha, Faculty of Social Sciences and Languages, Sabaragamuwa University of Sri Lanka

Mentor: Mr. W. A. Sanjeewa, Mr. W. A. Sanjeewa, Faculty of Applied Sciences, Uwa Wellassa University of Sri Lanka

Undergraduates: U.H.D.D. Udawela, W.S.Chamika, W.H.LM.L.P. Waidyarathna, M.G.M.T.Malalgoda, and M.Shanuga, Faculty of Computing, Sabaragamuwa University of Sri Lanka

Introduction

AQUO is an advanced Agricultural Work Maintaining and Monitoring System. Hence, AQUO focuses on automated watering and fertilizing systems. Here, it will measure the soil moisture and it will check the required level. If the soil level meets the specified conditions, the water valve will open. Additionally, AQUO will automatically schedule fertilization tasks, and users will receive notifications regarding fertilizer availability. The best part is users have the flexibility to customize these actions according to their preferences. AQUO developers have created a fully automated system using IOT and mobile applications. AQUO tackles these challenges by,

- **Real-time Data** – *Using weather forecast data obtained through an API to enhance its predictive capabilities.*
- **Precision Irrigation** – *Recommending optimal irrigation schedules based on factors such as weather conditions, soil moisture levels, and crop water requirements, thereby conserving water and energy.*
- **Schedule Fertilizing** – *Scheduling a fertilizing system and providing notifications about fertilizer availability and other relevant details.*

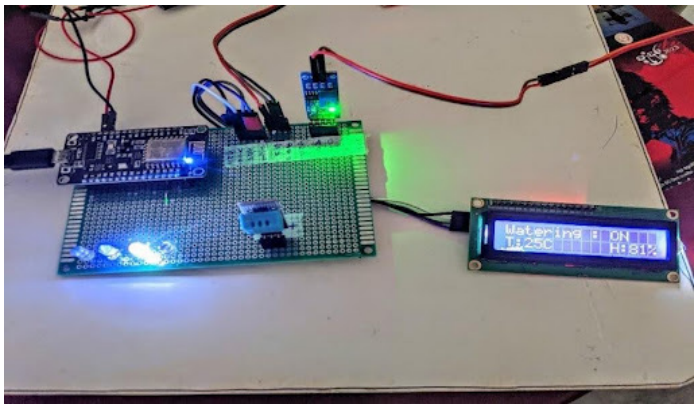


Figure 1: *SEQ Figure * ARABIC 1 IOT part*

Our primary objectives include real-time monitoring and control of crucial environmental variables that influence crop growth, sustainable water management through continuous soil moisture monitoring, and the automation of irrigation and fertilization processes. The system seamlessly integrates with a user-friendly Flutter application called AQUO, providing farmers with an intuitive and user-friendly interface for monitoring, control, and data analysis.

Software Architecture and Process

AQUO boasts a robust system architecture featuring the NodeMCU microcontroller, DHT11 sensor for monitoring ambient temperature and humidity, soil moisture sensor for accurate water content assessment, water valve control for automated irrigation, and Firebase as the database management system for efficient data storage and retrieval. This integration of hardware components ensures AQUO's ability to collect, process, and respond to real-time data, empowering farmers to make informed decisions that optimize resource utilization and enhance agricultural productivity. AQUO integrates weather forecast data through an API to enhance its predictive capabilities. The openweathermap.org API is used here to collect data. The following diagram illustrates the flow of data in AQUO.

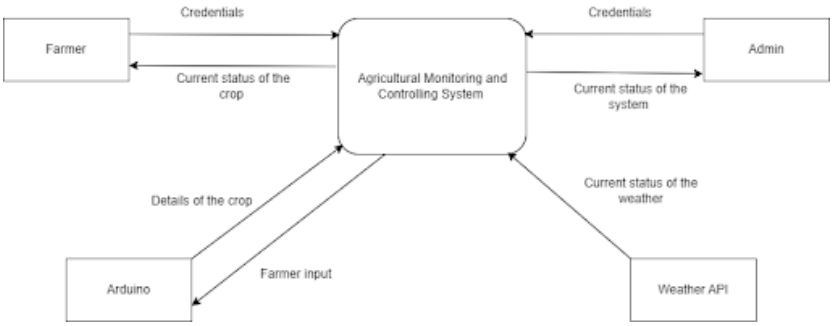


Figure 2: *Data Flow Diagram*

Upon activating the main switch in the application, users gain access to the water valve switch and fertilizing switch. In the background, NodeMCU always collects data from DHT11 and soil moisture sensors. Decision-making algorithms then trigger the water valve based on soil moisture levels.

Conclusion

In conclusion, the development of the Agricultural Work Maintaining and Monitoring System (AQUO) represents a significant stride toward efficient and intelligent gardening practices. Through careful consideration of various challenges and learning experiences, the project has evolved to offer a robust and scalable solution for users seeking an automated and data-driven approach to plant care. The expansion of sensor capabilities, including moisture sensors, ensures a comprehensive monitoring approach, capturing vital data points for informed decision-making. The journey undertaken in developing this AQUO serves as a testament to the dedication to excellence and the pursuit of sustainable, intelligent, and user-friendly gardening practices in the modern era.

Congratulations to the Vangaurd

(Selected to the Top 10 Team at CodeSprint 8)

With immense pride, the Faculty of Computing at SUSL congratulates the Team "Vanguard" for being selected as one of the Top 10 teams at the CodeSprint 8 organized by the IEEE Student Branch of the Informatics Institute of Technology (IIT), Sri Lanka.

INDUSTRIX AWARENESS

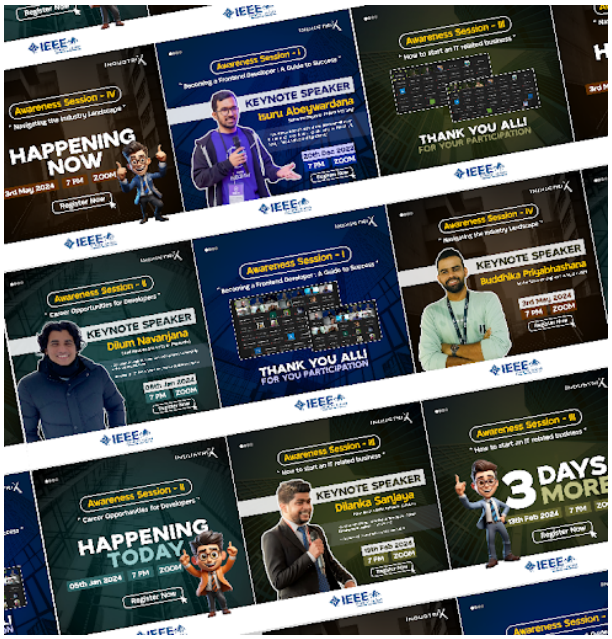
INDUSTRIX: INSPIRING YOUNG MINDS TO EXPLORE THE WORLD OF INFORMATION TECHNOLOGY

Composed by Mrs. Lohara Chathumini(lohara@foc.sub.ac.lk) (Councellor), and Ms. Bimesha Perera (abtperera@std.appse.sub.ac.lk), IEEE Student Branch of Sabaragamuwa University of Sri Lanka

The IT industry is one of the fastest-growing sectors in the modern world. Consequently, there has been a notable surge in employment prospects within the IT sector. Furthermore, a large number of young people are entering the IT sector as a result of the demand it has created. Developing one's abilities and acquiring the required information is essential for success in the industry. The IEEE Student Branch of Sabaragamuwa University in Sri Lanka is hosting a series of online awareness seminars called "IndustriX," aimed at providing students with more information about the IT industry. The purpose of this program is to motivate students to participate in IndustriX, an initiative designed to educate them on the prerequisites for entering the IT business in the future.

The IEEE Student branch of Sabaragamuwa University of Sri Lanka is distinguished by its unwavering commitment to fostering technological advancement through the organization and hosting of various influential technological forums. Supported by the IEEE Sri Lanka Section, this student branch plays a pivotal role in providing opportunities for young tech enthusiasts to share ideas and expertise, thereby catalyzing innovation and progress.

One notable initiative of this branch is IndustriX, a Zoom virtual webinar series designed to equip students with practical industrial knowledge and skills. Featuring both internal and external speakers, each session of IndustriX delves into topics ranging from sustainability and emerging tech trends to career pathways. Scheduled to kick off in December, this series will consist of monthly one-hour sessions, offering flexibility to accommodate the majority of participants' schedules.



IndustriX warmly welcomes all students with a passion for IT to join its enriching series. Positioned as a platform for holistic professional growth, IndustriX offers a spectrum of opportunities, including networking, skill enhancement, career guidance, and certifications. Promoted through university channels and social media platforms, these seminars bridge the gap between academia and industry, equipping students with invaluable tools for their future endeavors.

At its core, IndustriX is dedicated to guiding students across diverse industries by fostering mentorship, refining industry-specific skills, and exploring the transformative impact of emerging technologies. Our mission extends to providing insights into various career trajectories and fostering colcollabor-

tive ties among students with varied industry interests. Through meticulously curated sessions and access to industry experts, IndustriX aims to equip students with the requisite knowledge and competencies to thrive in today's dynamic professional realm.

More than just a webinar series, IndustriX serves as a catalyst for personal and professional advancement, empowering participants to deepen their comprehension of the IT domain. It represents a pathway to excellence, emphasizing continual refinement of knowledge and skills, thus propelling individuals towards becoming proficient contributors in the ever-evolving landscape of Information Technology.

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