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ComSpective

Enlightening perspectives on computing today and tomorrow

- Technologies & Trends
- Research & Applications
- Professional & Personal Development
- Perspectives on Computing
- Software Development Projects
- Interdisciplinary Topics
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Faculty of Computing
Sabaragamuwa University of Sri Lanka

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SABARAGAMUWA UNIVERSITY OF SRI LANKA

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Volume: 03 Issue: 02 November, 2023

With the aim of exploring today'sworld-changing sciences and technolgies in the domain of computing, the Faculty of Computing, Sabaragamuwa University of Sri Lanka takes a step forward to unite with industry professionals and researchers through ComSpective the ICT Technical Magazine.

The magazine provides a brilliant opportunity for individuals who wish to contribute to the knowedge-base through submittingarticles on technol-ogy insights,research investigations and experiences in the domain of computing.

CALL FOR ARTICLES

VOLUME 04 | ISSUE 01

WE SEEK ORIGINAL SUBMISSIONS ON THE FOLLOWING TOPICS OF INTEREST

- *Information Systems*
- *Software Engineering*
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- *Industrial Informatics*
- *Robotics and Automation*
- *Image processing and Computer Visios*
- *Services Computing*
- *Multimedia Technologies*
- *Cloud Computing*
- *Visualization and Computer Graphics*

The magazine also welcomes articles and contributions on various emerging and interdisciplinary topics.

ComSpective

Enlightening perspectives on computing today and tomorrow

IMPORTANT DATES

SUBMISSION DEADLINE	PUBLICATION DATE
15TH MARCH 2024	25TH MAY 2024

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- **Technical Articles**
- **Columns**
- **Features**
  - *Profiles/Personalities*
  - *Historical Events*
  - *News/Achievements*
  - *Photo Features*
- **Industry Articles** - *Emerging Technologies, Current Trends and Professional Development.*
- **Best of Student Articles**
- **Alumni Views**
- **Entrepreneurial and Startup Ideas**
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EDITOR'S NOTE

"Exploring technology advancements will direct the country to a strong and better future"

Dear Reader,

As Sri Lankans, We find ourselves in the midst of a transformative phase in a nation grappling with a profound economic downturn. While economists seek the best possible solution to today's challenges, our talented scientists and technology professionals play a critical role in restoring the country's economy to normalcy by inventing a plethora of new technologies and related products.

As we all know, we live in a world that develops numerous advanced technologies and employs those technologies to benefit society. Though there are many growing technologies, we cannot trust them completely as there are both benefits and drawbacks in everything. Exploring these developing technologies in all possible ways is hence the best way forward

As one of the prominent Faculties at Sabaragamuwa University of Sri Lanka, the Faculty of Computing has always made every attempt to create innovative solutions through extensive research and development. Not only that, we are also developing new platforms to share the latest results of all Sri Lankan researchers and inventors with the rest of the world. As a result, The Faculty of Computing is pleased to announce the publication of Volume 03 Issue II of the ComSpective, a bi-annual technical magazine containing a collection of technological articles written by well-known technology professionals, researchers, and new inventors from all over Sri Lanka expressing their innovative and groundbreaking ideas, views, experiments, and research findings. As we reach the three-year milestone, we are filled with delight to reflect on our accomplishments.

Thank you.

Subodhi Wasalathilaka
Editor-in-Chief

FEATURES

Page 11

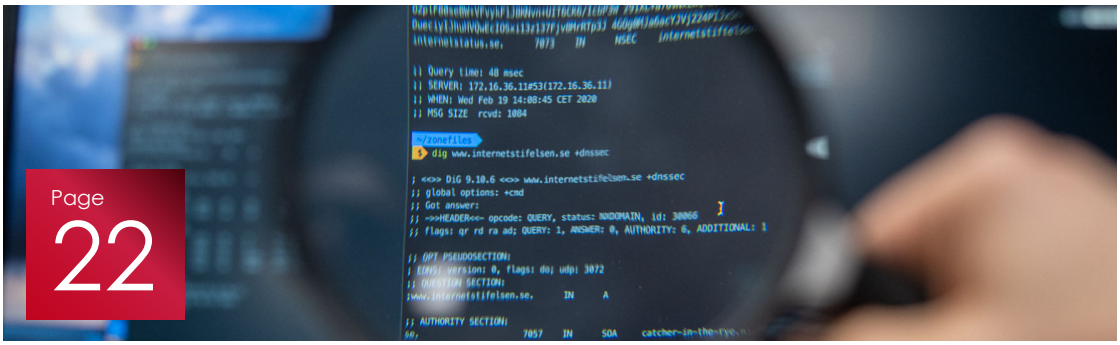
Cyberbullying: Unveiling the South Asian Context and Strategies for Mitigation

- ***Dr. Achchuthan Sivapalan***

Page 15

Multi-Agent Systems for SustainableAgriculture: Enhancing Efficiency and Resilience

- ***Ms. H. K. N. Udayangani & Mr. S.P.Sellapperuma***



Page 22

InFluxDB for Time-Series Data

- ***Mr. W.M.C.J.T. Kithulwatta***

Page 28

Text Classification on Fake News Detection: A machine learning based approach

- ***Mr. Vadivel Abishethvarman & Mr. Kuhaneswaran Banujan***

CONTENT

The Faculty of Computing is pleased to present the 2nd Issue of the Volume 03 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 SUCCESS: CONGRATULATIONS TO THE FIRST BATCH TO GRADUATE FROM THE FACULTY OF COMPUTING, SUSL

Composed by Dr. Sugeeswari Lekamge and Ms. Ashansa Wijerathne

27th July 2023 marked a historic moment for the Faculty of Computing, Sabaragamuwa University of Sri Lanka as Eighty-Three graduates stepped into the next chapter of their lives, adorned with BSc Honours in Computing and Information Systems. This cohort not only witnessed their hard work materialize but also made history as the first batch to graduate from the Faculty of Computing. The Professor Dayananda Somasundara Auditorium of the University witnessed this momentous occasion, graced by the esteemed presence of the Vice Chancellor, Senior Professor Udaya Rathanyaka.

The Dean of the Faculty of Computing, Professor S. Vasanthapriyan, the Heads of the three Departments: Computing and Information Systems, Software Engineering, and Data Science, along with the entire academic staff of the Faculty applauded the graduates for their dedication and achievements. The journey to success was not solitary; it was a collaborative effort with the unwavering guidance of the Dean and academic staff of the Faculty of Applied Sciences, who have nurtured these undergraduates throughout their journey, who provided the foundation upon which they built their knowledge and skills. The entire University community, including sister Faculties, academic, administrative, and non-academic staff, played pivotal roles in shaping these graduates. This achievement is not just personal but resonates as a significant milestone for the Faculty of Computing, symbolizing its commitment to academic excellence.

Among the shining stars, Ms. Saleem Adeeba stood out, earning not only her Degree but also the Thambipillai Thambiratnam (J.P.U.M) Attorney-at-Law Memorial Gold Medal. This prestigious award recognizes the student with the Best Performance in Computing and Information Systems, achieving a First Class Degree with the Highest Final Grade Point Average in the Degree Examinations.

Adding another accolade to her impressive list of achievements, Ms. Adeeba was honored with the Best Undergraduate Researcher of Computing Gold Medal awarded by the Department of Computing and Information Systems. Guided by the expertise of Professor B.T.G.S. Kumara and co-supervised by Mr. Banujan Kuhaneswaran, her research in the realm of Social Media Analysis, Text Mining and Natural Language Processing, has not only significantly contributed to academia but has also cast light on critical societal issues.

The first batch graduating from the Faculty of Computing at SUSL has set the bar high, leaving an indelible mark on the history of the Faculty. As these graduates embark on new endeavors, we extend our heartfelt wishes for continued success and fulfillment in their future pursuits.

Congratulations to the 2016/2017 Batch!

THE BEST RESEARCHER
THE FACULTY OF COMPUTING-2022

The Faculty of Computing is pleased to announce Professor **B.T.G.S. Kumara** as the recipient of the prestigious award for the Best Researcher of the Faculty of Computing of the Year 2022, presented during the 27th University Day Celebrations of SUSL held on 28th June 2023.

Professor Kumara's remarkable contributions to the realm of research have garnered this much-deserved recognition. We are inspired by your accomplishments, which serve as a guiding light for students and fellow researchers, motivating them to reach for greater heights and pursue ambitious dreams.

Humanoid Robots with the Expansion of Artificial Intelligence

Mr. Lashen Kariyawasam *and* ***Mr. W.M.C.J.T. Kithulwatta*** *(chiranthajtk@gmail.com), Uwa Wellassa University.*

Mr. Lashen Kariyawasam is an Undergraduate at the Department of Information and Communication Technology, Faculty of Technological Studies, Uva Wellassa University of Sri Lanka, Badulla.

Mr. W.M.C.J.T Kithulwatta is a Lecturer (Probationary) at the Department of Information and Communication Technology, Faculty of Technological Studies, Uva Wellassa University of Sri Lanka, Badulla.

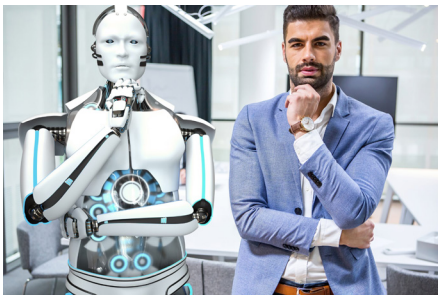
With the advancement of Artificial Intelligence (AI), we can see that AI is powering every aspect of the world. With these types of gadgets, life is now easier than it was previously. Let's look at how Artificial Intelligence (AI) is being used to improve the performance of humanoid robots in this article.

What is a Humanoid Robot?

A robot that has a similar body shape to a human is called a humanoid robot. We have seen them commonly in sci-fi movies such as “A.I. Rising” and “Hi AI”. Now it has been changed to not only movies but also in the real world. These robots are built for various purposes, such as domestic and industrial use cases, entertainment purposes, and military and government use cases.

Types of Humanoid Robots

Industrial Humanoid Robots - These robots are used for manufacturing or other industrial purposes. In contrast to other humanoid robots, these robots. are often more expensive. They can operate for extended periods without getting tired and are considerably more durable.



Source: https://grmdaily.com/worlds-first-human-robot-press-conference/

Figure 1: *Humanoid Robots*

Consumer Humanoid Robots: These robots are designed for personal use. Compared to other humanoid robots, these are less expensive. The design is much more user-friendly, and they are used for various tasks, such as assisting with domestic duties or being a companion.

Research Humanoid Robots: They have been designed for scientific research. They are often more expensive and have more advanced capabilities than industrial humanoid ro-

bots. They may be unable to work longer hours and are not as durable.

How is AI being used for humanoid robots?

Undoubtedly, the most fascinating area in robotics is Artificial Intelligence. Humanoid robots can learn from their surroundings and adapt to them thanks to AI algorithms that, over time, help them carry out duties more efficiently and accurately. Also, they can communicate with people more naturally due to their capacity to recognize and react to human gestures, facial emotions, and vocal commands.

In earlier stages, research was the primary objective of AI for humanoids. But now, humanoids are being created for a variety of non-research uses. They are employed in various roles and have been developed to carry out various human activities.

Robots with human traits come in wide different varieties. They have sensors that enable them to sense their surroundings. In contrast, someone has cameras that allow them to see objects properly. Whereas the motors, commonly known as actuators, are fixed in key locations and control their movement and motions.

Chat GPT, the most demanding AI-trained model, which Open AI is developing, has released an API for Chat GPT, a startup attempt for the humanoid robot. This would be the turning point for advancing humanoid robots as they have been well-trained. Following are some examples of advanced humanoid robots.

ChatGPT can support various functionalities of humanoid robots by providing them with natural language processing capabilities. Firstly, ChatGPT enables natural language interaction between robots and humans. This means that users can communicate with the robot using spoken or written language, making it more accessible and user-friendly. Whether it's giving commands, asking questions, or engaging in casual conversation, ChatGPT allows robots to understand and respond in a human-like manner.

Secondly, ChatGPT can assist with information retrieval and explanation. When a user asks a question, the robot can leverage ChatGPT to search for relevant information on the internet or in its internal database and provide a concise and coherent response. Additionally, when the robot performs complex tasks, it can use ChatGPT to explain its actions or decisions in plain language, enhancing transparency and trust in human-robot interactions.

Lastly, ChatGPT can contribute to the emotional intelligence of humanoid robots. By analyzing the context and sentiment of conversations, ChatGPT can help robots understand and respond to users' emotional states. This can be crucial in applications like healthcare and therapy, where robots need to provide emotional support and empathy. Overall, ChatGPT's language capabilities enable humanoid robots to engage in more natural and versatile interactions with humans, making them more useful and relatable in a wide range of scenarios.

Nadine: Nadine is an empathic robot who greets people back, maintains eye contact, and recalls every conversation you've ever had with her.

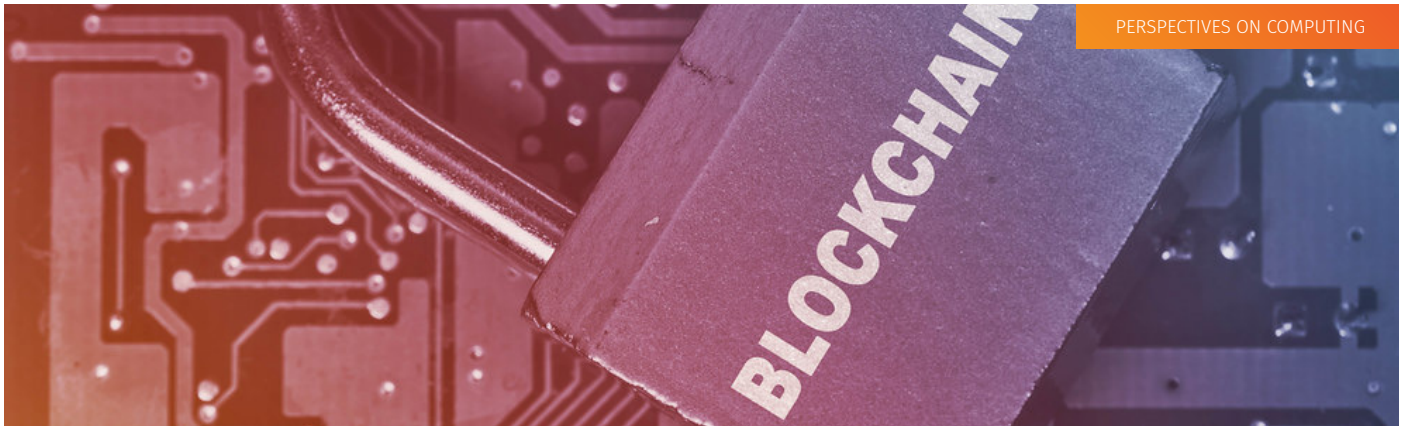
Geminoid DK: This robot is a lifelike clone of Henry Scharfe's from the University of Aalborg.

Junco Chihira: Junco is a full-time Tokyo tourist information center employee.

Jia Jia: Jia Jia is the first humanoid robot made in China. In Shanghai, this humanoid robot from China charms the crowds.

Sophia: Sophia is regarded as the most sophisticated humanoid robot.

A new era in the development of humanoid robots has begun with the advancement of AI technology. To ensure that humanoid robots are utilized in ways that benefit society, it is crucial to continue to monitor and regulate their development and use.



The Blockchain Trilemma - Unsolved Mystery in the Blockchains

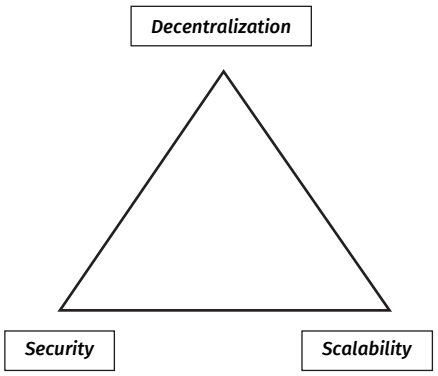
Mr. Teshan Prabuddika *and* ***Eng. Chameera De Silva*** *Coventry University, National Institute of Business Management, National Innovation Center (NIC)*

Mr. Teshan Prabuddika is a First Year Undergraduate who is following BSc (Hons) Data Science at the Coventry University, National Institute of Business Management, National Innovation Center (NIC)

Eng. Chameera De Silva is a Module Leader & a Consultant in Machine Learning at the National Institute of Business Management, National Innovation Center (NIC)

Imagine a world where everyone has access to a secure and transparent financial system, regardless of their location or socioeconomic status. This is the vision of blockchain technology, a decentralized and distributed ledger system that has the potential to revolutionize the way we interact with the world. Satoshi Nakamoto is the founder of this blockchain technology. In the decentralized public ledger, anyone can access the records anytime, from anywhere in the world. The decentralized public ledger is validated with each new block added to the blockchain.

The blockchain is a revolutionary technology, but there is an unsolved issue that stops it from reaching its full potential. That issue is the blockchain trilemma, which is one of the biggest challenges blockchain technology is facing today. It is the challenge of balancing three competing goals: scalability, security, and decentralization. In this article, we cover scalability, security, and decentralization in depth to examine the blockchain trilemma.



Scalability

Achieving scalability of a blockchain is highly challenging because the scalability of a blockchain is determined by increase transaction speed (faster finality), and transaction throughput (high transactions per second), without sacrificing decentralization or security (Smith, 2023). To increase the maximum number of throughput per block, blockchain developers need to consider 4 main factors.

Consensus mechanism: A procedure

through which all the peers of the Blockchain network reach a common agreement about the present state of the distributed ledger. (GeekofGeeks)

Block time: The time a block takes to validate and added to the blockchain.

Block Size: The maximum capacity of data each block can hold.

Network Latency: Quality and the speed of the internet connection to run a node.

To achieve scalability. Developers have to select a consensus mechanism that matches the requirements to increase the scalability of blockchain. The increased block time will cause vulnerable attacks on the blockchain, and the increased block time will cause a higher time to validate a block. It will also decrease the confirmation of transactions per second (TPS).

The proof-of-stake consensus mechanism addresses all these issues. In proof-of-stake, the block time is theoretically milliseconds to validate a block. If the networks have more validators, instead of high storage capacity and high time frame blocks, Proof of Stake can validate reduced storage capacity blocks within milliseconds. This will increase the validation of blocks per second (BPS) and also increase the transactions per second (TPS). As an additional requirement. Validators need to have a low-latency, high-speed internet connection to validate a block. (Dusart, 2023)

Using a proof-of-stake algorithm to increase the scalability of a blockchain will also increase its security. But it will cause the decentralization of a blockchain to fail. Because the proof-of-stake consensus mechanism is too centralized to not achieve decentralization, all the validators have to update their light client to the most up-to-date version to mine blocks in proof-of-stake. Projects have to use verified centralized nodes to validate blocks. If an unknown validator in the network stops validating the blocks, the entire blockchain will have to face downtime, and it will also decrease security. The network may become vulnerable to attackers. So developers have to extensively centralize their nodes to achieve scalability and security. (Dusart, 2023) (Elliott, 2022)

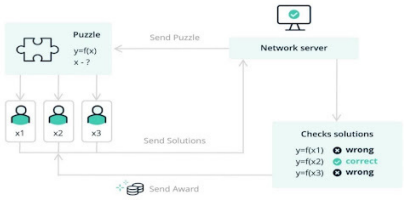
Security

Blockchain security is a critical component of a blockchain network. A secure blockchain will improve its ability to prevent unauthorized access and fraudulent activities. Blockchain security depends on two key factors:

1. Consensus mechanism.

2. The cryptographic method used to secure the blockchain.

To achieve the security of the blockchain network. The developers need to use a consensus mechanism with a strong cryptographic method. Proof-of-work is a commonly used consensus mechanism that is often paired with the SHA-256 cryptographic method. In proof-of-work, each node has a copy of the distributed ledger. Mining a block in the proof-of-work consensus required high computational power. Miners have to find the unique hash code of each block. When a miner solves the hash code problem sent by the network server, the miner broadcasts, the miner has added mined block to the blockchain. For this effort, the blockchain rewards a block reward and the transaction fee of the mined block to the miner. And other miners will move to mine the next block. (Moreland, 2023)



If someone tries to double-spend or engage in fraudulent activity in the network, the consensus mechanism can make it very difficult and expensive to carry out such attacks. Because each block has its own unique hash identity, if someone tries to change the transaction details, the unique hash value will change, and the consensus will identify the block with other blockchain records. The modified block will be rejected by the other network participants, and it will not be added to the blockchain.

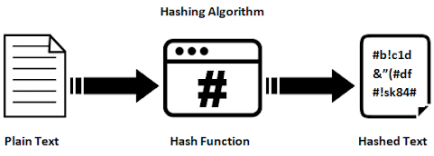


Figure 1: *SHA256 Hashing Algorithm (thesslstore.com)*

Instead of proof-of-work, proof-of-stake can be used to increase the security of the blockchain. but it does not use mathematical hashing algorithms like proof-of-work to increase the security of a blockchain. That means the

validator's total stacked amount in the network and his track record of block validation will be considered when selecting the validator. Each validator has a fair chance of being selected to validate a block. This will prevent any single validator from gaining control of the network. The validator will receive transaction fees in the mined block. If the validator makes a mistake or engages in fraudulent activity in the blockchain network without validating a block, as punishment, their total staked amount will be slash by the algorithm.

There is a risk of a 51% attack on each blockchain consensus. If a miner or validator gets 51% of the network, the miner or validator will be able to make a fake transaction to the network (a double-spend attack). The proof-of-work has a direct risk of being open to this kind of attack, and the proof-of-stake prevents a single miner from getting the majority of the network because if the validator needs to attack by getting the majority (51% of the network), The validator needs to purchase 51% of the token supply to run an attack. It's practically impossible.

Decentralization

Decentralization is a key principle in blockchain technology. Decentralization means the transfer of control and decision-making from a centralized entity (individual, organization, or group) to a distributed network. A decentralized blockchain network ensures the security and transparency of the network. The blockchain and its data are strictly resistant to attacks; there is no single point of failure. Further, there will be no trust issues; decentralization helps build trust in its community. Decentralization helps to avoid censorship by the government or a single entity that censors the data distributed through a decentralized network.

When balancing decentralization with security and scalability, the consensus mechanism helps to maintain decentralization. In most consensus methods, proof-of-work is a consensus mechanism that is well-suited for achieving decentralization because it requires all participants to have a copy of the distributed ledger. So no one can change or delete the blockchain records. If someone tries to edit or delete a blockchain record, other participants in the network will reject the edited or changed data included in the block.

Achieving decentralization comes with a lot of challenges. Highly decentralized blockchains have high security, but they may be slower to process transactions than centralized blockchains because each participant in the network must validate each transaction. When the number of active nodes in the network increases, the block mining difficulty adjustments of the blockchain network will increase. This will increase the complexity of the network to maintain security and decentralization, and it will decrease the scalability of the blockchain to process the increased demand for transactions. (OKX, 2023)

Sharding and Layer 2 Solutions

In the present, people believe that sharding and layer 2 solutions are the best solutions to achieve decentralization. However it is not true. Sharding means splitting a blockchain up into smaller, more agile blockchains so it can handle more transactions. (bitpanda) Achieving scalability through sharding a blockchain will lose security and decentralization because splitting a blockchain into agile blockchains needs centralization to check the overall state of the agile blockchains. Also the agile blockchains become more vulnerable to attackers.

Layer 2 solutions are more scalable than Layer 1 and more affordable for blockchain users. But layer 2 solutions are also centralized and less secure than layer 1 solutions. Most layer 1 solutions and sharding solutions use proof-of-stake as a consensus mechanism. In a decentralized environment, proof-of-stake cannot run a node. It has to be a centralized and verified node to run the network. If not, the network will face downtime or stop processing blocks. Companies or organizations have to run centralized and verified nodes to achieve scalability and security by giving up decentralization. Sharding and Layer 2 solutions are not perfect solutions for the blockchain trilemma. Both of these have challenges to overcome, and they are constantly working to achieve them. There is an optimistic future, and the blockchain trilemma will be solved by layer 2 and sharding solutions. (Washburn, 2023)

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IX 23

1st RUNNER UP

Congratulations to Team Pixel Concepts from the Faculty of Computing, Sabaragamuwa University of Sri Lanka for their remarkable achievement as the 1st Runners-Up of IX-23

We commend Team Pixel Concepts for their dedication and hard work, and we are incredibly proud of their success!

ICARC 2024

EXPLORING THE FUTURE OF COMPUTING AT THE 4TH INTERNATIONAL CONFERENCE ON ADVANCED RESEARCH IN COMPUTING – ICARC 2024

Composed by Dr. Sugeeswari Lekamge and Ms. Nirubikaa Ravikumar

In a world where technology is advancing at an unprecedented pace, the intersection of Artificial Intelligence (AI), edge computing, quantum computing, the Internet of Things (IoT), and immersive technologies is shaping the future of computing. The 4th International Conference on Advanced Research in Computing – ICARC 2024, hosted by the Faculty of Computing at Sabaragamuwa University of Sri Lanka is set to be a beacon of knowledge and innovation, offering insights into the smart and innovative trends in next-generation computing technologies.

Scheduled to be held at the picturesque Sabaragamuwa University of Sri Lanka nestled in the serene surroundings of Belihuloya, on the 23rd and 24th of February 2024, ICARC 2024 revolves around the theme of "Smart and Innovative Trends in Next Generation Computing Technologies." This two-day event will bring together experts, scholars, and industry leaders to discuss and explore the transformative potential of emerging computing technologies.

ICARC 2024 takes pride in presenting an exceptional lineup of speakers, featuring the distinguished Professor Saman Halgamuge as the keynote speaker and Mrs. Jyotika Athavale as the special guest speaker under the Women in Engineering (WIE) initiative. Hailing from the University of Melbourne, Australia, Professor Halgamuge is a luminary in the realms of Artificial Intelligence (AI) and Machine Learning, bringing a wealth of expertise to the conference. Meanwhile, Mrs. Athavale, currently serving as the President of the IEEE Computer Society for 2024, stands at the forefront of functional safety standardization initiatives. Her significant contributions to the computing industry, particularly in collaboration with vital organizations like IEEE, ISO, UL, and SAE SDOs, make her a compelling addition to the conference's speaker lineup. Together, their insights are poised to illuminate the audience on the most pivotal trends in the ever-evolving landscape of computing, promising a thought-provoking and enlightening experience for all attendees.

ICARC 2024 has received technical co-sponsorship from IEEE, IEEE Sri Lanka Section, IEEE Computer Society Sri Lanka Chapter, and IEEE Communications Society Sri Lanka Chapter. The accepted papers will be submitted for inclusion into IEEE Xplore Digital Library subject to meeting IEEE Xplore's scope and quality requirements. This is a testament to the high caliber of research and innovation presented at ICARC year after year.

ICARC 2024 features a diverse range of tracks, providing a comprehensive exploration of various computing disciplines. Attendees can delve into Artificial Intelligence and Machine Learning, Computer Vision and Image Processing, Text Analytics and Natural Language Processing, Computer Networks and Internet of Things, Human-Computer Interaction, Knowledge Management and Software Engineering, and Digital Transformation and Industry 4.0 for cutting-edge discussions.

With an array of oral presentations, pre-conference workshops and tutorials, ICARC 2024 promises to be an intellectual feast. Attendees will have ample opportunities for discussion and knowledge dissemination, fostering collaboration and innovation within the computing community.

ICARC 2024 is not just a conference; it's a glimpse into the future of computing. As technology continues to evolve, this event serves as a platform for experts and enthusiasts to come together, share insights, and shape the trajectory of computing technologies. Don't miss the chance to be part of this intellectually stimulating experience that explores the forefront of innovation in the ever-evolving world of computing.

4th International Conference on Advanced Research in Computing
ICARC 2024

23rd & 24th February 2024

"Smart and Innovative Trends in Next Generation Computing Technologies"

CALL FOR PAPERS

We are pleased to extend a warm invitation to researchers, scholars, and professionals from across the globe to be a part of the 4th International Conference on Advanced Research in Computing - ICARC 2024. Hosted by the Faculty of Computing at Sabaragamuwa University of Sri Lanka, this event centered around the theme ***"Smart and Innovative Trends in Next Generation Computing Technologies"*** promises to be a dynamic platform for the exchange of cutting-edge ideas and groundbreaking advancements in the realm of computing.

- TRACK 01 — Artificial Intelligence & Machine Learning
- TRACK 02 — Computer Vision & Image Processing
- TRACK 03 — Text Analytics & Natural Language Processing
- TRACK 04 — Computer Networks and Internet of Things
- TRACK 05 — Human-Computer Interaction
- TRACK 06 — Knowledge Management and Software Engineering
- TRACK 07 — Digital Transformation and Industry 4.0
- TRACK 08 — Open

IMPORTANT DATES

SUBMISSION OPEN	01st September 2023
SUBMISSION DEADLINE	30th November 2023
PAPER NOTIFICATION	01st January 2024
CAMERA READY SUBMISSION	15th January 2024
REGISTRATION DEADLINE (EARLY BIRD)	01st February 2024
REGISTRATION DEADLINE (REGULAR)	15th February 2024
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Cyberbullying: Unveiling the South Asian Context and Strategies for Mitigation

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Dr. Achchuthan Sivapalan holds the position of Senior Lecturer in Commerce at the Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka. His scholarly focus encompasses consumer behaviour, business strategy, and sustainable development. Dr. Achchuthan 's dedication to advancing knowledge in these areas is evidenced by the publication of his research in reputable journals. His notable contributions have found a place in distinguished publications such as Marketing Intelligence & Planning, Journal of Retailing and Consumer Services, International Journal of Hospitality Management, Journal of International Consumer Marketing, Services Marketing Quarterly, Society and Business Review, International Review of Public and Non-profit Marketing, and Sustainable Consumption and Production, among others.

Cyberbullying refers to the act of using digital platforms, such as social media, instant messaging, and online forums, to harass, intimidate, or harm others. It can manifest in various forms, including sending threatening messages, spreading rumors, posting offensive comments or images, and impersonating someone with the intent to cause harm. Unlike traditional bullying, cyberbullying can reach a vast audience quickly, allowing it to persist and escalate rapidly. In today's digital era, the rise of cyberbullying has become a significant concern. This article delves into the world of cyberbullying, with a specific focus on the South Asian context. The article will explore what cyberbullying entails, the trends observed in this region, the dire consequences it has on individuals, and the strategies available to mitigate and combat this pervasive issue.

Cyberbullying Trend in South Asian Context

In recent years, the South Asian region has experienced a notable surge in incidents of cyber-bullying (Achuthan et al., 2023). This increase can be attributed to several factors that have shaped the digital landscape of the region. First and foremost, there has been a widespread penetration of the internet across South Asian countries, making it easier for individuals to access online platforms and engage in various forms of communication. The popularity of social media platforms, in particular, has soared, providing a virtual space where people can interact, share information, and express their opinions (Hossain et al., 2022).

The growing reliance on digital communication has further fueled the rise of cyber bullying. With more people relying on online platforms for work, education, and socializing, the opportunities for negative interactions and harassment have multiplied. Studies have indicated that S-

outh Asian countries exhibit a high prevalence of cyberbullying cases. People of all ages can become targets, but adolescents and young adults are particularly vulnerable due to their frequent use of digital platforms and their developing ability to navigate the online world. The consequences of cyberbullying can be severe, leading to psychological distress, social isolation, and even physical harm. (Hossain et al., 2022). Therefore, addressing this issue has become a pressing concern for governments, educators, and communities in the region, who are working towards raising awareness, implementing legal frameworks, and promoting digital literacy to combat cyber bullying effectively.

Consequences of Cyberbullying

The consequences of cyberbullying can be severe and long-lasting. Victims often experience emotional distress, anxiety, depression, and even suicidal thoughts. The constant fear and humiliation can lead to social isolation and impact academic performance, causing a decline in overall well-being. Additionally, cyberbullying can leave a digital footprint, affecting future educational and professional opportunities, as well as tarnishing one's reputation within their community.

Mitigating Strategies for Cyberbullying

Addressing cyberbullying requires a collaborative effort from individuals, families, educational institutions, and society as a whole. Here are some strategies to mitigate cyberbullying:

Education and Awareness: - Promote awareness campaigns to educate individuals about cyberbullying, its impact, and ways to prevent it. Encourage open conversations about online safety and responsible digital citizenship.

Strict Policies and Legislation - Enact robust laws and regulations to combat cyberbullying. Ensure that online platforms have clear guidelines and reporting mechanisms in place to address instances of harassment swiftly.

Parental Involvement - Parents should actively engage with their children, monitoring their online activities, and fostering open lines of communication. Encourage them to report any cyberbullying incidents and provide emotional support.

Digital Literacy Programs - Integrate digital literacy programs into school curricula to teach students about online etiquette, responsible behavior, and safe internet practices.

Support Systems - Establish support systems, such as counseling services, helplines, and online support groups, to assist victims of cyberbullying. These resources can offer emotional support and guidance during difficult times.

Empower Bystanders - Encourage bystanders to intervene and report cyberbullying incidents. Promote a culture of empathy and solidarity, where individuals feel empowered to stand up against online harassment.

Conclusion

Cyberbullying is a distressing issue that demands immediate attention. By understanding its nature and prevalence in the South Asian context, we can develop effective strategies to combat this growing menace. Through education, awareness, and comprehensive support systems, we can empower individuals to navigate the digital world safely and responsibly. Let us collectively strive to create an online environment that promotes kindness, respect, and empathy, ensuring the well-being of all individuals, regardless of their digital presence.

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IEEE STUDENT BRANCH, SUSL

DUELO ROBOTIC BATTLE 2023: A FUSION INNOVATION AND AMBITION

Composed by Mr. P. K. G. D. D. Rathnayake, Faculty of Computing, Sabaragamuwa University of Sri Lanka

In the dynamic landscape of technology, where innovation and imagination take center stage, all eyes are on the stage set for Sabaragamuwa University's Robotics Rivalry 2023. Envisioned by the IEEE Student Branch at Sabaragamuwa University of Sri Lanka, in collaboration with the Faculties of Technology, Computing, and Social Sciences and Language, this inter-university showdown is on track to reshape the panorama of technological advancement and prowess.

At the forefront of progress, the IEEE Student Branch of Sabaragamuwa University champions technological innovation and excellence for the betterment of humanity. This competition epitomizes their dedication, designed to nurture and showcase the latent potential of young minds in robotics. As the world's largest technical organization dedicated to propelling technology for societal betterment, IEEE's influence echoes throughout the event's fabric.

At its core, Sabaragamuwa University's Robotics Rivalry 2023 is a jubilation of technological prowess and innovation. What sets this competition apart is its unwavering commitment to enhancing the technical skills of STEM undergraduates. It functions as a crucible for honing expertise in artificial intelligence, automation, and programming – the building blocks of the contemporary technological vista.

The event draws the sharpest minds from universities across the nation, converging in a grand display of inventiveness and engineering excellence. The IEEE Student Branch of Sabaragamuwa University, in synergy with the participating faculties, has meticulously curated an arena where participants can unfurl their creativity and skills while embodying the spirit of affable competition.

Sabaragamuwa University's Robotics Rivalry 2023 goes beyond a mere contest; it's a platform designed to empower aspiring robotic enthusiasts to flaunt their talents. This event bridges innovation and learning, enabling participants to stretch their technical boundaries, nurture camaraderie, and collaborate with fellow undergraduates.

The aim is crystal-clear: to elevate each participant's technical prowess and pave the path for a future in which technology converges seamlessly with humanity's requisites. By fostering a competitive yet cordial milieu, the event endeavors to ignite curiosity, zeal, and creativity, ensuring every participant walks away not just with prizes, but with an enriched understanding of technology's potential to shape the world.

The event's agenda promises an immersive experience, from the launch of registrations to the final crescendo of the award ceremony. The itinerary seamlessly blends competition, knowledge infusion, and jubilation.

Months of hard work and engineering culminate in the competition. Inside the battleground, robots fashioned by teams of five undergraduates engage in riveting battles, unveiling their control, strategy, aggression, and damage-dealing capabilities. The intricate structure of the competition, shrouded in secrecy until the event, is poised to captivate both participants and spectators alike.

Echoing the commitment and skill of the participants, Sabaragamuwa University's Robotics Rivalry 2023 presents an array of enticing cash rewards. Winners stand to gain recognition, along with tangible tokens for their toil, innovation, and perseverance. The allure of these prizes acts as a compelling impetus for participants to invest their all, pushing their boundaries and striving for the pinnacle of excellence.

In alignment with IEEE's dedication to fostering technology for the betterment of humanity, the event offers avenues for organizations to partner and align with this grand celebration of innovation. These partnerships not only bolster the event but also furnish organizations with an opportunity to showcase their allegiance to technological advance-

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WINNERS

EIDOS IDEATHON BY LAZARUS 2.0

Disara Mapalagama

Minuri Hewage

Congratulations to Disara Mapalagama and Minuri Hewage for being the winners of EIDOS Ideathon by LAZARUS 2.0 organized by the Power and Energy Society of the IEEE Student Branch of SLIIT, on 29th of July 2023.

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

Multi-Agent Systems for SustainableAgriculture: Enhancing Efficiency and Resilience

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Ms. H.K.N.Udayangani is a Postgraduate student at the Faculty of Applied Sciences, Uwa Wellassa University with a research interest in Multi agent systems.

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Sustainable agriculture is an essential component for food security and environmental preservation in a growing global population. Conventional practices strain natural resources, requiring innovative, eco-friendly approaches. Multi-agent systems (MAS) offer a promising solution, integrating advanced technologies and intelligent agents to optimize agricultural processes, reduce waste, and promote ecological balance.

Agents, often known as intelligent agents, are cutting-edge methods for creating software applications that replicate intricate worlds with important interactions. They have brought about a paradigm change in the domains of computer science and software development, particularly in relation to artificial intelligence technology. Multi-agent systems (MAS) are groups of autonomous agents that collaborate with one another and their surroundings to accomplish particular objectives. These agents in sustainable agriculture may include drones, robots, sensors, algorithms for making decisions, and farmers themselves. Each agent has unique skills and knowledge, and by working together and communicating, they can effectively do difficult jobs like the ones listed below.

Precision Farming

Precision farming is essential for sustainable agriculture, utilizing Multi-Agent Systems (MAS) to collect real-time data on soil quality, crop health, and weather conditions. Drones with sensors provide high-resolution imagery, enabling early detection of stress, disease, or pest infestations.

Smart Water Management

Water scarcity is a challenge in many regions, and sustainable agriculture must focus on efficient water management. MAS can optimize irrigation schedules, considering soil moisture, weather patterns, and crop water requirements, contributing to water conservation efforts.

Integrated Pest Management (IPM)

MAS can aid IPM strategies by monitoring pest populations, suggesting targeted interventions, and reducing reliance on chemical inputs, addressing environmental and human health issues associated with chemical pesticides.

Soil Health and Nutrient Management

Soil degradation impacts agricultural productivity and ecosystem health. MAS can analyze soil data and provide recommendations for improving soil health through nutrient management, cover cropping, and reduced tillage. Supporting integrated pest management (IPM) strategies involves monitoring pest populations, suggesting targeted interventions, and reducing reliance on chemical inputs.

Enhancing Biodiversity and Ecosystem Services

Biodiversity is essential for ecosystem resilience and natural pest control; MAS aids in designing diverse crop rotations, intercropping systems, and habitat restoration plans for biodiversity conservation.

Climate Resilience and Adaptation

Climate change poses risks to agriculture, including extreme weather and shifting seasons. MAS can help adapt by offering climate-resilient farming practices and supporting crop variety selection.

Sustainable Supply Chain Management

MAS integrates blockchain technology for sustainable supply chain management, enhancing transparency, traceability, and efficiency, promoting environmentally and socially responsible agricultural production and transportation.

MAS for Current context in Sri Lankan Agriculture sector

Multi-agent systems have the ability to alter agriculture by promoting sustainable food production and environmental protection. Sri Lanka's agricultural methods have the potential to be revolutionized by the use of Multi-Agent Systems (MAS) for sustainable agriculture. Sri Lanka can improve agricultural productivity, preserve essential resources, and lessen environmental challenges by embracing intelligent agents, cutting-edge technology, and data-driven decision-making. In order to ensure food security while protecting the country's natural resources and ecosystems, MAS offers a holistic strategy to handle the complex problems of water scarcity, soil degradation, pest control, and climate change adaptation. This ground-breaking strategy is in line with international sustainability objectives and is a critical step toward a more effective, resilient, and eco-friendly future for Sri Lankan agriculture.

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SLASSCOM Professional Skills Development Workshop for Computing Undergraduates at SUSL - An Incredible Success

The Faculty of Computing of Sabaragamuwa University of Sri Lanka organized a transformative event that left an indelible mark on over a hundred students who gathered at the Mini Auditorium of the Faculty of Applied Sciences on 17th October, 2023

The Society of Computer Science (SOCS), Sabaragamuwa University of Sri Lanka

Composed by Ms. Ashansa Wijerathna and Mr. Nipun Wimalasooriya, Sabaragamuwa University of Sri Lanka.

The Society of Computer Science (SOCS) was established in 2012 by the students of the Department of Computer and Information Systems. With the establishment of the Faculty of Computer, SUSL in 2023, this society started functioning as an affiliated society, but this also works in cooperation with other undergraduate students who are interested in the subject of Information Technology.

This time, the Annual General Meeting of the Society of Computer Sciences (SOCS), Sabaragamuwa University of Sri Lanka was held on 16th May 2023 at the University premises in which the Executive Committee for the year 2023/2024 was appointed. On that day, Mr. Shanaka Vidanage was elected as the new president of the society, Mr. Chathura Senarathne as vice president, Mr. Nipun Wimalasooriya as secretary, Ms. Ruwini Kularathne as the vice secretary, Mr. Hashan Ranasinghe as the editor, Mr. Avishka Kothalawala as the treasurer and Ms. Ashansa Wijeratne as the senior treasurer.

SOCS was founded with the intention of fulfilling the objectives like improving the knowledge of undergraduates regarding the subject of information technology, meeting the human and technological requirements needed to improve the IT knowledge of university undergraduates and organizing university-wide information technology events. As a result, there are a number of events conducted through this society to improve the computer literacy of undergraduates.

Our signature Fortnight event is a unique platform where students come together to explore the latest trends and advancements in the world of ICT. It is a platform to share knowledge, ideas, and connections in the world of computer sciences. SOCS has proudly conducted 30 Fortnight events since 2012 with the participation of undergraduates and academic staff members. The 30th iteration of the CIS Fortnight Meetup, organized by the Society of Computer Sciences, was held on 7th of September 2023 at 5pm, and it featured students discussing and presenting diverse technological topics. Mr. Prabhath Rathnayaka from 2nd year and Mr. Sujair Ibrahim from 1st year from FoC were speakers for the event and did sessions on “UI/UX Basics” and “Introduction to AI” respectively.

Another notable endeavor is the Virtual Rival (VR) event that is held by the society in collaboration with IEEE student’s branch of Sabaragamuwa University of Sri Lanka which is a perfect platform for both gamers and tech enthusiasts to participate in a captivating gaming competition. The latest iteration of the Virtual Rival was held successfully on 13th of July 2023 from 9am to 12pm at Sabaragamuwa University premises.

Furthermore, SOCS hosts LetMeHack, an inter-university hackathon conducted in partnership with the Faculty of Computing. This event, which has been successfully held twice within the university, holds the distinction of being the inaugural inter-university hackathon organized by the society. Plans are underway to hold the next version of this exciting hackathon.

Vidunena is a free seminar session conducted for the A/L students via online platforms together with IEEE, WIE and the Faculty of Computing. The Society of Computer Sciences also holds the CodeNight event for the undergraduates of the faculty of computing. Here, third year students have the opportunity to participate in an idea while the second year undergraduates can get the chance to participate in an algorithm.

It is important to mention that all these events are successfully being conducted with the support of academic staff of the Faculty of Computing and the dedication of all the committee members of the society and the undergraduate of the faculty.

Industry 5.0: The Next Industrial Revolution

Ms. Nirubikaa Ravikumar *(niru@foc.sab.ac.lk), Sabaragamuwa University of Sri Lanka and* ***Dr. Achchuthan Sivapalan*** *(achchu@univ.jfn.ac.lk), University of Jaffna, Sri Lanka*

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Dr. Achchuthan Sivapalan holds the position of Senior Lecturer in Commerce at the Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka. His scholarly focus encompasses consumer behavior, business strat-

Industry 5.0: Navigating the Next Industrial Revolution

The world does not stand still, and neither does the industrial sector. As we saw with Industry 4.0, which ushered in an era dominated by AI and IoT-driven automation, change is constant. We now stand on the cusp of Industry 5.0. But what does this entail, and what are the broader implications?

Understanding Industry 5.0

At its core, Industry 5.0 is a harmonious collaboration between humans and machines. While Industry 4.0 was lauded for driving efficiency through automation, the new paradigm recognises that human creativity is irreplaceable. Industry 5.0 aims to find the ideal equilibrium between human ingenuity and technological prowess, promising a more sustainable and adaptive future.

Embracing Human Creativity

Humans possess a flair for innovation and problem-solving that machines can't emulate. While AI can analyse vast data sets and predict trends, it lacks the intuitive spark that drives human creativity. Industry 5.0 promotes the idea that machines should complement humans, not replace them. For instance, while robots in manufacturing plants can perform repetitive tasks, humans can focus on design, strategy, and quality control, leading to better products and innovation.

Technological Integration in Industry 5.0

Though the human element is vital, we cannot underestimate the role of advancing technologies. FANUC, with its "zero waste factory," utilises robotics, AI, and 3D printing to adapt quickly to changing production demands. Similarly, Adidas's "Speedfactory" exemplifies how humans and robots can work in tandem to produce customised products efficiently.

But what about evidence? According to a study by McKinsey, factories embracing the Industry 5.0 model have witnessed a 20-50% in

egy, and sustainable development. Dr. Achchuthan 's dedication to advancing knowledge in these areas is evidenced by the publication of his research in reputable journals. His notable contributions have found a place in distinguished publications such as Marketing Intelligence & Planning, Journal of Retailing and Consumer Services, International Journal of Hospitality Management, Journal of International Consumer Marketing, Services Marketing Quarterly, Society and Business Review, International Review of Public and Non-profit Marketing, and Sustainable Consumption and Production, among others.

crease in productivity. Furthermore, the World Economic Forum projects that by 2025, the economic impact of Industry 5.0 adaptations could be upwards of $3.7 trillion globally

Challenges and Future Implications

However, like all transformations, Industry 5.0 isn't without its hurdles. Adoption requires significant capital, and there are concerns about data security with increased IoT integration. Additionally, as we transition, questions arise about the potential displacement of jobs and the subsequent need for re-skilling workers.

Regions like Europe are already pioneering worker retraining programs, while African countries see Industry 5.0 as an opportunity to leapfrog certain stages of industrialisation. This global perspective reveals both the opportunities and challenges faced by different nations.

Ethical and Social Dimensions

Any discussion about Industry 5.0 must consider the ethical ramifications. What happens to workers whose roles become redundant? How do we ensure that the benefits of Industry 5.0 are equitably distributed? Governments and industries must collaboratively address these challenges, ensuring that economic advancements don't come at the cost of social well-being.

Conclusion

Industry 5.0 heralds an era where technology and human ingenuity coalesce. While the potential benefits are immense, a nuanced understanding requires us also to consider the challenges ahead. We can navigate this transition by integrating data-driven insights, global perspectives, and ethical considerations to create a prosperous, inclusive future.

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IEEE Day 2023 at Sabaragamuwa University of Sri Lanka

The IEEE Student Branch of Sabaragamuwa University of Sri Lanka celebrated the IEEE Day on 24th of October 2023 with a mission to "Leverage Technology for a Better Tomorrow".

WOMEN IN ENGINEERING

PATH FORWARD 2023

Composed by IEEE WIE Affinity Group of Sabaragamuwa University of Sri Lanka

The IEEE WIE Student Branch Affinity Group of Sabaragamuwa University of Sri Lanka (SUSL) is excited to introduce our "Path Forward 2023" session series. This series of sessions has been specially designed to address our undergraduate students' critical need for career guidance. The journey from being a student to a professional can be an intimidating one, and it is essential that our students are well-equipped with the knowledge and skills to navigate this transition successfully. The "Path Forward 2023" series aims to empower our students with the tools they need to make informed decisions about their future careers. In order to achieve this goal, we have enlisted the expertise of seasoned IT professionals who will share their insights, provide valuable guidance, and recount their own experiences during these sessions. By tapping into the wealth of knowledge within our industry, we can help our students to make wise choices for their future endeavors.

In this age of rapid technological advancement, Information Technology offers many professional opportunities. The "Path Forward 2023" series aims to raise awareness among our undergraduates about this diversity of career paths within the IT sector. We want our students to understand their options and identify their interests, skills, attitudes, and values that align with these career paths.

We understand that each path requires specific skills, attitudes, and education, and we aim to equip our students with this knowledge. Additionally, we will guide them in developing effective job search strategies, including crafting a comprehensive CV and preparing for interviews. We want to ensure that our students are aware of their options and well-prepared to pursue them.

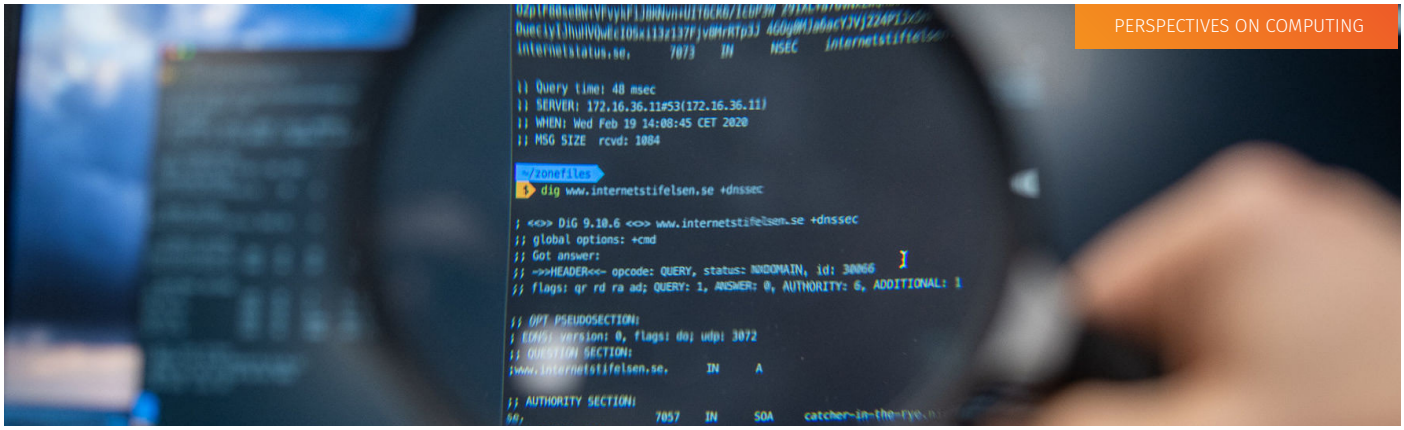
Beyond the practical aspects of career development, we also aim to foster critical thinking among our undergraduates. We want them to consider the broader impact of their career choices on society and the environment. By encouraging our students to align their careers with their values and interests, we hope to inspire them to make choices that contribute positively to society and the environment.

Our journey began with the series' first session, "Exploring Methodologies in IT Industry," held on the 17th of May 2023 at the Sabaragamuwa University of Sri Lanka. This session provided a comprehensive overview of the methodologies employed in the IT industry, such as the Software Development Life Cycle, including Agile and Scrum methodologies. Ms. Sonali Akarawita, a Senior Software Quality Assurance Engineer from TIQRI (Pvt.) Ltd. graced us with her expertise as the speaker for this session.

In conclusion, the IEEE WIE Student Branch Affinity Group of SUSL is proud to present the "Path Forward 2023" series as a vital step towards preparing our undergraduates for the challenges and opportunities in the IT industry. We are excited about the possibilities this initiative holds and look forward to continuing our mission of nurturing the future IT professionals of Sri Lanka.

BEST ACADAMIC PERFORMANCE
GOLD MEDAL

Congratulations **Ms. Saleem Adeeba** for winning the Thambipillai Thambiratnam (J.P.U.M) Attorney-at-Law Memorial Gold Medal awarded by Professor S. Vasanthapriyan awarded to the student with the best performance in Computing and Information Systems, who obtained a First Class Degree with the highest Final Grade Point Average in the Degree examinations, at the 24th General Convocation (Phase II) of the Sabaragamuwa University of Sri Lanka, held on 27th July 2023.



InFluxDB for Time-Series Data

Mr. W.M.C.J.T. Kithulwatta *(chiranthajtk@gmail.com), Uwa Wellassa University.*

Mr. W.M.C.J.T. Kithulwatta is a Lecturer (Probationary) at the Department of Information and Communication Technology, Faculty of Technological Studies, Uva Wellassa University of Sri Lanka, Badulla.

Time Series Databases (TSDBs) are specialized database platforms created to effectively manage and analyze time-stamped data, in which each data item is connected to a unique timestamp. When it comes to storing and retrieving time series data, such as sensor readings, stock market information, and system metrics, these databases shine. Their timestamp-centric design, optimized storage for high write performance, support for aggregation and downsampling, and skill with time-windowed queries are key differences from other database types. InfluxDB, TimescaleDB, Prometheus, and OpenTSDB are a few famous TSDBs. Each is designed for various time series data use cases and offers performance, scalability, and particular query capabilities suited for time-based data analytics.

An open-source time-series database called InfluxDB is made specifically for storing and handling time-stamped data effectively. It specializes in managing massive amounts of time-dependent data, including financial data, application metrics, and sensor readings. The database is excellent for real-time data input and analysis since it is optimized for quick queries and high-speed writes. Users may organize data using tags, fields, and timestamps thanks to InfluxDB's schema flexibility, and its SQL-like query language, InfluxQL, which supports a variety of data manipulation and aggregation operations. InfluxDB is a well-liked option in sectors like IoT, monitoring, and DevOps where real-time insights from time series data are vital thanks to features like retention policies for data management and interaction with visualization tools like Grafana.

The primary competencies of InfluxDB are its effective handling of time series data, support for high availability and clustering, and interface with data collection tools like Telegraf. The database is ideal for applications that call for time-stamped data points to be monitored and analyzed in real-time, allowing users to gain knowledge and make decisions bas-

ed on shifting trends and patterns. InfluxDB enables companies to efficiently manage their time series data, from data collection to visualization, to produce actionable insights and boost operational efficiency, whether they use open-source or enterprise offerings.

Source: https://www.influxdata.com/time-series-platform/

Figure 1: *Sample InfluxDB Dashboard*

Key features of InfluxDB include:

Schema Flexibility: With the help of InfluxDB, customers can organize and manage their time series data in a way that best fits their individual use case. Tags, fields, and timestamps are the key ideas behind this versatility.

Tags: Each data point has a set of key-value pairs called tags. They are employed for indexing and collapsing related data items. Tags are perfect for metadata that doesn't change often, like a sensor's location or device ID. They make it possible to efficiently query and categorize data without adding to the burden on the storage system.

Fields: The actual data values connected to a data point are known as fields. These could be strings, numbers, or other kinds of data. Fields are indexed for quicker querying than tags are not. Data that changes often, such as sensor readings or performance indicators, can be stored in fields.

Timestamps: In InfluxDB, each data point has a timestamp attached to it that shows the date and time the data was recorded. This is crucial for time series analysis and visualization because it makes it possible to sort data points chronologically.

High Write and Query Performance:

A popular option for managing time series data in real-time and high-frequency applications, InfluxDB is well known for its high write and query performance.

High Write Performance:

Because InfluxDB is designed for speedy data intake, it is the best option for applications that need to quickly and effectively record incoming data points. Several methods are used to obtain this great writing performance.

Time-Structured Storage: The data storage architecture of InfluxDB is created to effectively handle time series data. Based on their timestamps, data points are arranged to enable efficient storage and retrieval.

Batch Writes: InfluxDB enables batch writes, making it possible to ingest numerous data points with only one request. By doing this, the overhead related to each write operation is reduced.

Data compression: To reduce storage needs while retaining speedy data access, InfluxDB uses a variety of data compression algorithms.

Fast Query Performance:

InfluxDB's design also places a high priority on quick query response times, allowing users to instantly get insights from their time series data. Its quick query performance is influenced by several things, including:

Time-Indexing: InfluxDB indexes data based on timestamps, enabling effective retrieval of data points in chronological order. For time-based analysis and visualization, this is essential.

Field Indexing: Fields are also indexed, allowing filtering, grouping, and aggregation-based queries to run more quickly.

Data Retention Policies: Pre-aggregation of data over time is made possible by InfluxDB's retention policies and continuous queries, which can greatly improve query speed for historical data.

Improved Query Engine: InfluxDB's query engine is built to handle time series data effectively, running complicated queries over even big datasets quickly.

SQL-like Query Language: The query language used by InfluxDB, called InfluxQL, is similar to SQL and was created expressly for querying time series data. Users can manipulate, filter, aggregate, and extract useful insights from their time series data stored in InfluxDB by using InfluxQL. While InfluxQL and SQL have some similarities, InfluxQL has a unique syntax and capabilities designed specifically for time series data processing.

Retention Policies: InfluxDB's retention policies provide a means for controlling how long data is kept in the database and how it is eventually purged automatically. By enabling you to establish various data reten

tion durations for various data kinds or use cases, retention policies aid in the optimization of storage consumption.

Telegraf Integration: Telegraf is a data collection tool created by InfluxData that is open-source. It is intended to gather data from a variety of systems, applications, databases, and other sources before sending it to InfluxDB for archival and analysis. By offering a variety of input plugins to collect data from multiple sources and output plugins to transmit that data to a variety of destinations, with InfluxDB as a common destination, Telegraf makes the process of gathering and forwarding data to InfluxDB simpler.

InfluxDB's focus on time-series data sets it apart from many other databases in significant ways. InfluxDB is highly optimized for use cases where data points are associated with timestamps and may arrive in high volumes and with varying frequencies, such as system monitoring, IoT sensor data, and financial market data. InfluxDB is purpose-built for efficiently storing and querying time-stamped data. When opposed to general-purpose databases, which might not have the same level of optimization and features designed expressly for time-series data management, this specialization produces better performance and scalability for time-series workloads.

Example use-case of InfluxDB time-series data: Assume that a system engineer has to monitor the system infrastructure with system metrics like CPU usage, memory usage, disk usage, and network usage. In this case, it is possible to store and process this time-series data effectively using InfluxDB.

BEST STUDENT
2022- DEAN'S LIST

Congratulations to **Hashan Sooriyage** from the 2018/ 2019 Batch of the Department of Computing and Information Systems, Faculty of Applied Sciences (formerly), on receiving a prestigious gold medal at the 27th University Day Celebrations of SUSL held on 28th June 2023.

Hashan made it to the Dean's List of the Faculty of Applied Sciences, being among the students with the highest academic performance in the Year 2022, securing a GPA of 4.0/4.0!

ACADEMIC RESEARCH PUBLICATION

REFEREED INDEXED JOURNALS

K. I. Senadhira, R. A. H. M. Rupasingha, **B. T. G. S. Kumara**, "A deep learning based approach for classifying tweets related to online learning during the Covid-19 pandemic," Education and Information Technologies, 2023, pp. 1-30.

CONFERENCE

S. Adeeba, **K. Banujan, B. T. G. S. Kumara**, "The Role of Social Media (Twitter) in Analysing Home Violence: A Machine Learning Approach," 2023 International Research Conference on Smart Computing and Systems (SCSE), 2023, pp. 1-6.

H. Gunawardhana, **B. T. G. S. Kumara**, K. Rathnayake, P. M. Jayaweera, "Effectiveness of Machine Learning Algorithms on Battling Counterfeit Items in E-commerce Marketplaces," 2023 International Research Conference on Smart Computing and Systems (SCSE), 2023, pp. 1-7.

CHAPTERS AND BOOKS OF SCHOLARLY WORK

M.. Ifham, S Prasanth, **K. Banujan, B. T. G. S. Kumara**, "Are students using the time effectively during the COVID-19 pandemic?" Recent Advances in Material, Manufacturing, and Machine Learning, 2023, pp. 1328-1335.

H. S. Adeeba, **K. Banujan, B. T. G. S. Kumara**, "Detecting home violence related tweets using machine learning techniques during the Covid-19," Recent Advances in Material, Manufacturing, and Machine Learning, 2023, pp. 1481-1489

CodeSprint 7.0 Show Down

Congratulations to the Team "SynTax_Error" from the Faculty of Computing, Sabaragamuwa University of Sri Lanka for being the winners of CodeSprint7.0 organized by the IEEE Student Branch of the Informatics Institute of Technology (IIT), Sri Lanka.

We commend Team "SynTax_Error" for their dedication and hard work, and we are incredibly proud of their success!

STUDENT RESEARCH PUBLICATION

JOURNALS

D. M. P. W. Dissanayake, Prof. R. M. K. T. Rathnayaka and Mr. L. L. Gihan Chathuranga, Crop Yield Forecasting Using Machine Learning Techniques – A Systematic Literature Review in KJMS journal

R. N. M. P. Ranaweera and Prof. R. M. K. T. Rathnayaka, Optimal Cut Order Planning Solutions Using Heuristic and Meta-Heuristic Algorithms: A Systematic Literature Review in KJMS journal

P. G. I. M. Chandrasekara, L. L. Gihan Chathuranga, K. A. A. Chathurangi, D. M. K. N. Seneviratna and R. M. K. T. Rathnayaka, An Intelligent Video Surveillance Mechanism to Real-Time Identify Abnormal Activities: A Systematic Literature Review in KDU journal of multidisciplinary studies (KJMS)

T. Shanmugarasa, J. Charles, V. Palanisamy, S. Lekamge, and S. Thuseethan, Predicting The Success of Scientific Papers Using Imbalanced Data - A review of literature in IUP Journal of Information Technology

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CONFERENCE

S. W. Athapaththu, U. A. Piumi Ishanka, Plant Leaf Recognition Using Texture, Colour and Vein Density Features, International Conference on Advanced Research in Computing, 2023 (IEEE)

S. Adeeba, B. T. G. S Kumara, and K. Banujan, The Role of Social Media (Twitter) in Analysing Home Violence Awareness: A Machine Learning Approach, International Conference on Smart Computing and Systems Engineering, 2023 (IEEE & Scoups)

Vaanathy Sabanayagam, Charles Joseph and Lekamge Sugeeswari, Machine Learning Approach to Detect the Anxiety and Depression Level of Video Game Dependent Individuals, 17th IEEE ICIIS, 2023

Priyamal, G. A. N.; Rupasingha, R. A. H. M., Sentiment Analysis of Twitter Data on the Tourism Industry During the Covid-19 Pandemic, 3rd international Conference on Advanced Research in Computing - ICARC, 2023 (IEEE)

M. A. F. Fasheera, U. P. Kudagamage, Analysis of the correlation between university students' academic performance and the influential factors, 13th IEEE Conf. Annual computing and communications, 2023

S. M. S. T. Wijekoon, R. A. H. M. Rupasingha, Machine Learning Approach for Discovering Successful Books Based on the Achievement of Award-Winning, "3rd International Conference on Advanced Research in Computing (ICARC), 2023"

ABSTRACTS

M. A. F. Fasheera, U. P. Kudagamage, Analysis of the correlation between university students' academic performance and the influential factors, Applied Sciences Undergraduate Research Symposium, 2023

P. G. I. M. Chandrasekara, L. L. Gihan Chathuranga, K. A. A. Chathurangi, D. M. K. N. Seneviratna and R. M. K. T. Rathnayaka, A Novel Intelligent Video Surveillance Mechanism to Real-Time Identify Abnormal Activities," in International Conference on Applied Sciences Sabaragamuwa University of Sri Lanka, 2023

OTHER

Jayaweera, M. P. G. K.; Kithulwatta, W.M.C.J.T. & Rathnayaka, R.M.K.T., Detect anomalies in cloud platforms by using network data: a review., Cluster Comput (2023).

TADHack 2023

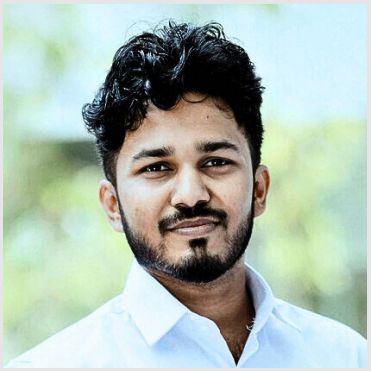
1st Runner Up

Congratulations to Team Zyndicate from the Faculty of Computing, Sabaragamuwa University of Sri Lanka for their remarkable achievement as the 1st Runners-Up at the TADHack Sri Lanka 2023, an open global hackathon organized by hSenid Mobile.

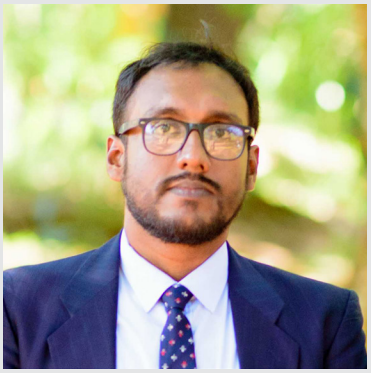
The event took place on the 21st of October 2023 at the Dialog Auditorium, Colombo, and Team Zyndicate demonstrated their exceptional skills, creativity, and innovation to secure this prestigious position. We commend Team Zyndicate for their dedication and hard work, and we are incredibly proud of their success!

Text Classification on Fake News Detection: A machine learning based approach

Mr. Vadivel Abishethvarman *(abishethvarman@gmail.com) and* ***Mr. Kuhaneswaran Banujan*** *(bhakuha@appsc.sab.ac.lk), Sabaragamuwa University of Sri Lanka*



Mr Vadivel Abishethvarman is a 4th-year undergraduate belonging to the Department of Computing and Information Systems, Faculty of Computing, Sabaragamuwa University of Sri Lanka.



Mr Kuhaneswaran Banujan is a Lecturer (Probationary) in Computer Science attached to the Department of Computing and Information Systems, Faculty of Computing. His research interests include Data Mining, Social Media Mining, Knowledge Management, and Ontology Modeling.

Fake news [1] is a serious issue for individuals, communities, and entire societies. It exploits the credibility of reliable information and can be exploited to manipulate people's beliefs and actions. Fake news[2] concerns false or misleading information presented as reliable news. It can be created for different motives, including financial gain or political manipulation. The dissemination of fake news can have severe consequences. With the proliferation of information in the digital age, the saturation of fake news threatens credible sources.

Advancements in machine learning algorithms have addressed the challenge of fake news detection. Researchers and developers have conducted several studies and implemented various models to detect fake news, especially through text classification. Detecting fake news through machine learning[3] involves several steps. A diverse and well-labelled dataset of reliable and fake news is needed. It is the utmost way to understand the text and perform to find the pattern of fake news. It involves preparing a dataset with labelled real and fake news articles. Creating a dataset for fake ne-

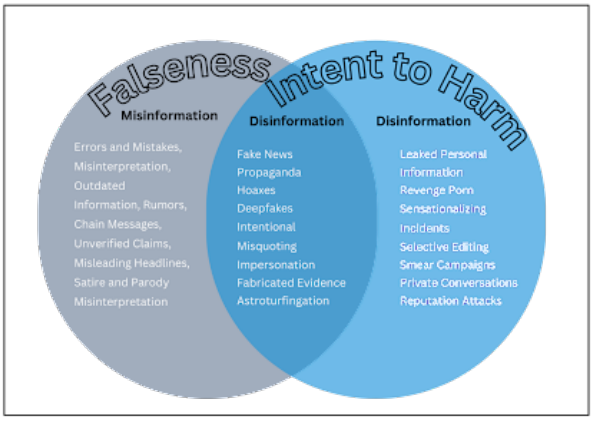


Figure 1: *Information Disorder Venn Diagram*

ws. It involves preparing a dataset with labelled real and fake news articles. Creating a dataset for fake news detection is complex and needs proper understanding, labelling, and verification.

Collaboration among various researchers can aid in dataset sharing and development. A good dataset should contain labelled examples of reliable and fake news articles covering various topics and domains. Then, the text should be tokenized, converted into numerical features, and used to train a machine-learning model. Techniques like feature extraction should be employed to extract relevant features from the text data. These features enable the model to classify articles as genuine or fake based on patterns identified during training.

This can be done in a supervised learning method. Fake news detection is very subjective. The labelled data makes the model learn patterns and features that distinguish between the two categories.

Various machine learning algorithms and models can detect fake news: naive Bayes, SVM, and Logistic Regression for text classification. Deep learning models like RNN LSTM or Transformer-based models can effectively handle more complex patterns in the text. The choice of algorithm or model depends on factors such as dataset size, task complexity, and available resources in feature engineering. The utilization of RNN LSTM [4] algorithms has proven particularly effective in capturing sequential order in text data, making them well-suited for detection.

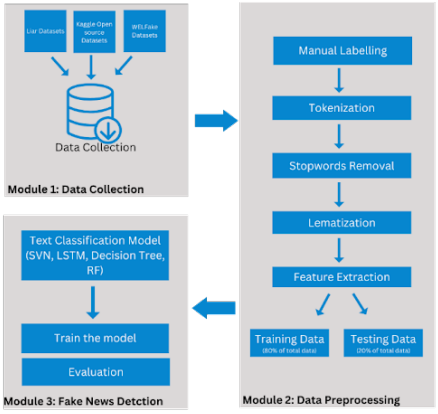


Figure 2: *Fake News Detection/ Classification Model*

In addition to accuracy, other metrics like precision, recall, and F1-score are crucial for evaluating the model's effectiveness in detecting fake news. Achieving a balance between false positives and negatives is essential to ensure the model minimizes misclassifications.

The future of fake news detection lies in advancements in various areas. Combining text, images, and social media metrics, multi-model approaches will provide a holistic view of fake news. An advanced approach involves user profiling, where browsing behaviour and social media activity are analyzed to build credibility profiles. These profiles help assess the reliability of sources and content shared by users.

Utilizing machine learning techniques can significantly contribute to mitigating the spread of misinformation.

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[2]. C. Wardle, "Fake news. It's complicated," First draft, vol. 16, pp. 1-11, 2017.

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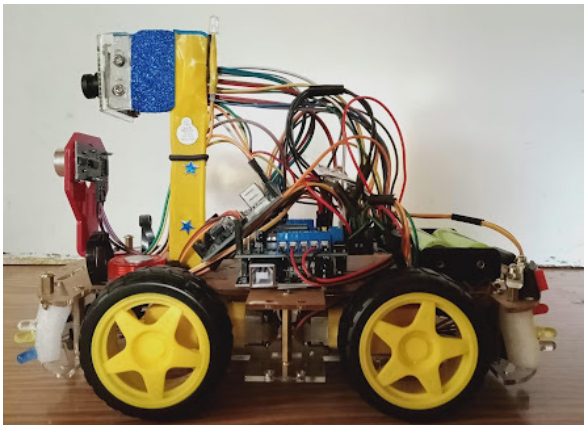
SUSL Undergraduates takes part in SLASSCOM G2C Workshops in Virtusa!!

Group of third-year and fourth-year undergraduates of the Department of Computing and Information Systems, Faculty of Computing at SUSL, joined forces with 40 talented students from universities across Sri Lanka for the SLASSCOM Graduate to Career (G2C) Industry Project Simulation Workshop which was held on 31st of October 2023 at Virtusa Auditorium.

STUDENT PROJECT

AI SMART CAR

Composed by Mr. Pulina Perera (pulinashewantha1@gmail.com), Faculty of Computing,
Sabaragamuwa University of Sri Lanka



This is an AI-based car, powered by an Arduino Mega and equipped with ultrasonic and IR sensors, a camera, a GPS tracker, and a TFT LCD display. It offers obstacle avoidance, road sign detection, collision warnings, live tracking, and edge detection. It boasts functional lights for a comprehensive and intelligent driving experience.

The AI Smart Robot Car project introduces cutting-edge software intelligence that empowers the vehicle to assess its environment, recognize obstacles, and navigate uncharted terrain with precision. The robot has a meticulously designed architecture tailored to its intended operational context. It optimizes space coverage, integrates an infrared sensor for obstacle detection, and incorporates a road sign recognition mechanism to enhance traffic sign-based navigation. Vehicles equipped with this system are capable of detecting collision probabilities and alerting drivers through visual and auditory cues, promoting accident prevention. The project leverages a comprehensive hardware suite, including an Arduino Mega, ultrasonic and IR sensors, a camera, a GPS tracker, a TFT LCD display, and the TensorFlow software framework for road sign detection, culminating in a sophisticated, intelligent driving experience.

The most important aspect of achieving autonomous motion control for a mobile robot is obtaining information about the surrounding environment and transferring it to the main controller for conversion into control commands so that the robot can safely and reliably avoid all obstacles while moving to its destination, which is possible when the mobile robot has a strong perception system.It has the capability of being employed as a mobile surveillance system. It may be controlled from a distance. It does not necessitate the use of manpower. It may be utilized in critical situations such as floods, bomb disposal, fires, terrorist attacks, earthquakes, and espionage.

THE PROJECT'S KEY GOALS MAY BE SUMMARIZED AS FOLLOWS:

- **The obstacle avoidance robot can navigate an unfamiliar environment without colliding with nearby objects. Based on a specified threshold distance, the robot would be able to identify obstructions in its route.**
- **After detecting an obstruction, the robot would make an independent choice to modify its trajectory to a more open path.**
- **During operation, it would not require any external control.**
- **It has the ability to measure the distance between itself and the objects around it in real-time.**
- **It would be able to function well in an unfamiliar setting.**

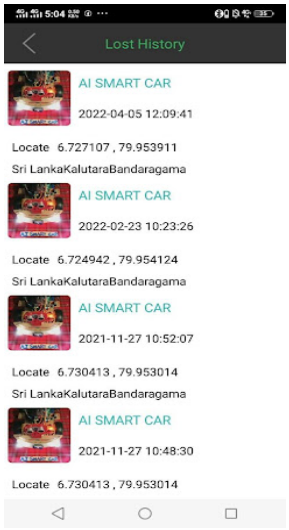
- **Obstacle-avoidance Robots apply to practically all mobile robot navigation systems.**

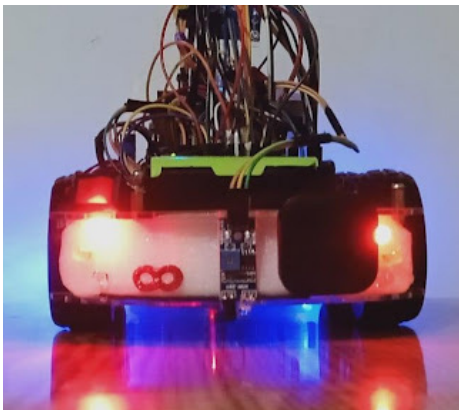
TECHNOLOGIES USED

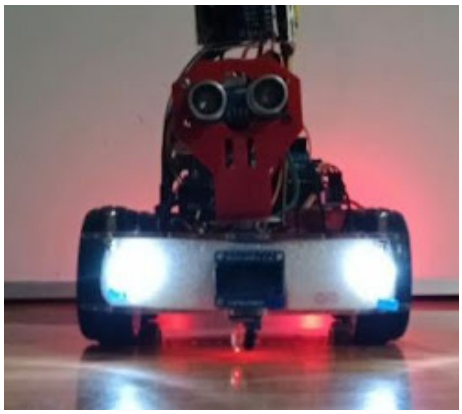
- Arduino Architecture
- Machine learning
- CMOS technology (for camera module)
- IR technology (for infrared sensor)
- Collision detection technology
- Reflective-display technology
- GPS technology

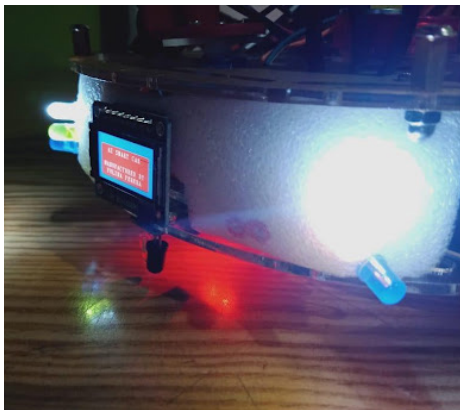
TOOLS USED

- Arduino IDE
- Tinkercad
- Kaggle
- PyCharm
- Arduino IoT Cloud









CERTIFICATE RECEIVED


RIIE 2023

Ruhuna Invention & Innovation Competition 2023

Organized by
University of Ruhuna & Sri Lanka Inventors Commission
Jointly with
Southern Province Industrial Development Authority &
Southern Province Education Department

This certificate of participation
is awarded to

Mr. Perera T.P.S

of

Sabaragamuwa University of Sri Lanka

for presenting the Invention Titled

AI Smart Car

Mr. N. N. W. Dolawatta — Director / CEO, Sri Lanka Inventors Commission, Ministry of Education
Dr. Lakiru Prabodha — Director, Technology Transfer Office, University of Ruhuna
Dr. J. A. P. Bodhika — Chairman, Ruhuna Invention & Innovation Exhibition - 2023, University of Ruhuna

Ruhuna Invention and Innovation Exhibition is organized by the University of Ruhuna, collaborating with the Sri Lanka Inventors Commission, the Southern Province Industrial Development Authority, the Southern Province Education Ministry, and Department. The main objective of this event is to uplift the talents of new inventors in the southern province by providing valuable recognition for their inventions. The financial support was given by the Technology Transfer Unit, under AHEAD funds, at Ruhuna University.

The RIIE-2023 was held on 05th June 2023, at the premises of the Department of Physics University of Ruhuna, with the participation of the Governor of the SouthernSothern Province, Vice Chancellor, Deputy Vice Chancellor of the University of Ruhuna, and many other distinguished guests and the general public. There were more than 750 inventions or innovations in various fields at the exhibition, from School students, University and Tertiary educational institutes, Other institutes, and Open and Commercialized categories.

NATIONAL INDUSTRY EXHIBITION

The Ministry of Industries has the primary responsibility of promoting the industrial sector in Sri Lanka and the Industrial Development Board (IDB), is the premier government organization for the Industrial development and promotion in the country. Considering the importance of the industrial growth in Sri Lanka, the Ministry of Industries and Industrial Development Board have organized the "Industry 2023", the National Industry Exhibition with the theme of "Towards export oriented manufacturing economy" which is the largest national industrial event. The exhibition is scheduled to be held from 22nd to 25th June 2023 at the BMICH.

BEST UNDERGRADUATE REASEARCHER IN COMPUTING GOLD MEDAL

Congratulations **Ms. Saleem Adeeba** for winning the Best Undergraduate Researcher of Computing Gold Medal, awarded by the Department of Computing and Information Systems, at the 24th General Convocation (Phase II) of the Sabaragamuwa University of Sri Lanka, held on 27th July 2023.

CALL FOR PAPERS

AN OPEN ACCESS JOURNAL

SUJCS
Sabaragamuwa University Journal of Computer Science
ISSN 2783-8846

The second volume second issue of the Sabaragamuwa University Journal of Computer Science (SUJCS) is planned to be launched in December 2023

The scope of the Journal includes, but not limited to the following topics:

- Communication Networks and Information Technologies
- Mobile Computing
- Data Mining and Knowledge Discovery
- Software Engineering
- Database Management and Information Retrieval
- Human Computer Interaction
- Multimedia Computing
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- Parallel and Distributed Technologies
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