IEEENews@UoJ

Newsletter of the IEEE Student Branch, University of Jaffna

IEEE-SB-UoJ won **6** *Awards*

IEEE Sri Lanka Section

Outstanding Student Branch Award 2022

The IEEE Student Branch of the University of Jaffna consists of members from the Faculties of Science, Engineering and Technology of the University of Jaffna. The student branch was established in September 2018. Currently, there are six chapters and an affinity group established under the Student Branch, namely Computer Society, Electron Devices Society & Nanotechnology Council, Power and Energy Society, Robotics and Automation Society, Signal Processing Society and Women in Engineering Affinity Group. As a young student branch of the IEEE Sri Lanka Section, it strives among more than a hundred undergraduate students and graduate members from the University of Jaffna. It is an active branch with many activities being conducted throughout a year that focuses on enhancing the professional and technical skills, and knowledge of IEEE and non-IEEE members.

Special Recognition IEEE R10

Outstanding Student Branch Award 2022

IEEE R10 Exemplary Student Branch Award 2022

IEEE Sri Lanka Section

Emerging WIE Affinity Group
[Student Branch Category]
Award 2022

IEEE Sri Lanka Section

Special Recognition for Membership Recruitment and Retention 2021

IEEE Sri Lanka Section

Outstanding **Branch Counsellor** Award 2021

◆IEEE
University of Jaffna
Student Branch

◆IEEE
University of Jaffna
Student Branch

Newsletter Designer
Mr. Nageswaran Thileepan
Department of Computer Science,
University of Jaffna

Cover Story

Since its establishment in September 2018, the IEEE Student Branch of the University of Jaffna (IEEE-SB-UoJ) has emerged as a dynamic force, dedicated to securing grants, fostering technological innovation, and promoting excellence for the benefit of humanity. With a diverse membership consisting of students from the Faculties of Science, Engineering, and Technology, the IEEE-SB-UoJ has made significant strides in advancing the theory and practice of Computing, Engineering, and Technologies.

At present, the IEEE-SB-UoJ consists of the Women in Engineering (WIE) Affinity Group and six vibrant chapters, namely, Power and Energy Society (PES) Chapter, Computer Society (CS) Chapter, Robotics and Automation Society (RAS) Chapter, Signal Processing Society (SPS) Chapter, Computational Intelligence Society (CIS) Chapter, and Electron Devices Society and Nanotechnology Council (EDS-NTC) Chapter.

Awards and Recognition
The IEEE-SB-UoJ, despite its status as a young student branch within the IEEE Sri Lanka Section, has received notable recognition and prestigious awards at both national and Asia-Pacific regional levels. These achievements highlight the branch's dedication and impact within the IEEE community.
At the Annual General Meeting of the IEEE Sri Lanka Section held on February 7, 2023, at Hilton Colombo Residences, the IEEE-SB-UoJ received the following awards:

- 🏆 "Outstanding Student Branch Award": This award recognizes the IEEE-SB-UoJ as an outstanding student branch within the IEEE Sri Lanka Section. It acknowledges the branch's exceptional performance, initiatives, and contributions in advancing the field of Computing, Engineering and Technology.
- 🏆 "Emerging Affinity Group Award" for the IEEE WIE Student Branch Affinity Group: This award acknowledges the outstanding progress and dedication of the IEEE WIE Student Branch Affinity Group in the student branch category.

In addition to these national awards, the IEEE-SB-UoJ also secured prestigious recognition at the regional level. The branch was honored with the "IEEE Regional Exemplary Student Branch Award" from IEEE Region 10. This award highlights the exemplary performance of the IEEE-SB-UoJ as an active student branch, offering technical programmes, activities, and professional networking opportunities to its members, thus enabling them to develop critical skills.

Furthermore, at the SYWL Congress 2022 held in South Korea from August 11 to 14, 2022, the IEEE-SB-UoJ received the "IEEE Region 10 Outstanding Student Branch Award" for its exceptional activities in the Asia-Pacific Region. This award signifies the branch's significant impact, leadership, and accomplishments within the region.

Moreover, at the "IEEE Sri Lanka Section Awards" ceremony held on January 27, 2022, the IEEE-SB-UoJ was recognized with the "Special Recognition for Membership Recruitment and Retention" award. This accolade acknowledges the branch's outstanding efforts in attracting and retaining members, showcasing its commitment to building a vibrant and engaged IEEE community within the Sri Lanka Section.

During the same event, Dr. A. Ramanan, the former Counsellor of the IEEE-SB-UoJ, was honoured with the "Outstanding Branch Counsellor Award." This prestigious recognition reflects Dr. Ramanan's exceptional guidance, mentorship, and contributions to the growth and success of the student branch.

These awards and accolades serve as a testament to the IEEE-SB-UoJ's dedication, innovation, and impact in advancing the field of Computing, Engineering and Technology, as well as nurturing a strong community of students and professionals within the IEEE Sri Lanka Section.

Grants

The IEEE-SB-UoJ has successfully obtained several competitive grants to execute a range of activities aimed at university and school students. Notably, the branch achieved the following grants:
- ▶ The IEEE-SB-UoJ won the "60 Second Innovation Contest - 2021" in conjunction with the IEEE Day Celebrations. As a result, we secured a funding of USD 850 from IEEE.
- ▶ In 2022, the branch received competitive funding of USD 1,968.65 under the IEEE Pre-University STEM Portal Grant program. This grant aimed to promote IT skills among school students. It is noteworthy that the IEEE-SB-UoJ was selected for this funding opportunity from a pool of 143 applications worldwide, and only two projects from Sri Lanka were chosen. Over 200 school students in the northern province of Sri Lanka benefited from the programme.
- ▶ The IEEE WIE Affinity Group of the student branch secured a WIE special fund of USD 400 in 2022. This grant was obtained to promote technology among women, highlighting the branch's efforts to empower and support women pursuing careers in Computing, Engineering and Technology.

These grants not only reflect the dedication and innovation of the IEEE-SB-UoJ but also provide valuable resources to support its activities.

The Counsellor IEEE-SB-UoJ

Prof. Manivannan Siyamalan
Department of Computer Science,
University of Jaffna.

The IEEE Student Branch of the University of Jaffna (IEEE-SB-UoJ) is one of the most active student branches in Sri Lanka since its inception in 2018. The branch is now expanded with six chapters and the Women in Engineering (WIE) affinity group. Among them, the Computational Intelligence Society student branch chapter and the Electron Devices Society & Nanotechnology Council student branch chapter were the new additions in 2022 and they became the first chapters in Sri Lanka under the respective societies.

Due to the dedication, cooperation, and the hard work of the Counsellors/Advisors and the the executive committees (past and the present), the branch received several international and national awards.

The IEEE members from the Faculties of Engineering, Science, and Technology of the University of Jaffna, other non-IEEE members of the university and the community greatly benefit from the activities organized by the IEEE-SB-UoJ. Despite the country's current economic crises, the branch organized various activities for the betterment of the students which includes tech-talks, workshops, industrial collaborations, soft skill developments etc.

Moreover, several of our student members were selected to contribute to various national level projects, which not only helps them to improve their leadership, team working and soft skills, but also gives a good visibility to the IEEE-SB-UoJ. Many congratulations to them.

This newsletter is another achievement of the branch. On behalf of the student branch, I thank and congratulate all the authors who contributed to this newsletter.

The Senior Treasurer IEEE-SB-UoJ

Prof. Amirthalingam Ramanan
Department of Computer Science,
University of Jaffna.

The IEEE-SB-UoJ remains committed to our members and volunteers in bringing awareness to the latest technology for the benefit of humanity. In 2022, though we reacted to the impact of COVID variants, we began to reopen in-person activities to strengthen our connections with scholars and technologists to make our members inspired by the emerging trends in computing and engineering. Together with our dedicated members and volunteers, the IEEE-SB-UoJ throughout the year was focused on helping especially IEEE student members and school students to succeed in countless ways. I am pleased to present the audited financial reports of IEEE-SB-UoJ for 2022. These reports indicate that the overall financial health became stronger, with a net balance of LKR 941.864.25 as of January 05, 2023, with the special funds of LKR 143,700.00 received by our WIE Affinity Group to conduct a workshop on IoT & Robotics, an amount of LKR 254,859.42 was received by the student branch as the IEEE rebate 2022, and a special fund of LKR 706,596.53 to conduct a series of programmes to inspire school students in STEM education. The IEEE-SB-UoJ had total expenses for 2022 of LKR 352,086.50. I submit these financial statements with confidence that IEEE-SB-UoJ continues to be a financially sound student branch at the University of Jaffna.

The Chairman SL Section

Prof. Pradeep Abeygunawardhana,
Chairperson,
IEEE Sri Lanka Section (2022/2023).

I warmly welcome all our readers to the newsletter produced by the IEEE-SB-UoJ. I wish a happy and prosperous 2023 to everyone who is reading this newsletter.

It is great to hear that the IEEE-SB-UoJ is producing a newsletter to enhance its members' technical knowledge and share their experiences. Out of 21 student branches under the IEEE Sri Lanka section, the IEEE-SB-UoJ is doing great with many activities with many students participating. It is pleased to see that the newsletter is helping its members to improve awareness about the events happening around the student branch.

As the Chair of the IEEE Sri Lanka Section, I would like to thank all who have contributed to this issue of the newsletter and I hope all the readers will enjoy the newsletter while sharing, recognizing, and appreciating the efforts put forth by IEEE volunteers of IEEE-SB-UoJ for the betterment of the membership and the society.

I wish the IEEE-SB-UoJ in the year of 2023.

The Chairman IEEE-SB-UoJ

Mr. Dilendra Tennakoon
Final Year Honours Degree Student,
Department of Computer Science,
University of Jaffna.

Releasing the second issue of the "IEEENews@UoJ" Newsletter of the IEEE-SB-UoJ is a proud achievement for all of us. As the Chairman of the Student Branch I extend my greetings to all our readers, and hope this publication will be of immense value to you in one way or another. The year 2021/2022 has not been very kind to all of us and we went through a rough time as a country due to numerous reasons. Nevertheless, we survived and have progressed through the year with determination and resilience. The same can be said for the Student Branch, and we grew to be the Student Branch with the second highest member count, received several awards including the Special Recognition for IEEE R10 Outstanding Student Branch Award 2022, IEEE Regional Exemplary Student Branch Award 2022, and the IEEE Sri Lanka Section Outstanding Student Branch Award 2022. We conducted several techtalks/sessions, established two new Student Branch Chapters: IEEE Computational Intelligence Society and the IEEE Electron Devices Society and Nanotechnology Council. Both of which are the first in the Sri Lanka Section. I believe there is still more to be achieved, a longer way to go and the potential to achieve it in the student branch. IEEENews@UoJ presents the reader with well-written articles carefully selected on interesting and enlightening topics and a record of the past year of IEEE-SB-UoJ, all of which are worthwhile and sure to enthrall the reader. I thank the Editor Ms. K. Pavithra, Designer Mr. N. Thileepan, Prof. M. Siyamalan and Prof. A. Ramanan for all their tireless effort and time put into releasing yet another successful issue of IEEENews@UoJ. Finally, I sincerely appriciate for the volunteers, IEEE members, staff and everyone else who contributed in someway to bring the Student Branch this far and for an unforgettable past term.

Wishes for a better and successful future!
Happy Volunteering!

The Secretary IEEE-SB-UoJ ───────

Ms. Pavithra Kanmanirajah
Final Year Honours Degree Student,
Department of Computer Science,
University of Jaffna.

It gives me immense pleasure to pen my words for the second issue of our very own newsletter IEEENews@UoJ, released by the IEEE-SB-UoJ. It is with so much pride that we were able to conduct virtual events in a manner that offered our Student Branch a forum for creative thinking, discussion, information sharing, problem-solving, and decision making. The IEEE-SB-UoJ achieved some of the socio-emotional criteria, such as empowerment, engagement, and affiliation, which were addressed through various webinars, workshops, techtalks, collaborations, and contests. I am happy to report that, this newsletter, with the help and support of our Branch Counselor, Senior Treasurer, and all our lecturers, along with the hard work of our Student Branch, contains the contents that we believe will be of interest to you.

We hope you enjoy the issue.

Joint Editors IEEENews@UoJ ───────

Ms. Pavithra Kanmanirajah
Final Year Honours Degree Student,
Department of Computer Science,
University of Jaffna.

Ms. Varsha Jeyarajalingam
First Year Undergraduate,
Department of Computer Science,
University of Jaffna.

It is a great pleasure to work as the Editors of the second issue of our newsletter. In this issue, we report the events that were organized by the student branch, its chapters and the affinity group during 2021/2022. In addition, we report the achievements, awards, and the recognitions earned by the student branch and its members. A set of selected scientific articles from the members of IEEE-SB-UoJ are also published in this newsletter. We do hope that this newsletter is a good platform for the members of the IEEE-SB-UoJ to express their creativity and skills. We wish to thank our Senior Treasurer Prof. A. Ramanan for always being with us and encouraging our students to take the student branch to the next level. Also, we are really thankful to our Branch Counsellor Prof. M. Siyamalan for his tremendous support to the student branch. In addition, we wish to thank Ms. Dharmalingam Hashini Rasanjali for proofreading this neswletter. Our special thanks to Mr. N. Thileepan for his wonderful creative design for the pages of our newsletter. Finally, we would like to thank all the volunteering pillars who worked hard behind the scenes for completing this newsletter successfully.

IEEE Student Branch - University of Jaffna

Introduction

The IEEE-SB-UoJ consists of members from the Faculties of Science, Engineering and Technology of the University of Jaffna, which is situated in Jaffna the Northern part of Sri Lanka. The student branch was established on the 27th of September 2018. Currently, there are six chapters and an affinity group established under the IEEE-SB-UoJ, among which the Signal Processing Society, the Computational Intelligence Society, and the Electron Devices Society and Nanotechnology Council Student Branch Chapters were established during the period 2021/2022.

As a young student branch of the IEEE Sri Lanka Section, it strives among more than a hundred undergraduate students and graduate members from the University of Jaffna. It focuses on achieving IEEE's objectives, namely fostering technological innovation and excellence for the benefit of humanity and promoting the theory as well as the practice of all aspects of Computer Science, Computer Engineering, Information Communication Technology, Electrical, and Electronics. It provides undergraduates a platform to prosper and flourish in their innovative ideas and technical and non-technical skills. It is a very active branch with many activities throughout the year that focuses on enhancing the professional and technical skills and knowledge of IEEE and non-IEEE members.

Vision ━━━━━━

Become a remarkable student branch dedicated to empower technological leaders by encouraging and facilitating students to attain highest achievements by developing their skills.

Mission ━━━━━━

Foster technological innovation and excellence for the benefit of humanity and promote the theory as well as the practice of all aspects of Computer Science, Computer Engineering, Information Communication Technology, Electrical and Electronics Engineering.

National/Regional Level Volunteers

Dr. Ahilan Kanagasundaram
Editor of the IEEE Sri Lanka Section

Mr. Dimuthu Anuraj
- Editorial Committee Member - IEEE Sri Lanka Section,
- IEEE STEM Champion at IEEE TryEngineering,
- Program Committee Member at IEEE Connecting the Unconnected Challenge in IEEE Future Direction,
- Manager at IEEE Puzzler Community,
- Lead Ambassador at IEEE Collabratec.

Mr. Heshan Nayanajith
- Lead Coordinator of Public Visibilty - IEEE R10 Student Activities Committee 2023,
- Vice Chair of Public Visibility for Student Activities Committee 2023 IEEE Sri Lanka Section,
- Graphic Designer and Supporting Coordinator of IEEE R10 Student Activities Committee,
- Editorial Committee Member - IEEE Sri Lanka Section

Mr. Nickson Joram
Lead Ambassador of IEEEXtreme 16.0
IEEE Sri Lanka Section

Ms. Mayuri Rajakaruna
- Social Media Coordinator of IEEE Computer Society Sri Lanka,
- Performance Tracking Coordinator of Chapter Engagement IEEE Sri Lanka Section SAC,
- Social Media Admin of IEEE Brain Global Community,
- Volunteer Training & Development Coordinator of Training and Development Subcommittee - IEEE Young Professionals

Ms. Divya Varatharajan
Digital Experience and Branding Coordinator of Public Visibility
IEEE Sri Lanka Section SAC

Mr. Dilendra Tennakoon
Project Lead (SYWC) of Member Activities
IEEE Sri Lanka Section SAC

Ms. Chamodi Hansika
Social Media Coordinator of Public Visibility
IEEE Sri Lanka Section SAC

Ms. Hiruni Thakshila
Publicity Team Lead of SLInspire
IEEE Young Professionals

Ms. Pavithra Kanmanirajah
Secretary Team Member of AI Driven Sri Lanka
IEEE Young Professionals

Ms. Dulmi Leelarathna
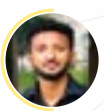Program Team Member of SLInspire
IEEE Young Professionals

Ms. Gayathri Bandara
- Logistics Team Member of SLInspire IEEE Young Professionals,
- Ambassador for University of Jaffna - IEEE DAY

Ms. Ayomi Darshika
Publicity Team Member of SLInspire
IEEE Young Professionals

Mr. Eranga Kodithuwakku
- Program Team Member for Technical Activities, Student Activities Committee - IEEE Sri Lanka Section,
- Design Team Member of Y2NPro - IEEE Young Professionals

Mr. Imesh Nuwantha
- Design Team Member of Let'sTalk - IEEE Young Professionals,
- Student Ambassador for the University of Jaffna - IEEEXtreme 16.0,
- Editorial Committee Member - IEEE Sri Lanka Section

Mr. Kushan Rathnayake
Finance Team Member of SLInspire
IEEE Young Professionals

Ms. Mani Manohari
- University Representative of INSL IEEE Sri Lanka Section,
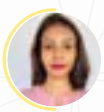- Co-chair - Subcommittee of INSL Northern Province

Mr. Kalpa Nayanajith
Video Editor of Volunteer Training & Development
Sub Committee -IEEE Young Professionals Sri Lanka.

Mr. Bhagya Kavijan
University Representative of IEEE StudPro 5.0
IEEE Young Professionals Sri Lanka

Ms. Nigee Hettige
Member of Secretariat & Editorial Committee
IEEE Sri Lanka Section SIGHT

Ms. Nipuni Fernando
Member of the Editorial Committee
IEEE Sri Lanka Section

Mr. Chanuka Ranathunga
- University Ambassador StudPro 5.0
- Designer IEEE Sri Lanka Section PES Chapter

> " Try not to become a man of success, but rather try to become a man of value.
>
> — Albert Einstein

PES Chapter IEEE-SB-UoJ

The Advisor

Prof. A. Atputharajah
Department of Electrical and Electronic Engineering,
University of Jaffna.

Today the country is facing its biggest challenge. Here Science, Technology, Engineering and Mathematics plays a major role in uplifting the country as well as keeping up the transparency, on whatever possible, in its management.

Accordingly, the IT sector plays a major role in automating all possible simple operations. This provides all information with date and time (first in first out transparency), documents transferring from one place to another place without loss and very fast action (instantly - reduces labor cost and reduces delays while increasing reliability and transparency). Simple example is foreign leave approval system implemented in the University system, which reduces the duration to get approval, from months to days and many of us experienced this. All operations should be automated where the developed countries have already taken in this direction. It also brings a number of advantages such as paper-less operations, which might have helped the country tremendously as what we are experiencing is a shortage of paper. Further reducing institutional operational cost in terms of employees salaries. Further speeding up operations itself has huge benefits in terms of efficient and effective operations. This will automatically make people's lives more efficient and effective while reducing wastage.

Further the Power and Energy sector, which is a large sector in the country, needs to implement the projects, which were planned already. Enormous time was spent on planning and it took further time on implementing. So many Renewable Energy based power plants were planned and not implemented on time. These all due to inefficient operations of Government sectors. These all need to be speeded up by properly implemented administration. When the administrative operations are automated, it becomes transparent and thus makes all accountable to the officer responsible. Then this will reduce any time delay of any specific officer. The automation also makes it transparent to the top rank officer where the operation is getting delayed.

In the higher education sector, all top class students are selected for free education. This education needs to be modified by reducing classroom teaching to project based teaching. The projects could be taken from the Industries or communities. Those projects could be arranged in such a way that will solve problems in the industries or communities. Every person's time should be effectively utilized. For example when the students are learning they should also be involved with the lecturers to solve real world problems in the industries or communities. Then all students' projects will lead to an outcome instead of academic activities. This will also produce responsible and practically experienced and solution based knowledgeable graduates.

The Chairman

Mr. Rajitha Priyankara Hemachandra
Final Year Undergraduate,
Department of Electrical and Electronic Engineering,
University of Jaffna.

It is my great pleasure to extend my heartfelt greetings to the readers of the second issue of the newsletter of IEEE-SB-UoJ. I am humbled by the opportunity to serve as the Chairman of the IEEE Power and Energy Society Student Branch Chapter, University of Jaffna. We are blessed with many dedicated volunteers who are deeply concerned about our discipline, its standards, and its contributions in an ever-growing world. I honestly appreciate my committee and all the members of the IEEE PES Student Branch Chapter, University of Jaffna for their immense commitment and collaboration in uplifting the standards of our society. Our prime objective is to foster technological innovation, creativity, and excellence in our students in the power and energy sector, for the benefit of humanity and for the advancement of technical professionalism. We are contributing to assist fellow students with precious opportunities to learn, share and innovate in the field of power and energy. I believe that this newsletter will serve as a window through which the complete profile of all the volunteering activities, achievements, and progress made during the stipulated period can be viewed.

Annual General Meeting 2023

The Annual General Meeting of the IEEE-PES-SB Chapter of the UoJ for the year 2022 was held on the 27th of March 2022 from 5.00 pm to 6.00 pm via the Zoom platform. The gathering was welcomed by Mr. Ishara Mahanama, former Chairman of the Student Branch Chapter. Followed by that, previous meeting minutes were presented by Miss. Achinthya Rajapaksha, former Secretary of the Student Branch Chapter. Then the meeting was addressed by the former advisor of the Chapter, Mr. R. Valluvan, and it was followed by the election of a new committee. Prof. A. Atputharajah was appointed as the new Advisor of the Student Branch Chapter. Finally, the AGM was concluded along with the vote of thanks from the newly appointed Chairman.

EVENTS

PS CAD Workshop

The first session of the PS CAD workshop was conducted on 1st of November 2022 from 4.00 pm to 6.00 pm at the Simulation laboratory of the Department of Electrical & Electronic Engineering, Faculty of Engineering, University of Jaffna by Prof. A. Atputharajah, the former Dean of the Faculty of Engineering, University of Jaffna. The main objective of this session was to deliver preliminary knowledge to the students on PS CAD as it is a powerful tool to visualize and analyze power systems and to give them a hands-on experience, while convincing them about the importance of learning and applying this tool for analyzing power systems. The targeted audience of this event was final year undergraduates of the Electrical & Electronic Engineering Department of the University of Jaffna who are interested in the power and energy sector. The event was concluded as a successful and an effective session.

Guest talk on "Vibro-Acoustic Measurement Based Condition Monitoring of Power Transformers"

The Guest talk on "Vibro-Acoustic Measurement Based Condition Monitoring of Power Transformers" by Dr. Lakshitha Naranpanawe was conducted on 26th September 2021 from 6.00 pm to 7.00 pm via Zoom platform.

Dr. Lakshitha Naranpanawe is currently a Research Fellow attached to the School of Information Technology and Electrical Engineering, the University of Queensland, Brisbane, Australia. He received BSc and Ph.D in electrical engineering degrees from the University of Peradeniya, Sri Lanka and the University of Queensland, Australia, respectively. The main objective of this session was to deliver more knowledge to the undergraduates on the Condition Monitoring of Power Transformers. The event was successfully completed with over 70 participants.

Webinar on "Engineering Ethics"

The webinar session on "Engineering Ethics" was conducted by Eng. Thilak De Silva (Chairman, Engineering Council Sri Lanka) and Eng. Asela C. R. Galappattige (CEO, Sri Lanka Telecom Services Ltd.), on the 27th December 2021 from 7.00 pm to 9.00 pm, via Zoom platform. The IEEE-PES-SB Chapter of the UoJ organized the event together with IEEE-RAS-SB Chapter, UoJ and the Institution of Engineers Sri Lanka (IESL). This event was supported by the IEEE-PES-Chapters Student Activities Committee of the IEEE Sri Lanka Section. The main objective of this session was to enhance the knowledge of undergraduates and all the participants on engineering ethics. The event was a massive success with the participation of over 220 participants.

5G TECHNOLOGY

Ms. Shobiga Sivabalan
Second Year Undergraduate, Faculty of Science.

5G technology is the fifth generation of the Internet and is considered the fastest and most secure means of data transfer so far. Its speed is more than 1Gbps, which is about ten times faster than a normal wireless mobile phone. 5G is much more powerful than its previous generations due to its high-speed data transfer and low latency.

5G will be able to sustainably satisfy the requirement of the 1000-time traffic growth. It provides users with fiber-like access data rate and "zero" latency user experience. It is capable of connecting 100 billion devices, and able to deliver a consistent experience across a variety of scenarios including the cases of ultra-high traffic volume density, ultra-high connection density, and ultra-high mobility. 5G will also be able to provide intelligent optimization based on services and users' awareness and will improve energy and cost efficiency by over a hundred times, enabling us all to realize the vision of 5G, "information a finger away, everything in touch."

How does 5G Work?

The transmission of the 5G network does not require any type of tower, but rather the transmission of signals through small cell stations in rooftops or electric poles. These small cells are significantly more important because of the millimeter-wave spectrum. Various state-of-the-art technologies such as Multiple Input Multiple Output (MIMO), TDD, etc. are used in 5G. MIMO technology provides downloading capability with an intensity of around 952 Mbps.

Evaluation from First Generation to Fifth Generation

In 1980, 1G Technology was launched, which worked on analog radio signals and supported only voice calls. 2G Technology was launched in the 1990s which used digital radio signals and supported both voice and data transmission with a bandwidth of 64 Kbps. In the 2000s, 3G Technology was launched with a speed of 1Mbps to 2 Mbps and it had the ability to transmit telephone signals including digitized voice, video calls and conferencing. 4G Technology was launched in 2009 with a peak speed of 100Mbps to 1Gbps.

Advantages of 5G Technology

Some of the important advantages of 5G Technology are: It is expected to offer advanced mobile broadband that can meet high coverage requirements, high resolution and bi-directional large bandwidth shaping, provides technology to gather all networks on one platform and to facilitate subscriber supervision tools for quick action. In addition, it will provide a huge broadcasting data (in Gigabit), which will support more than 60,000 connections. It can be easily manageable with the previous generations. It supports heterogeneous services (including private networks), and provides the possibility to provide uniform, uninterrupted, and consistent connectivity across the world.

Challenges of 5G Technology

Some of the challenges of the 5G technology are: the proposed speed of 5G is difficult to adopt considering the inefficient technical support in most parts of the world. 5G requires investors to invest more than $2000 billion per year, which discourages investors. The switch from 4G to 5G will be infrastructure intensive & the development of infrastructure for 5G is very expensive.

IEEE COMPUTER SOCIETY

CS Chapter IEEE-SB-UoJ

The Advisor
Dr. S. Mahesan
Department of Computer Science,
University of Jaffna.

The IEEE Student Branch at the University of Jaffna is releasing its second issue of the Newsletter, IEEENews@UoJ. I am happy to write this note as an advisor to the Computer Society Chapter of this branch.

The Chairman of the Computer Society planned for annual events based on a survey conducted among the Computer Science related students. Due to constraints in time, the society was able to implement only part of the plans. The rest can still be brought forward for the completion of the good plan.

At this juncture I wish to congratulate the committee of the IEEE-SB-UoJ for their award-winning activities. The Computer Society chapter also takes part in the happy moments of the celebration. I wish to thank all the members, national/regional level volunteers for their contribution and also wish to thank the counsellor and senior treasurer for their valuable guidance and timely decision to lead the branch towards the right direction.

I wish the new committees of the branch and its societies will take forward good activities along with new fruitful activities on the mission in order to achieve the vision of the IEEE-SB-UoJ.

The Chairman
Mr. Heshan Nayanajith
Final Year Honours Degree Student,
Department of Computer Science, University of Jaffna.

I am pleased to write this message for the second issue of the newsletter "IEEENews@UoJ" as the Chairperson of the IEEE Computer Society Student Branch Chapter of the University of Jaffna.

As the student branch was started in 2018, we came along a challenging path to the position that we are in today. When the branch was started we didn't have any sectional or regional level volunteers with much experience. However, in 2021 we won many awards and recognitions in the IEEE Boost recognition Ceremony and in IEEE Sri Lanka Section Awards night. I'm really happy to be a part of those winning moments and I wish you all the best to obtain those remarkable winnings this year also.

As I started as a chairperson of the IEEE-CS-SB Chapter, we conducted a survey to get an idea from the Computer Science-related students to plan our yearly plans. By considering those and by getting advice from our Chapter Advisor Dr. S. Mahesan, we came up with an awesome plan line-up and at the moment we are at the stage of executing those. So I hope those activities also will help to bring IEEE-SB-UoJ name to a remarkable place in IEEE Sri Lanka Section as well as in IEEE Region 10.

Inaugural General Meeting 2022

The Annual General Meeting of the IEEE Computer Society was held on 14th March 2022 at 4.00 p.m via Zoom Platform. The session started with a welcome speech and followed by a Guest Speech. The guest speaker Mr. Chamika Sudusinghe (Chair, Student Activities Committee, IEEE Sri Lanka Section) gave an introduction about the benefits of IEEE CS Chapter membership and IEEE Computer Society Sri Lanka Chapter Activities. In addition, he briefed the opportunities, in terms of scholarships awarded to the IEEE CS members. Then, the previous committee's Secretary minutes were read by Mr. Dilendra Tennakoon. Next, we moved to the important part of the AGM in electing the new office bearers. The rules and regulations for the election were explained and the election was held for the year 2022/2023. After the new committee members were elected, the new Chairperson delivered his speech with gratitude. The session was successfully completed with over 40 participants.

EVENTS

Flip the Pages of IEEE Volunteering

The session titled "Flip the Pages of IEEE Volunteering" was held on 30th June 2022 at 6.30 p.m via Zoom Platform with over 30 participants. There were three speakers who shared their experiences. Our first speaker Mr. Chamika Sudusinghe (Chair, Student Activities Committee, IEEE Sri Lanka Section), shared his previous volunteer experience with IEEE and the benefits he received from it. After that, Ms. Thihara Mallikarachy (Industry Engagement Coordinator - Student Activities, IEEE Computer Society Sri Lanka Chapter) briefed the audience about IEEE volunteer opportunities and why volunteers should take advantage of them. She also described how the volunteer process works and the importance of attending conferences. After that, Mr. Thimira Chandrasekara (Vice Chair - Chapter Engagement, Student Activities Committee, IEEE Sri Lanka Section) shared how his own experiences and skills developed, as he progressed through his IEEE career. The session followed with Q&A. Many questions were dropped in the Zoom chat related to IEEE volunteering and national project opportunities. Finally, the session concluded with a vote of thanks.

Flip the pages of IEEE volunteering

Chamika Sudusinghe
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Vice Chair - Chapter Engagement
Student Activities Committee
IEEE Sri Lanka Section

30th May 2022   6.30 pm   via ZOOM

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Let's Git Together

The "Let's Git Together" technical session was held on 21st June 2022 at 5.00 p.m via Zoom Platform. The Session started with a small introduction about the speaker Mr. Dilum De Silva (IoS Engineer at Hectre Group New Zealand, Visiting Lecturer at IIT Co-Host TechSideChat at GitHub). He shared his experience and knowledge in Git and GitHub. The session was conducted as a presentation session with a demonstration done by Mr. Lakshitha Viraj (Final year Undergraduate, Department of Computer Science, UoJ). The session focused on the basics of version control and GIT. Speakers gave a deep idea to the audience and gave answers to all the questions raised to them. The overall session was very useful and informative especially for the students who are doing their project work. The session was successfully completed with 30+ participants.

Info industry v1.0

As the first initiative, the IEEE Computer Society Student Branch Chapter of the University of Jaffna organized the "Info Industry v1.0" series of sessions. The first session in collaboration with IFS (leading enterprise software solution provider) was conducted via zoom on 30th September 2022 from 6.30 p.m. Our speakers Mr. Supul Mallawarachchi (Program Manager, IFS R&D), Mr. Rifki Razick (Vice President Development and Extensibility) and Mr. Shawn Britto (Lead Systems Engineer) explained about IFS, their working style, and their expectations of freshers and newbies. Over 40 participants attended the session and got to know about IFS and its work culture.

Privacy and Security in the Digital Era

- Ms. Vieronicka Kanesamoorthy
First Year Undergraduate, Department of Computer Science.

"People often represent the weakest link in the security chain and are chronically responsible for the failure of security systems" - Bruce Schneier (cryptographer and computer security professional and writer of many books related to computer security and cryptography).

Security and privacy are two widely used terms in this digital era, and they are about safeguarding data and safeguarding user identity respectively. Data security, Cyber security, and Blockchain play a major role in the field of privacy and security.

Data Security

Our data is exposed to the possibility of being attacked, stolen or harmed no matter where it resides. Due to social engineering and other attacking techniques we cannot ensure hundred percent security for our data. However, we can try our best to secure it by the use of techniques such as encryption, data erasure, access controls, data masking, data resiliency, authentication and backup and recovery. Effective data security takes into account the sensitivity of various datasets and corresponding regulatory requirements. Confidentiality, Integrity, and Availability are three core elements of data security that all organisations should adhere to, and are known as the CIA triad. CIA triad functions as a security model and framework for data security. Though it's really a hard task to ensure security for data, there are several steps, tactics and best practices that can help to minimise the chances of data breach, loss and exposure. Without making common data management mistakes the data and sensitive files should be quarantined and protected. In addition, high risk activities should be blocked when using websites to ensure the security of data.

Cyber Security

Since digital technologies play a bigger role in everyone's lives, cyber security has become important as it protects all categories of data from theft and damage. Just as physical security protects buildings and people in them from various physical threats, cyber security safeguards digital technologies and their users from digital dangers. Cyber security is a broad topic covering many different disciplines, actions, threats and ideas. However these parts come back to the same idea, protecting people's digital lives and assets. With the widespread adoption of digital technologies and the immense amount of data being used today, numerous cybersecurity measures have been developed, including network security, application security, cloud security, information security, endpoint security, and more. Additionally, managing cyber threats like malware, phishing, insider threats, man-in-the-middle attacks, and botnets is crucial to maintaining security. Cybersecurity best practices that can be implemented include using anti-malware software, verifying before trusting, updating frequently, encrypting data where possible, segmenting networks, creating backups of sensitive files, and regularly reviewing security measures.

Blockchain

Blockchain is another major aspect of security and privacy in the digital world. Blockchain started as a way to store and secure digital data. It is an openledger that several parties can access at once. Blockchain can provide secure transactions, reduce compliance costs and speed up data transfer processing. The CIA triad mentioned above is highly maintained by blockchain technology which implies that the trust is maintained in many linked fields such as business, finance, law, medicine, real estate etc.

Cryptocurrency is also related to Blockchain which is a coded string of data representing a currency unit, and they are being served as both a currency and an accounting system. Cryptocurrency is a digital or virtual currency that is meant to be a medium of exchange. It is quite similar to real-world currency, except it does not have any physical embodiment, and it uses cryptography to work.

Technology is just a tool, we the human beings should work with that tool with self discipline and self control which will pave way to successful protection in any field. This privacy and security can be a complex topic but it is essential. Everyone from the world's most powerful CEOs to casual Facebook users should understand the importance of security. Understanding privacy and security is the basic and first step to staying safe in today's digital world.

RAS Chapter IEEE-SB-UoJ

The Advisor
Mr. N. Pathmapirian
Department of Computer Engineering
University of Jaffna.

The IEEE Robotics Automation Society Student Branch Chapter of the University of Jaffna has opened doors to serve the students who have an interest in automation. When a university student is involved in club activities he also gets benefitted and hence it is a "win-win" situation for the community as well as the society. It is with great enthusiasm that I have taken up the Advisor for the year 2022/23 and look forward to the Worthy year 2022/23 where we shall engage with one another in all the activities like workshops and webinars to guide the students to achieve their goals. Wishing the new team for their future endeavors and a great year of service.

The Chairman
Mr. M.W.M. Keshan
Final Year Honours Degree Student,
Department of Computer Engineering
University of Jaffna.

As the Chairman of the IEEE Robotics and Automation Society Student Branch Chapter, University of Jaffna, it gives me great pleasure to extend a hearty greeting to each and every reader of the second volume of the IEEENews@UoJ newsletter.

IEEE RAS-SBC-UoJ was established in July 2021. We are blessed to have many active volunteers who are truly interested in our field. The RAS's objectives are scientific, literary, and educational in character, which aim to foster the development and facilitate the exchange of scientific and technological knowledge in Robotics and Automation. RAS is interested in both applied and theoretical issues in Robotics and Automation. Robotics is not limited to intelligent machines and systems while automation includes the use of automated methods in various applications to improve performance and productivity. Society strives to advance innovation, education, and fundamental and applied research in Robotics and Automation.

As of date, the IEEE RAS-SBC-UoJ has successfully held events like workshops, tutorials, and guest talks and intends to hold numerous events in the near future to enhance the Robotics and Automation knowledge and skills of the undergraduate students of the University of Jaffna.

Annual General Meeting 2022

The AGM of the IEEE RAS-SBC-UoJ was conducted on 27th of July 2022 from 7.30 pm to 9.00 pm via the Zoom platform to appoint a new committee. The previous Advisor Mr. S. Sangar addressed the meeting, and then, the Secretary conducted the election and appointed the new committee. Finally, the newly appointed Advisor Mr. N. Pathmapirian addressed the meeting, and the AGM was concluded.

EVENTS

Robotics to School-ரோபோtiக்ஸ் with IEEE

The virtual workshop series "Robotics to school-ரோபோtiக்ஸ் with IEEE" was organized by the IEEE RAS-SBC-UoJ to create awareness in the field of Robotics and Automation among school students. This series was organized in collaboration with the New Inventions and Robotic Society - Mahinda Rajapakse College, Matara. It consisted of four virtual workshop sessions conducted from the 15th of February to the 7th of March 2022. The key resource persons for the event were Mr. Banula Lakwindu, Mr. Anuka Mithara, Mr. Madusha Keshan, and Mr. Isuru Akalanka - Undergraduate students from the Faculty of Engineering, University of Jaffna. The event covered the introduction and several other key areas of Arduino Programming with live demonstrations and implementation of different projects. The workshop series was successfully concluded with the participation of over 35 school students.

Introductory Session for "IEEE R10 Robotics Competition 2022"

An introductory session on "IEEE R10 Robotics Competition 2022" was held on the 12th of August 2022 from 7.00 pm to 9.00 pm via the Zoom platform to introduce Innovative Robots Development for Healthcare and Humanitarian Applications Project 4.0. The guest speaker, Mr. Thimira Chandrasekara, (Undergraduate - Electronic Engineering, SLIIT) briefly gave an introduction about the competition, its eligibility criteria, the rules and regulations, judging criteria and the prizes. The target audience for the event were undergraduates from all the universities in Sri Lanka. More than 50 students participated in the session.

Internet of Things for Sustainable Community Development

The talk "Internet of Things for Sustainable Community Development" addressed a portfolio of cutting-edge, interdisciplinary research developments and challenges in environmental, climate change, energy, water, health, mining, agro-economic, and cybersecurity that limits the development of a sustainable community. This talk aimed to introduce the usage of IoT and its challenges in these fields of study. The event was organized by the THREE-Lanka Project - University of Jaffna Center jointly with IEEE RAS-SBC-UoJ, Mechanical Engineering Society UoJ, Electrical and Electronic Engineering Society UoJ, IEEE PES-SBC-UoJ, IEEE SPS-SBC-UoJ and IESL Vadakkin Chapter. The resource person for the event was Dr. S. Thananjeyan (Senior Lecturer, Department of Electrical and Electronic Engineering, UoJ). The session was conducted on the 19th of January 2022, from 7.00 pm to 8.00 pm, virtually with the participation of over 20 participants.

WIE Affinity Group IEEE-SB-UoJ

The Advisor
Dr. (Mrs.) Barathy Mayurathan
Department of Computer Science,
University of Jaffna.

It is a great pleasure to congratulate the IEEE-SB-UoJ on presenting the second issue of the newsletter for the IEEE community. I believe this will contribute to the dissemination of knowledge and awareness in a wide area of disciplines.

IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity. The IEEE-SB-UoJ is one of the outstanding and very active student branches in Sri Lanka, thanks to its members for their commitment and heartily dedication. I wish the IEEE-SB-UoJ great success in all its endeavors. I wish all of the office bearers for this accomplishment on publishing the newsletter successfully. I wish you all the best for the success of the upcoming issues of this wonderful initiative in future.

The Chairman
Ms. Kokila Madhuwanthi
Third Year Honours Degree Student,
Department of Computer Science, University of Jaffna.

It is my pleasure to be appointed as the Chairperson of IEEE WIE Student Branch Affinity Group University of Jaffna for the year 2022 and I would also like to add my heartiest greetings to all the members of the 2022 new Executive Committee. I will take this opportunity to thank our past executive committee for their valuable activities and their sacrifices for the university. We would like to express our heartfelt thanks to our WIE-SB-AG-UoJ Advisor Dr. (Mrs.) B. Mayurathan, IEEE-SB-UoJ Counsellor Prof. M. Siyamalan and IEEE-SB-UoJ Senior Treasurer Prof. A. Ramanan for their valuable advice and guidance and look forward to their close support to carry out the work well in the future.

Annual General Meeting 2022

The first AGM of IEEE WIE-SB-AG-UoJ was held on 6th of September 2022 to assign the new executive committee for the year 2023. First, the welcome speech with a small introduction on WIE was given by Ms. T. Methusha the former Chair of IEEE WIE-SB-AG-UoJ. Then Dr. (Mrs) B. Mayurathan, Advisor, IEEE WIE-SB-AG-UoJ delivered her speech. The guest of honour, Dr. (Ms.) Akila Wijethunge (Chair, IEEE WIE Sri Lanka Section) then addressed the audience. Her speech included an introduction to IEEE WIE, the benefits of joining WIE and some special moments of her IEEE journey. Then the annual report was submitted by Ms. R.H.M. Mayuri Rajakaruna and Ms. K. Pavithra (Former Treasurer of IEEE WIE-SB-AG-UoJ) presented the financial report for the year 2021/2022. After that, the election for different positions were conducted.

EVENTS

Spill the Ink - Poetry Competition

In honour of the International Day of the Girl Child 2021, the IEEE WIE Affinity Group organized a poetry competition for the first time under the theme of "Digital Generation. Our Generation". The details of this competitions were mainly published via WhatsApp, Facebook, and LinkedIn social media platforms. Female undergraduate students from all universities in Sri Lanka were eligible to participate in the competition. Eighteen submissions were received from students from seven Sri Lankan universities. The ranking was based on both voting obtained from social media for the post related to the submission and the marks received from a judging panel. Ten merit certificates were issued in addition to the certificate and a cash prize for the winner.

Workshop on Roadmap to successful project

A virtual webinar on "Road Map to Successful Project" was held on the 27th of September 2021, from 6.00 p.m. to 7.00 p.m. Ms. Abarnah Kirupananda (Editor, IEEE WIE Sri Lanka Section, Senior Lecturer at IIT, Sri Lanka) was the resource person for this workshop. More than seventy students benefited from this workshop.

Workshop on IoT and Robotics

The IEEE WIE-SB-AG-UoJ secured a special funding of USD 400 from IEEE R10 to conduct an IoT workshop under the title "An awareness session on IoT and Robotics". This workshop was successfully conducted on the 26th of February 2022 from 9.00 am to 4.00 pm. Three resource persons delivered talks under different topics and at the end a hands-on session on IoT was conducted. Prof. S. R. Munasinghe from the Department of Electronic and Telecommunication Engineering, University of Moratuwa delivered a talk on "IoT and Robotics". Following that a talk on "Bionic Limbs in Biorobotics" by Prof. Ruwan Gopura from the Department of Mechanical Engineering, University of Moratuwa was delivered. Finally, Prof. Buddhika Jayasekara from the Department of Electrical Engineering, University of Moratuwa, delivered a talk on "Intelligent Service Robots". After these tech-talks, the hands-on session on IoT was conducted by Mr. T. Kalaineethan (Founder of AIRIIS). Approximately 100 students benefited from this event.

WomenShar Essay Competition

"WomenShar" - an essay competition in honour of the Women's Day of 2022 was conducted in March 2022 to empower girls, enhance their writing skills, and amplify their voices in their own native languages. This competition was open to the undergraduate students of any university in Sri Lanka. The details of this competition were published via social media platforms. Top three winners were selected from each of the Tamil and Sinhala language submissions by a judging panel consisting of four lecturers from two different universities in Sri Lanka.

Techtalk on Coverage Path Planning for Reconfigurable Floor Cleaning Robots

A techtalk on "Coverage Path Planning for Reconfigurable Floor Cleaning Robots" was conducted by IEEE WIE-SB-AG-UoJ on 16th of August 2022 from 1.30 pm to 3.00 pm at the Department of Computer Science. University of Jaffna. The guest speaker Ms.Bhagya Samarakoon (Secretary IEEE WIE-AG Singapore) delivered her talk via the Zoom platform. More than 35 students participated in this event.

Techtalk on Deep Learning and its Applications

A techtalk "Deep Learning and its Applications" by Dr. (Mrs.) Subha Fernando (Senior lecturer, Department of Computational Mathematics, University of Moratuwa) was held on 9th of August 2022 from 1.30 pm to 3.30 pm at the Department of Computer Science, University of Jaffna. The session focused on an introduction to Deep Learning and its applications. Over 40 students benefited from this session.

Personality Development

A webinar on "Personal Development" was conducted on the 17th of January 2022, from 6.00 p.m to 7.00 p.m by Mr. Samisa Abeysinghe (Technology Consultant at Virtusa) via Zoom. This was a mentoring session to support our young generation to develop themself to be a better version of themselves and achieve a bright future. Over fifty participants benefited from this webinar.

A workshop on "Personality Development" was organized by the IEEE WIE-SB-AG-UoJ on the 13th of August 2022 at 1.00 pm to 3.00 pm at the Department of Computer Science. University of Jaffna. The guest speakers of this session were Ms. R. Mithulan (Lecturer, Department of HRM, University of Jaffna) and Ms. T. Yogeshwaran (Lecturer, Department of HRM, University of Jaffna). The speakers explained about personality, personality development skills and table etiquette. The event mainly targeted undergraduates and there were more than 35 participants who benefited from this event.

SPS Chapter IEEE-SB-UoJ

The Advisor
Dr. M. K. Ahilan
Department of Electrical and Electronics Engineering
University of Jaffna.

It is my great pleasure to write this message to the IEEENews@UoJ as the advisor for IEEE Signal Processing Society Student Branch Chapter University of Jaffna.

The IEEE-SB-UoJ organized several events to enhance the skills of students. IEEE Signal Processing Society Student Branch Chapter UoJ was formed in October 2021. It conducted many technical talks for the benefits of fellow students and members of the community even during these challenging times. I am sure this trend will continue further with innovative ideas going forward. I take this opportunity to congratulate the IEEE-SB-UoJ and its Chapters of technical societies for their tremendous achievements and wish them the very best for another great year!

The Chairman
Mr. Marasinghe P. G. I. M. M
Final Year Honours Degree Student,
Department of Electrical and Electronics Engineering
University of Jaffna.

I am extremely happy to present this message to you as the founding president of IEEE Signal Processing Society Student Branch Chapter of the UoJ. The signal processing society joined as a new IEEE student branch chapter of the UoJ on 29 of September 2021. It was started with the aim of improving knowledge, skills and understanding topics regarding signal processing. Signal processing is the enabling technology for the generation, transformation, and interpretation of information. The main goal of this society is to create a better platform for people interested in signal processing to interact and exchange ideas. In order to achieve these objectives, we are actively working by organizing various activities. With the active contribution of the members of the society, we are trying to adopt new knowledge concepts and new methods day by day.

Inaugural General Meeting 2021

The petition submitted to establish the IEEE Signal Processing Society Student Branch Chapter - University of Jaffna was approved by the IEEE on the 29th of September 2021 with the Geo-code SBC11373C. The inauguration of the Signal Processing Society was held on the 8th of Oct 2021. First the welcome speech was delivered by Mr. Indunil Madushan - the Interim Chairman IEEE SPS-SBC-UoJ. Special Guest, Dr. K. Ahilan addressed the gathering. Then the election was conducted for different posts. The newly elected Secretary of SPS-SBC-UoJ delivered the vote of thanks. The meeting adjourned at 4.30 pm.

EVENTS

Webinar on Cochlea signal processing: Modeling and Integration with Machine Learning

This event was jointly organized with the IEEE SPS Sri Lanka Section and it was held on the 3rd of January 2022 from 5.30 pm. Welcome speech was given by the SPS Sri Lanka section chairman and the special guest Prof. Eliathamby Ambikairajah (School of Electrical Engineering & Telecommunications, University of New South Wales, Sydney, Australia) presented the webinar on "Cochlea signal processing: Modelling and Integration with Machine Learning". The secretary of the Sri Lanka Section delivered the Vote of Thanks. The meeting adjourned at 6.45 pm.

Webinar on Deep learning basics and its application for renewable energy

This online event was started by the moderator Dr. (Mrs.) T. Tharshika at 7.00 pm. Welcome speech was given by Eng. U. Anuraj. Special Guest, Dr. K. Ahilan (Senior Lecturer, Department of Electrical and Electronic Engineering) delivered the talk on "Deep learning basics and its application for renewable energy". The event adjourned at 8.00 pm.

Webinar on Next Generation - Passive Optical Networks

The webinar was held on the 9th of June 2022. This webinar was started by Mr. Hashitha Lakmal the Secretary of the SPS Student Branch Chapter UoJ at 7 pm. Welcome speech was given by Raveena Somasundaram, Assistant Secretary. Special Guest, Eng. (Dr.) A. Prashanthan (Project Engineer, Sri Lanka Telecom PLC) addressed the gathering. The secretary delivered the vote of thanks. The meeting adjourned at 8.30 pm.

CIS Chapter IEEE-SB-UoJ

The Advisor
Dr. K. Sarveswaran
Department of Computer Science
University of Jaffna.

It is my pleasure to write this message to the Annual Newsletter of the IEEE-SB-UoJ. The IEEE CIS Student Branch Chapter was established at the IGM held on the 14th of March, 2022. This society is the first CIS Chapter in Sri Lanka Section. The Fourth Industrial Revolution is a paradigm shift in how we live and work. This shift is triggered by technologies which merge the physical, digital and biological worlds. At this juncture, the field of computational intelligence becomes very important as it comprises the theory, design, application and development of biologically and linguistically motivated computational paradigms. Therefore, I congratulate IEEE Student Branch for taking this timely initiative. As we look ahead to the new year, I am excited about the opportunities and challenges that lie ahead for the field of computational intelligence. I have no doubt that, with the continued dedication and collaboration of our members and support from other societies and branches, we will make significant strides and advance the field in meaningful ways.

The Chairman
Mr. S. P.D. Anuraj
Research Assistant,
Faculty of Engineering, University of Jaffna.

It is with great excitement that I write to you as the Chairperson of the newly formed IEEE CIS Student Branch Chapter at the University of Jaffna. Especially I am delighted to announce that our chapter is the first of its kind in the IEEE Sri Lanka Section, and I am honoured to have been a part of its establishment. As the founding Chairperson of the IEEE-SB-UoJ, I am overjoyed to see this new chapter flourish and grow. For those who are unfamiliar, the CIS is the world's leading membership organization dedicated to the advancement of artificial intelligence, machine learning, neural networks, and other related technologies. As a member of the IEEE CIS, students will have access to a vast network of professionals, technical resources, educational opportunities, Travel grants, scholarships and many more. This new chapter, I believe, will be a vital role in advancing the field of computational intelligence not only in Sri Lanka but around the world. I have confidence that the tools and encouragement the IEEE is offering our students will help them succeed and advance in the field. Taking this chance, I want to express my sincere gratitude to everyone who helped make this chapter possible. specifically our Advisor Dr. K. Sarveswaran and Counsellor Prof. M. Siyamalan. In helping to make this vision a reality, I am appreciative of your commitment and diligence. We love to invite you all to become members of IEEE and the IEEE CIS, and wish the Student Branch and the CIS Chapter luck in their upcoming endeavours.

Inaugural General Meeting 2021

The IGM of the IEEE CIS SBC was held on 14th of March 2022, at 4.00 pm via Zoom to elect new committee members for 2022/2023. The moderator of the event Mr. Dilendra Tennakoon (Former Chairman/IEEE-SB-UoJ) delivered a welcome speech, Following that new committee for 2022/2023 was appointed. Afterwards the newly elected chairman Mr. S. P. D. Anuraj, delivered a speech. The meeting adjourned at 4.30 pm.

EDS Chapter IEEE-SB-UoJ

The Advisor
Dr. M. Thanihaichelvan
Department of Physics
University of Jaffna.

I am humbled to write this message for the second issue of the newsletter from the IEEE-SB_UoJ as the founding advisor of the IEEE University of Jaffna Electron Devices Society and Nanotechnology Council Student Branch Chapter.

The year 2022 is an important year for the field of Electronics as we are celebrating the 75 years of the invention of the transistor. As one of the leading institutions in the electronic devices and nanotechnology research in Sri Lanka, University of Jaffna is the first to establish an EDC and NTC chapter in Sri Lanka. The EDC and NTC chapter at UoJ was inaugurated on April 19th 2022. I take this opportunity to thank the founding chair, members and the administrators for the help to establish the society and to support the ongoing activities. The EDC and NTC chapter is keen on conducting innovative and knowledge sharing events for the undergraduate and graduate students and education and personal development programs to the school students. Also I sincerely acknowledge the hard work offered by the committee members of the year 2022 as they came across many hurdles due to the economic crisis in Sri Lanka.

The Chairman
Mr. Randika Medagama
Final Year Honours Degree Student,
Department of Physics,
University of Jaffna.

I'm happy to write this message for the newsletter of the IEEE-SB-UoJ as a chairperson of the newest member of the IEEE UoJ family. Our EDS and NTC student branch chapter is the first ever Electronic Devices Society in Sri Lanka. It is a matter of pride for our university as well as the IEEE-SB-UoJ. As the Chair of the new chapter, I take this time to say thanks to our Advisor Dr.Thanihaichelven, Branch Counselor Prof. M. Siyamalan, and Senior treasurer Prof. A. Ramanan for this success. In the near future we are planning to conduct a Nano Technology awareness program for G.C.E.O/L and G.C.E.A/L students and a Special programme to celebrate the diamond jubilee of transistors. Apart from this, I and my team will give our utmost to keep the name of our Chapter and Student Branch at the top through various activities and programs.

Inaugural General Meeting 2021

The Inaugural General Meeting of the IEEE EDS and NTC student branch chapter was held on 19th of April 2022, at 10.00 am via Zoom with the purpose of assigning new committee members for the year 2022/2023.

Annual General Meeting 2021/2022

The IEEE-SB-UoJ conducted its third AGM on the 26th of September 2021 from 4.00 p.m. to 5.30 p.m. via Zoom. In this AGM the first newsletter of IEEE-SB-UoJ, the "IEEENews@UoJ" (can be accessed via http://society.jfn.ac.lk/ieee/index.php/newsletter) was launched by Dr. (Mrs.) Maheshi B. Dissanayake (Chair of the IEEE Sri Lanka Section). Then the awarding ceremony of Benvenuto 2021 was held. Benvenuto is a team competition among the IEEE student members of the UoJ which was organized in January-February 2021 to identify volunteers for creative tasks. Six tasks were conducted and the winners of each category were announced. The first three places of the overall winners in all six tasks were announced at the end of the awarding ceremony. It was followed by the election of the new executive committee for the year 2021/2022.

Green Home Computing

The IEEE Student Branch of the University of Jaffna organized a virtual session under the theme "Green Home Computing" as a celebration of "IEEE Day 2021". The session was held on the 11th of October with the keynote speaker Dr. S. Thananjeyan (Senior Lecturer, Department of Electrical and Electronic Engineering, UoJ). The objective of this session was to give a brief introduction about Green Home Computing to students. The students of the Faculty of Science and the Faculty of Engineering of the University of Jaffna, participated in this session as they are more likely to use computers than others. Over 90 participants attended this session.

IEEE Day 2021 - Recreato Competition

The Logo recreation competition Recreato 2021 was organized by the IEEE-SB-UoJ on the occasion of the International IEEE Day 2021 celebration. Every year IEEE-SB-UoJ celebrates IEEE Day in memorable ways. Just like the other years, the IEEE-SB-UoJ decided to celebrate this year's IEEE Day with a logo recreation contest and a virtual session on Green Computing. Students from all the faculties of the University of Jaffna participated in this contest. This contest was opened for submission from the 06th of October 2021 to the 12th of October 2021. The basis of this contest was to recreate the IEEE Day 2021 logo in a creative manner (for example kolam, paper quilling, cross-stitching, etc). Digital arts, pastel arts, and paintings weren't accepted for the contest as the aim of this contest was to challenge the participants' divergent thinking skills. There were over 15 submissions for the contest. All the participants in this contest received an E-Certificate for their participation and the winners were awarded with valuable prizes.

WORKSHOPS

WIEEE STEM*όνειρα*

This workshop was held on 23rd and 24th of December 2022 from 9.00 AM to 5.00 PM to the School students from the Jaffna district with the main objective of improving their IoT knowledge and providing them hands-on experience. A total of 121 students from six schools participated in this workshop and the medium of instruction was Tamil. Mr. N.Pathmaprian (Lecturer, Department of Computer Engineering, Faculty of Engineering, University of Jaffna), Mr.S.Suthakar (Senior Lecturer, Department of Computer Science, University of Jaffna), and Mr. T. Kalaineethan (Software Engineer, Greystack Pvt. Ltd.) were the resource persons for this workshop. At the end of the session an IoT related competition was conducted among the students and certificates of excellence were given to the winners.

CODING COMPETITIONS

IEEEXtreme 16.0

IEEEXtreme 16.0 was held on the 22nd of October 2022 with 58 competitors from 20 teams competing through the IEEE-SB-UoJ with knowledge and the understanding acquired during the "Step-Up" session and the guidance provided by the proctors. The competitors faced the competition well and were able to obtain good marks and good ranks in the standings. Thanks to the dedication and hard work of the competitors, 3 teams have reached the top 100 teams in Sri Lanka.

AWARENESS SESSIONS

IEEEXtreme 15.0 & IEEEXtreme Awareness Session

IEEEXtreme is an annual hackathon and competitive programming challenge, supported by an IEEE Student Branch and proctored by an IEEE member, competing for 24 hours in a programming platform against each other to solve a set of programming problems. IEEEXtreme 15.0 was held on the 23rd of October 2021. The IEEE-SB-UoJ proudly presented a virtual awareness session, "Prolog to Xtreme 15.0", on the 21st of October 2021, with keynote speakers Mr. Budvin Edippuliarachchi (Tactician, Team CodeBreakers - University of Moratuwa) and Mr. Sunera Avinash (Coding Machine, Team CodeBreakers - University of Moratuwa), to encourage the students and to give them essential tips about participating in the competition. It was mainly focused on Data structures and Algorithms required for problem solving. Over 100 students participated in the session.

Inception for Google Cloud Platform

The IEEE-SB-UoJ organized an awareness Session on the Google Cloud Platform which was held on the 16th of January 2022 from 5.00 pm to 6.00 pm via Zoom. The keynote speaker for this event was Mr. Chaminda Bandara (Software Engineer at Wavenet International). More than 40 participants were present in the session.


Google Code Jam Awareness Session

The Google Code Jam Awareness session to provide a basic idea about the Google Code Jam competition was held on the 28th of March 2022 from 8.00 pm to 9.00 pm via the Zoom platform. The Keynote Speaker of this event was Mr. Indrajith Ekanayake, (Lecturer, Open University of Sri Lanka). The speaker elaborated on the Google Code Jam competition and its benefits in addition to Algorithmic programming. The event was mainly targeted at coders, and there were more than 20 participants for the event.


Benvenuto 2022

As a result of the membership development campaigns, many new students joined IEEE, and they wanted to show their skills and volunteer in branch activities. So, IEEE-SB-UoJ organized Benvenuto 2022 to welcome the new members to the IEEE-SB-UoJ. It was a series of activities and team competitions that was organized as a week-long event among all the IEEE-SB-UoJ members to identify their talents and skills in content writing, flyer designing, and riddle creation. The following events were conducted under the Benvenuto 2022: team flyer designing, riddle creation, caption writing, and riddle solving.
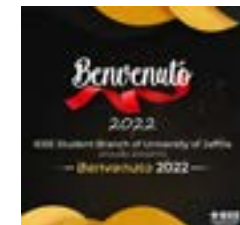
JamborIEEE

The IEEE-SB-UoJ in collaboration with the University of Vavuniya and the Rajarata University of Sri Lanka organized this event at the University of Jaffna premises on 28th of January 2023. The main purpose of the event was to raise awareness about IEEE and its benefits among undergraduates. Moreover to improve their soft skills, expand their professional network, and to increase the IEEE student membership. The event started at 10.30 am at the Kailasapathy Auditorium with a lightning oil lamp. The Co-Chair of JamborIEEE Mr. Eranga Kodithuwakku welcomed the gathering. The Guest speaker Mr. Lakshan Madushanka (who is he) delivered his speech about IEEE. Following that, the keynote speakers Mr.Heshan Mallawaarachchi (Chair, IEEE-CS-SB chapter, UoJ) and Mr. Dimuthu Anuraj (Chair, IEEE-CIS-SB chapter, UoJ) shared their experiences in the IEEE journey. The event was colorful with amazing dances and fun activities with over 170 participants.
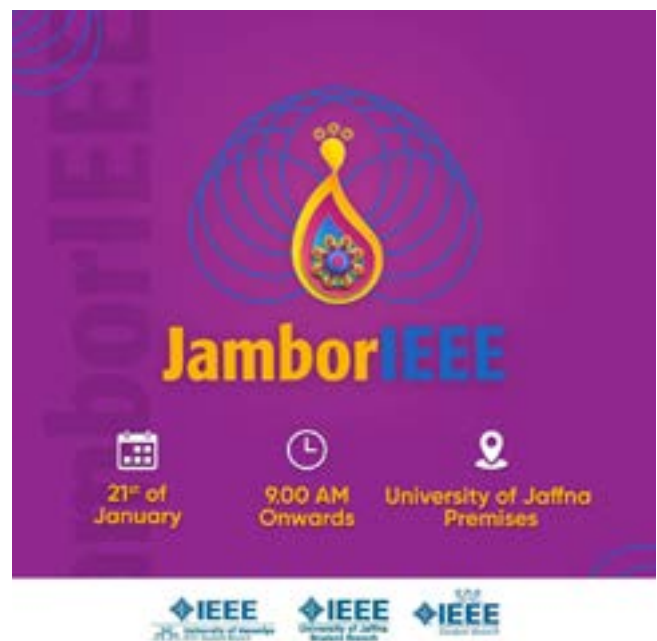
INDUSTRIAL COLLABORATIONS

Software Quality Assurance to Quality Engineering

The IEEE-SB-UoJ organized an Industry Orientation Program series with SLASSCOM to focus on Software Quality Assurance. This series was held on the 21st of June, 23rd of June, 30 th of June, and 2nd of July 2022 with the keynote speakers Miss. Thuvareka Shanmugalingam (Lead Quality Assurance Engineer, IFS), Mr. Kishan Nuvarathne (Manager - Quality Engineering Sysco Labs), Mr. Siva Velauthapillai (Lead - Quality Engineering, Wiley Global Technology Pvt.Ltd), Miss. Suganthika Amaradasa (QA Lead, 99X), and Mr. Tarinda Liyanage (Senior QA Lead, 99X). In the first three days techtalks were conducted on Quality Assurance and Quality Engineering and the last day ended with an assessment. Over 30 participants attended and benefited from each of these sessions.

Neural Network Learning Paradigms

A physical event under the theme "Neural Network learning Paradigms" was held on 28th of June 2022 from 10.00 am to 12.30 pm with five keynote speakers. Professor Saman Halgamuge (Faculty of Engineering and IT, University of Melbourne, Australia), Professor Niranjan (School of Electronics and Computer Science, University of Southampton, UK) and Professor Suganthan (School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore) delivered their talks via Zoom, and Ms. Tamasha Malepathirana (PhD Candidate, Optimization and Pattern Recognition Group, University of Melbourne, Australia) and Ms. Rashindrie Perera (PhD Candidate, Optimization and Pattern Recognition Group, University of Melbourne, Australia) delivered their talks in person at the Department of Computer Science, University of Jaffna. More than 170 participants benefited from this event.

Enterprise AI using IBM POWER Systems

A session on Enterprise AI Using IBM POWER Systems was held on the 19th of August 2022. This physical event was conducted by Mr. Ganesan Narayanasamy (IBM Global Leader, AI and Cloud Enablement and Ecosystem) with Mr. Madan Kantheesan (Technical Leader, Object Automation Systems Solutions, India) and Mrs. BragathaLakshmi Bharani (Operational Automation Systems Solutions, India). This session helped students to know more about Machine Learning, Natural Language Processing, Enterprise AI, and Chips Design using openPOWER.

GlanceUp

The IEEE-SB-UoJ collaborated with H2O.ai and presented a two-day session on "Introduction of H2O.ai and a brief introduction to its applications" on the 26th and 27th of August 2022 at the Department of Computer Science, University of Jaffna. Speakers for the event are Mr. Sajith Ariyarathna (Lead Software Engineer, H2O.ai), Mr. Mathanraj Sharma (Machine Learning Engineer, H2O.ai), Mr. Ahsan Shamsudeen (Senior Solutions Architect, H2O.ai), Mr. Nayananga Anuradha Muhandiram (Software Engineer in Full Stack Development, H2O.ai) and Mr.Vijitha Ekanayaka (Senior Full Stack Software Engineer, H2O.ai).

Step Up

The IXD Labs partnered with the IEEE-SB-UoJ and conducted a "Step Up" an event session to focus on Competitive Programming and making students aware of Data Structures and Algorithms. This was a series of events from 31st of August 2022 to 3rd of September 2022.

On the first day (31st of August 2022) Mr. Deepana Ishtaweera (CEO of IXD Labs) conducted the first session about Competitive Programming. The attendees received a clear understanding of what competitive programming means, how it improves skills, and how to prepare for a competition. On the second day (1st September 2022) Mr. Sunera Avinash (CTO of IXD Labs) gave a brief introduction to Data Structures and explained how to use them to solve problems. On the next day (2nd of September 2022) Mr. Budvin Edippuliarachchi (DevOps Engineer at IXD Labs) conducted the session on Introduction to Algorithms and he explained how to write algorithms to solve problems. The last day (3rd of September 2022) was a handson session on Competitive Programming, and it was conducted by Mr. Damika Gamlath (Software Engineer, The AI Team (PVT) Ltd). He demonstrated how to solve problems step by step using the knowledge we acquired from previous sessions.

ARTICLES

Evolution of Perovskite Field Effect Transistors as light absorbers to X-ray radiation detectors

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The introduction of perovskite semiconductors made a revolutionary pathway in electronics for their advantages of outstanding electro-optical properties and the much easier and less expensive processing techniques to the deposit of thin films on the insulator surfaces to construct the devices than the costly and complicated manufacturing methods are being used to deposit the conventional semiconducting thin films on the substrates. Furthermore, after their impactful performance with the power conversion efficiency (PCE) in solar cell applications, perovskite semiconductors have recently gained prompt attention as semiconducting material to fabricate active channels in Field Effect Transistors (FETs). However, the poor stability of the perovskite material during the fabrication and operation stages and toxicity due to the heavy metals are considered obstacles to commercialization. Nevertheless, the evolution of lead-free all-inorganic perovskites research provides solutions to overcome those issues.

The term perovskite stands for the structure of the materials with the generic chemical formula of ABX_3 and the 3D framework of corner-sharing octahedral crystal shape, causing multiple advantages over the other semiconductors in different applications, including FETs. A perovskite thin-film field-effect transistor consists of two metal electrodes, Source 'S' and Drain 'D', and Gate electrode 'G', separated by an insulator from the active channel layer. In the early stages, perovskite FET studies were carried out by the IBM T.J. Watson Research Centre briefly [1,2] with different solution process techniques and fabrication methods. Subsequently, perovskite FETs are being extensively studied for a wide range of applications such as phototransistors, photo detectors, light emitting FETs and Ferroelectric Random Access Memory (FeRAM). Furthermore, the current studies of radiation detectors based on perovskite FETs are considered a pioneer for futuristic developments in the medical imaging field. Hybrid halide perovskites have been the most dominant materials in those applications' studies. Most notably, Methyl ammonium Lead Halide ($MAPbX_3$) perovskite is studied in the highest proportion of perovskite FETs research works and unreservedly in the radiation detectors as well. The X-ray images captured with the two terminal perovskite X-ray detectors have dark currents and noise. Still, those effects are reduced by the three-terminal perovskite FET radiation detectors.
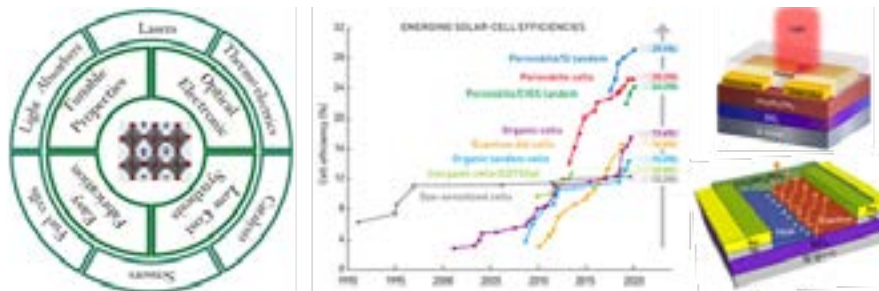

Figure 1. Numerous applications of perovskite materials due to their unique properties and the high power conversion efficiencies of perovskite solar cells [3]. Photo FET and LeFET applications of perovskite FETs.

The X-rays are electromagnetic waves with wavelengths of 0.01 to 10nm and incredible photon energy more significant in the order of 104 to 108 than visible light and interact with matter by scattering and absorption. The radiation detecting material with the effective interaction between the photons and electrons is mainly used to construct the radiation detectors. The radiation detecting material with the effective interaction between the photons and electrons is mainly used to construct the radiation detectors. The high sensitivity of the perovskite material is essential to detect even small X-ray doses as the exposure to the high X-rays causes an increase in the lifetime of cancer risk in patients. The X-ray detection ability of $MAPbI_3$ perovskite was tested by [4] for medical imaging, and [5] tested X-ray imaging capabilities of different all-inorganic perovskites in the photon energy range with a hyper spectral camera.
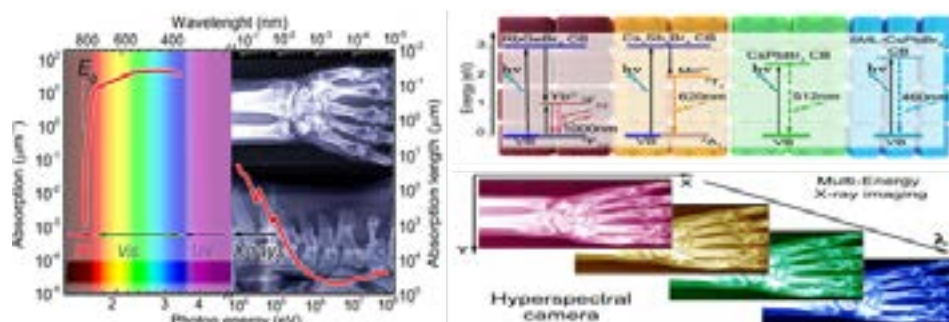

Figure 2. Absorption coefficient and absorption length as a function of photon energy, spanning from infrared to X-ray of a MAPbI3-based radiation detector [4] and multi-energy X-ray imaging of different perovskites

For the purpose of designing highly sensitive materials for direct X-ray detection, [6] studied triple cation metal halide perovskite thin films as X-radiation detectors. Perovskite FETs were fabricated to look at the photo conversion properties of perovskites during the detection of X-rays. The detection performance of the MAPbI3 was improved significantly with the MA+ cation mixed with FA+ (Formamidinium) and Cs+ ions. Generally, the radiation detectors work in current mode for medical imaging and spectroscopy and in voltage mode. The X-ray sensitivity of the perovskite films was observed even at low voltages less than 10V which is a promising sign to the future developments of perovskite radiation detectors.
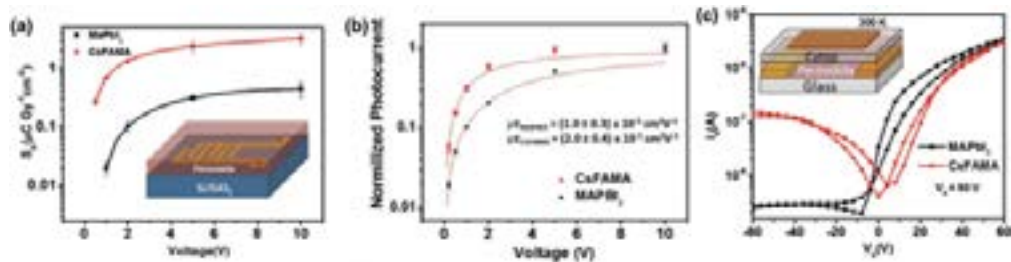

Figure 3. Electrical characterization of fabricated perovskite thin films of MAPbI3 (Black) and CsFAMAPbI3 (Red). (a) Sensitivity of the two terminal inter-digitated x-ray detectors (b) Log normalized photocurrent variation of the X- ray detector. (c) Transfer characteristics of the perovskite thin films obtained using the perovskite FET.

All-inorganic perovskite Cs3PbBr3 quantum dots (QDs) were used as a channel material in a thin film FET to detect the X-rays [7]. An inexpensive inject printing method was demonstrated to fabricate radiation detectors on a large scale at the Department of Materials Science and Engineering, Monash University, Australia. The flexible, printable and soft X-ray detectors are considered the ideal platforms for the future evolution of the perovskite FET-based X-ray detectors as they respond to the soft X-rays with the low bias voltage.

Different perovskite semiconductors like Cs2AgBiBr6, RbGeBr3, Cs3Sb2Br9, RbGeBr3 and (BA)2(MA)2Pb3I10 other than the MAPbI3 perovskites are synthesized to fabricate X-ray and gamma-ray detectors are fabricated in recent studies. The performances of the devices show promising signs of becoming the potential dominator in the medical imaging field.
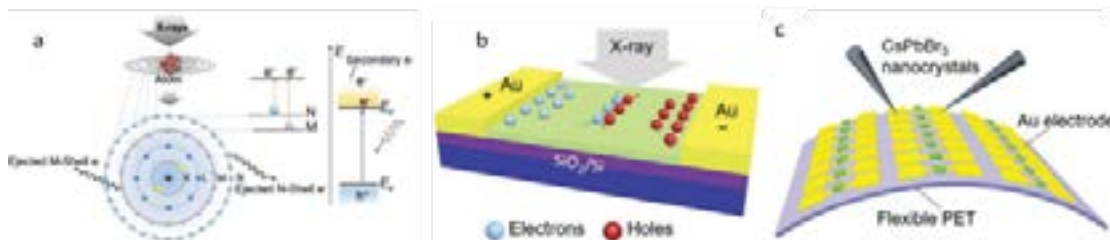

Figure 3. (a) Mechanism of conversion of photons to current by CsPbBr3 QDs film used in Australian Synchrotron. (b) The configuration of CsPbBr3 QDs FET-based X-ray detector (c) Schematic of the flexible perovskite-based X-ray detector printed arrays on PET substrate [7]

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Artificial Intelligence - Technology that changes the world

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Artificial Intelligence (AI) mimics the problem-solving and decision-making capabilities of the human brain. AI is becoming a part of daily life from the spread of smart assistants like Siri and Alexa to the emergence of self-driving cars. As a result, several IT firms from a variety of sectors are making investments in AI technology. AI is impacting our lives through smart phones, navigation, e-commerce, social media platforms, banking and finance sector, security, autonomous vehicles, smart homes and so on. So, if we name a technology that completely changed the 21st century, it would be AI.

AI is the science and engineering of making intelligent machines, and can also be defined as the development of computer systems that can carry out activities that need human intelligence, such as decision making, object detection, solving complicated problems with higher precision and so on.

A brief history of AI

The idea of AI dates back to the 19th century, and it was Alan Turing who proposed the Turing test in 1950 to determine if a computer could exhibit human-like intelligent behavior. Turing's proposal is considered the first in the philosophy of AI, making him widely regarded as a founding father of the field. The term "Artificial intelligence" was first coined by John McCarthy in 1956, and the first AI laboratory was established in 1959. The first robot was introduced to the General Motors assembly line in 1960, and the first AI chatbot, ELIZA, was unveiled in 1961. In 1996, IBM's Deep Blue defeated the world champion in chess, and in 2005, the autonomous robotic car named Stanley won the DARPA Grand Challenge. IBM's Watson, a question-answering machine, was introduced in 2011.

Stages of AI

There are three different stages of AI, which are: *Artificial narrow intelligence, Artificial general intelligence and Artificial super intelligence.*

Artificial narrow intelligence (ANI) is called weak AI and it involves machines that can perform only a narrowly defined set of specific tasks. Much of narrow AI is powered by breakthroughs in Machine Learning and Deep Learning. Voice assistants like Siri and Alexa, Google search, conversational bots, email spam filters, Netflix's recommendations and self-driving cars are the examples for weak AI.

Artificial general intelligence (AGI) also called strong AI and it is the evolution of AI in machines which possess the ability to think and make decisions just like humans. AGI has the ability to learn, generalize, apply knowledge and plan for the future. These systems are currently not fully realized.

Artificial Super intelligence (ASI) is the stage of AI when the capability of computers will surpass human beings. This is currently seen as a hypothetical situation as in movies and science fiction books.

Types of AI

There are four types of AI, which are: Reactive Machines, Limited Memory, Theory of Mind, and Self-Awareness.

Reactive machines are able to perceive and react to the world in front of it as it performs limited tasks. Example is the IBM chess program that defeated the world champion in the game of chess. The second type is called Limited Memory which can store past data and/or predictions, and use that data to make better predictions. Self-driving cars are an example for the limited memory AI. Theory of Mind is a more advanced type of AI that will mainly focus on emotional intelligence. It can make decisions based on its perceptions of how others feel and make decisions. Although this type of AI has not been fully developed yet, the humanoid robot Sophia, developed by Hanson Robotics in Hong Kong, can recognize faces and respond to interactions with her own facial expressions.

The last type, Self-Aware, is the most advanced type of AI, which is able to operate with human-level consciousness and understand its own existence. This type of AI does not exist yet.

The present and future of AI

So far, many advanced AI systems have emerged and they continue to improve. The AI robot Sophia was given Saudi Arabian citizenship in 2017, and became the first robot to receive citizenship of any country. Further, Intelligent Process Automation, AI with the Internet of Things (AIoT), AI for cyber security and data privacy, AI infused chatbots, the transformation of digital workflow, advancements in Computer Vision, Hybrid Workforce with AI, and AI-enabled processors to enhance performance are some of the latest AI innovation trends. In almost every sector, AI is influencing how people will live in the future. It already serves as the primary force behind developing technologies like big data, robotics, and the Internet of Things (IoT). Also it will continue to do so for the foreseeable future.

Conclusion

AI is a world changing technology and it provides many valuable advantages. Such as reduction in human error, faster decision making, new inventions, applicable to all kinds of important fields, digital assistance, medical and research progress, substitution of humans by machines in risky jobs, and operates 24x7 without interruption or breaks. So, AI is an outstanding technology that has been playing a key role in helping industries and offices enhance their workflows. However, there are some disadvantages too, including, high development costs, unemployment as a social problem, lack of out of the box thinking, dangers concerning military operations and serious threat to humanity.

What is Plagiarism and how to avoid it?

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Regrettably, academic plagiarism is a pervasive and prevalent problem at every educational level. Apart from the usual instances among young students, it is not difficult to come across well-known cases of plagiarism that have been reported in various settings. While the problem is not new, the revolution in how we search and process content brought by the Internet has increased the challenge in educational settings. Plagiarism has various forms, including passing off the ideas or words of another as one's own, using another's work without crediting the source, and committing literacy theft. Although various definitions exist, Plagiarism can be simply defined as the act of using another author's work without citation, thus portraying it as one's own work.

There are six types of plagiarism. They are:

1. **Self-plagiarism:** It occurs when someone uses data, facts, or figures from his/her previously written work and fails to mention its source of origin.
2. **Direct plagiarism:** It is a direct copy of a significant amount of phrases from another source without acknowledgement. It is also known as "word-for-word plagiarism" or "copy and paste" plagiarism.
3. **Idea plagiarism:** If a person came up with a new and unique idea, concept, or solution to a problem, then it belongs to him or her. Copying and using these ideas or concepts without proper acknowledgement to the sources of origin is also considered plagiarism.
4. **Mosaic plagiarism:** Here, the copied parts are almost similar to the original source but with minor changes, and without proper acknowledgements to the original source.
5. **Unintentional Plagiarism:** In this case, the writer does not know that everything that comes from outside must be cited. This includes, failure to cite a source that is not common knowledge, paraphrasing some information in the writer's own words but without citing the original source where the information comes from. The misuse of sources can be the result of ignorance or laziness but is not the result of a desire to cheat.
6. **Intentional Plagiarism:** This is knowingly presenting someone else's ideas, research, or words as your own, i.e., not giving credit to the source of origin.

The following are some of the ways and means to avoid being accused of plagiarism:

- **Quoting:** Quoting is reproducing words from another source using exactly the same wording, spelling, punctuation, and capitalization. The general rule of thumb is any time when using three or more words as they appeared in the original source, it should be treated as a quote and cited properly.

- S**ynthesizing:** Synthesis is the process of using information from two or more sources in order to develop new ideas about the topic or draw conclusions about it. It provides background, to explore causes and effects, contrast explanations, or consolidate support for your writing. Synthesis is a core component of the critical thinking and writing process.

- **Paraphrasing:** If the original author's exact words are not especially important to the point you may try to reword it in your own words to have a clear explanation. This might be particularly true in writing details or information. You need to be careful about directly quoting your research too much because it can sometimes make for awkward and difficult-to-read prose. So, one of the reasons to use a paraphrase instead of a quote is to create balance within your writing. Note that proper citations should be included even if you paraphrase someone else's wording in your writing.

- **Summarizing:** A summary helps to understand the key ideas and content in an article, part of a book, or a cluster of paragraphs. It presents key ideas and information from a source in our own writing without unnecessary detail that might distract readers. Summarizing is most useful when we wish to focus on the main ideas of a selection rather than specific details or steps of a process. When summarizing, it is necessary to use your own words, sentence structure, and phrasing to avoid plagiarism.

- **Citing:** Every author is responsible to provide reference sources using appropriate citation styles. Referring appropriately to a source leads the readers to identify resources that help to follow the argument and avoid plagiarism by linking other people's contributions to the work.

- **Highlight a particular idea:** A writer could highlight a particular idea as a new issue in knowledge development or a challenging topic to discuss further. This technique is subject to ensure that there'll be more possible chances of the writer's own words and could ease an author to follow the rules and ethics of the writing which helps in avoiding plagiarism.

- **Build argument:** The writer could learn new things by contributing to the development of the argument. Usually supervisors of the students do not expect students to write the paper entirely but expect the students to produce the original idea to create space for building the argument.

To identify potential plagiarism in your writing you may use plagiarism checking softwares such as Grammarly, Quetext, and Ouriginal. These softwares save students a lot of time by pointing out the parts of writing with potential plagiarism.

In the academic world, plagiarism is a serious matter because ideas in the forms of research, creative work, and original thought are highly valued. Accessing information for free on the internet does not imply that you are permitted to use it in your academic writing without appropriate citation. Similarly, when information from library journals and books is available to you for free, it is essential to cite it to acknowledge the original source.

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