



Nepalese Engineers Association, Japan (NEAJ)

A report of webinar on
Electronics, AI & IT: Sharing Professional Experience and Academic
Research Work

Organized by:
5th Executive Committee of NEAJ

November 27, 2021

A WEBINAR ON ‘ELECTRONICS, AI & IT: SHARING PROFESSIONAL EXPERIENCE AND ACADEMIC RESEARCH WORK’

The webinar on ‘Electronics, AI & IT: Sharing Professional Experience and Academic Research Work’ organized by the 5th executive committee of Nepal Engineers Association, Japan (NEAJ) has been successfully completed on November 27, 2021. In line with the previous *cluster programs*, this webinar is also similar but has combined the three disciplines, i.e., Electronics, AI and IT due to limited number of presenters and to include a greater number of participants. Although merging three disciplines (electronics, AI and IT) in a single webinar may not affect the set objectives of cluster program, and also these disciplines are slightly related, it was decided from the executive committee to conduct the webinar in this form. In this webinar, two presentations are from the academic research work and three from experience of the professionals. The schedule and invitation information of webinar is shown below:



NEAJ Webinar on Electronics, AI & IT: Sharing Professional Experience and Academic Research Work 13:30-16:30 JST/ 10:15-13:45 NPT, Nov. 27 (Sat), 2021

Zoom Link: <https://zoom.us/j/96435184901>

Meeting ID: 96435184901

Passcode: 1126

Registration link for participation: <https://forms.gle/TTNJSkcQxwFsiBUGA>

PROGRAM

13:30 Opening Remarks

Dr. Kabir Shakya, NEAJ President

13:35 Brief Explanation of this Program

Er. Binod Kumar Shrestha, NEAJ Treasurer

13:40 - 14:20 Part One: Academic Research (Each 10mins Presentation, 10mins Discussion)

Session Chair: *Dr. Achyut Sapkota*, Professor, National Institute of Technology, Japan.

1. Metamaterial Inspired High Power Wireless Power Transfer System.
Er. Babita Gyawali, Master’s 2nd year, Graduate School of Information Science and Electrical Engineering, *Kyushu University*, Japan.
2. On-chip High Frequency RF System Design for THz Applications (Beyond 5G).
Er. Samundra Kumar Thapa, PhD Scholar, Graduate School of Information Science and Electrical Engineering, *Kyushu University*, Japan.

14:20 - 15:35 Part Two: Professional Experience (Each 15mins Presentation, 10mins Discussion)

Session Chair: *Dr. Ved P. Kafle*, Research Manager, National Institute of Information and Communications Technology, Tokyo, Japan.

3. Reinforcement Learning for Energy Harvesting Wireless Sensor Nodes.
Dr. Shaswot Shresthamali, Postdoctoral Researcher, Kondo Laboratory, Faculty of Science and Technology, *Keio University*, Japan.



4. AI for IT (Information Technology) Operations.
Er. Satish Jaiswal, Hitachi Ltd., Japan.
5. Recent DDoS Trends and Response Strategies.
Er. Kumar Simkhada, KDDI, Japan.

15:35 ~ Virtual Nomikai (Virtual Party)

Presentation of Academic Research:

This session was chaired by Dr. Achyut Sapkota. The abstracts of the presentations of academic research are shown below.

Presentation 1:

Title: Metamaterial Inspired High Power Wireless Power Transfer System.

Presenter: *Er. Babita Gyawali*, Master's 2nd year, Graduate School of Information Science and Electrical Engineering, *Kyushu University*, Japan.

Abstract: Wireless Power Transfer (WPT) technologies transfer the electric power from transmitter to receiver without using any physical link like cables and wires. Nowadays, these technologies are getting attention and are increasing in practical use rapidly because of its convenience as compared to the power transfer through physical link. However, conventional WPT system were employed for small distance (usually in near contact distance) in lighter loads conditions such as mobile phones, mobile tablets, small biomedical devices etc. But, designing high power RF to DC conversion WPT system becomes more challenging when the transmission distance between transmitter and receiver increases. Furthermore, misalignment between transmitter and receiver sharply drop the efficiency of overall WPT system. So, inserting meta-material in between the transmitter and receiver we can achieve higher efficiency even at large transmission distance between transmitter and receiver in both alignment and misalignment cases.

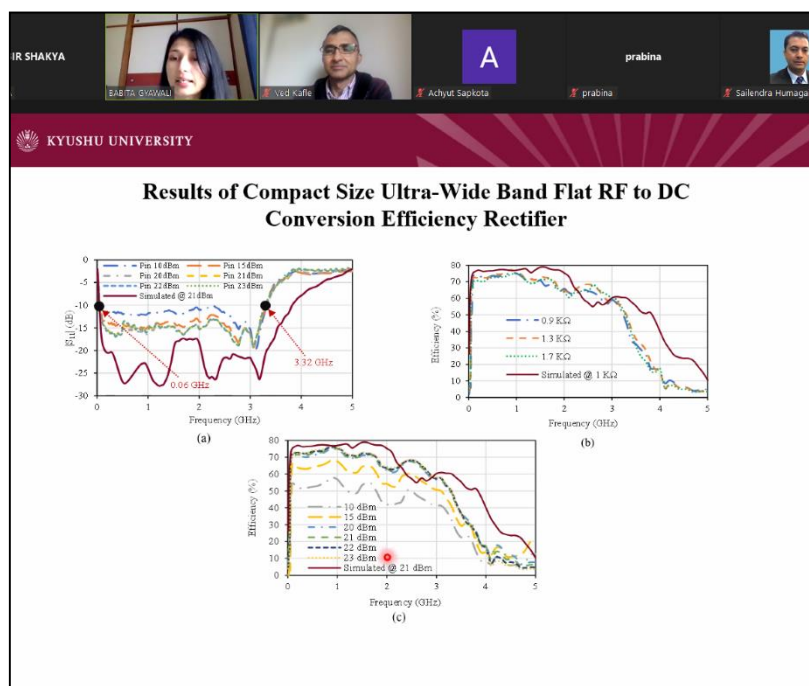


Fig. 1. A picture of the presentation made by Er. Babita Gyawali related to her academic research.

Presentation 2:

Title: On-chip High Frequency RF System Design for THz Applications (Beyond 5G).

Presenter: *Er. Samundra Kumar Thapa*, Ph.D. Scholar, Graduate School of Information Science and Electrical Engineering, *Kyushu University*, Japan.

Abstract: Just in the last two decades, technology has undergone immense wireless traffic scenarios with intelligent IoT's. In parallel, communication systems have evolved to recent 5G communication to accommodate such enormous wireless traffic. Today 5G is using a sub-millimeter (3.7 and 4.8 GHz – Planning 28 GHz) band with a data rate of 10 Gbps, and very soon, 5G will be using millimeter Wave (mmWave) band targeting 20 Gbps+ data rate. However, this scenario is never stopping as hundreds of thousands of devices will soon be added with advanced technologies. Beyond 5G, THz band is getting attention for future generations of communications like 6G, 7G, etc. However, in high frequency applications conventional lumped components, microstrip, coplanar waveguide technologies will possess significant losses and are mostly likely unusable. On the other hand, high quality factor Substrate Integrated Waveguide (SIW) has been effective in applications for high frequency designs, but they are bulky to implement as a whole. So, different miniaturized designs of resonators, filters, couplers, mixers, etc., based on SIW, are studied for applications to design THz systems and frontend designs.

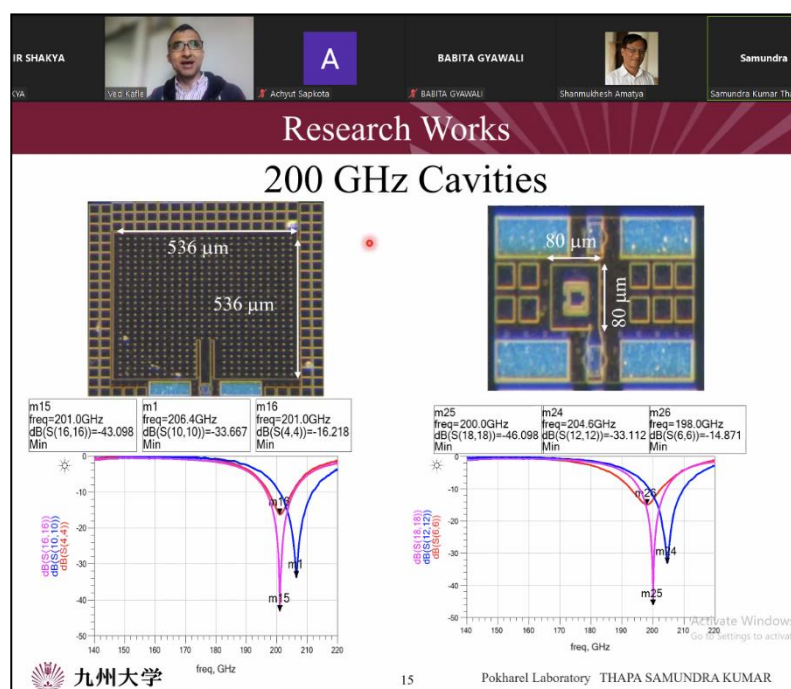


Fig. 2. A picture of the presentation made by Er. Samundra Kumar Thapa related to his academic research.

Presentation of Professionals:

This session was chaired by Dr. Ved P. Kafle. The abstracts of the presentations of professionals are shown below.

Presentation 3:

Title: Reinforcement Learning for Energy Harvesting Wireless Sensor Nodes.

Presenter: *Dr. Shaswot Shresthamali*, Postdoctoral Researcher, Kondo Laboratory, Faculty of Science and Technology, *Keio University*, Japan.

Abstract: Energy Harvesting Wireless Sensor Nodes (EHWSNs) have become very popular as edge devices in the Internet of Things (IoT) ecosystem. Since they harvest energy from their working environment, they can operate perpetually by maintaining energy neutrality. This makes them very attractive as long-term sustainable solutions for IoT. In this talk we will investigate how EHWSNs can leverage Reinforcement Learning (RL) to learn intelligent energy management policies that can optimize and adapt even when the working environment is complex and unpredictable. However, RL requires significant amounts of time and computation in addition to the risks associated with trial-and-error learning. We will discuss why the learning process is so inefficient and what solutions are feasible in the context of EHWSNs. Specifically, we will look at how clever problem formulation and distributed learning can help overcome some of the challenges in implementing RL for EHWSNs.

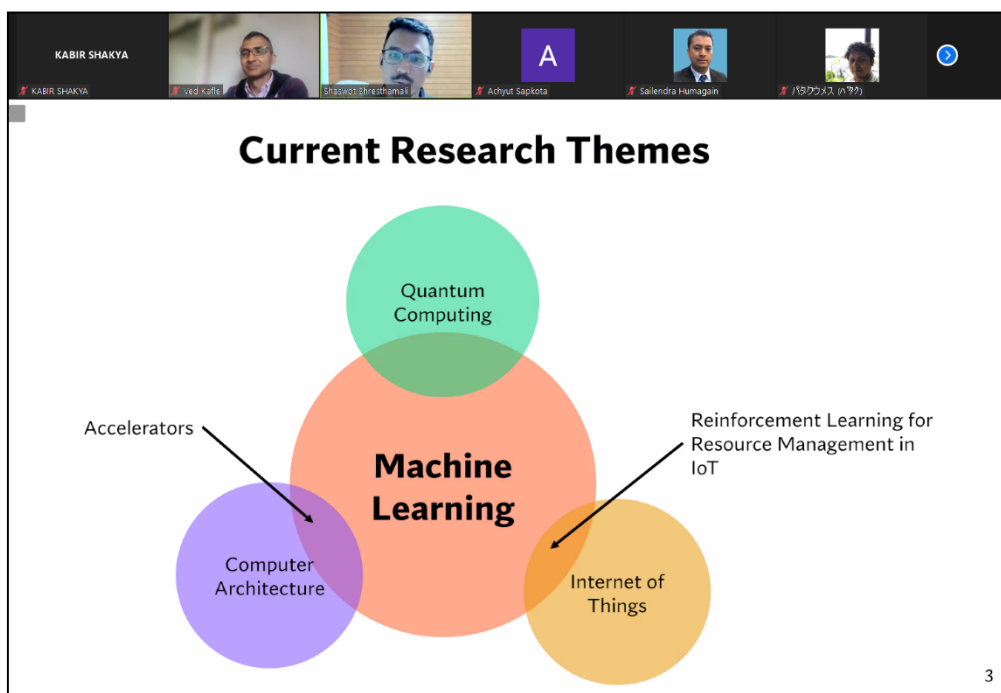


Fig. 3. A picture of the presentation made by Dr. Shaswot Shresthamali related to his professional experiences.

Presentation 4:

Title: AI for IT (Information Technology) Operations.

Presenter: *Er. Satish Jaiswal, Hitachi Ltd., Japan.*

Abstract: In an Information Technology (IT) system, metrics and logs generated by servers, storage and network devices, and software applications are analyzed to gain useful insights for operational tasks. IT operations include tasks such as monitoring and detecting any anomalous behaviors or incidents in IT systems, analyzing the root cause of those anomalous behaviors or incidents, and troubleshooting in order to restore the normal operation. Today's IT systems due to their large scale and complexity generate a huge amount of data which is not feasible to analyze manually. As a result, there is an increasing trend to use Artificial Intelligence (AI) to automate the analysis of metrics and logs. The use of AI to automate IT operations is known as AIOps. It is an emerging market, and thus there is increasing interest in research related to AIOps. While there have been some mature anomaly detection algorithms, root cause analysis and automatic remediation is still in its infancy. The prospects of co-operative AI for root cause analysis and automatic remediation is high.

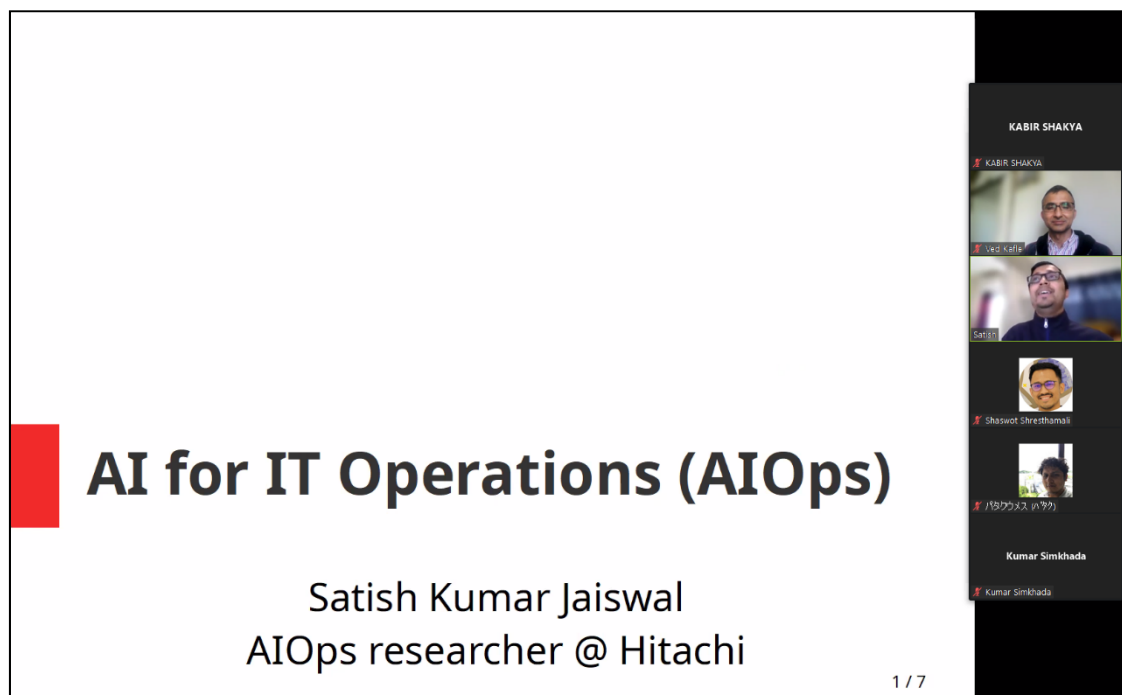


Fig. 4. A picture of the presentation made by Er. Satish Jaiswal related to his professional experiences.

Presentation 5:

Title: Recent DDoS Trends and Response Strategies

Presenter: *Er. Kumar Simkhada, KDDI, Japan.*



Fig. 5. A picture of the presentation made by Er. Kumar Simkhada related to his professional experiences.

Participants:

On average 30 participants fully attended the webinar and participated actively during the questions and answers session. Equal numbers of participants from Nepal and Japan attended and showed much interest on the information and knowledge shared in this webinar. Several feedbacks, comments and suggestions for such future program was obtained from the participants.

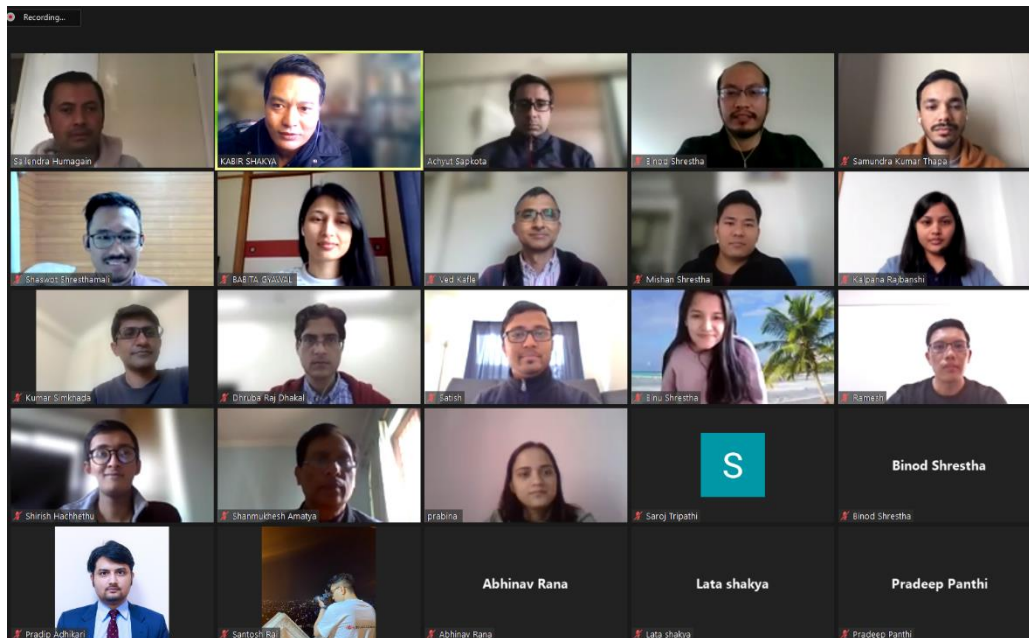


Fig. 6. Group photo during the program

Virtual Nomikai:

A virtual *Nomikai* (*Japanese culture of drinking after some event or occasion*) was done with the active discussion regarding the questions and comments on the presentations made on this webinar. Professional also shared their interesting experiences to the participants. Students who have queries regarding their research were also discussed openly. Virutal Nomikai and the program was ended with thanks message to all the participants and supporting hands for the successful accomplishment of webinar by the President of 5th executive committee of NEAJ.

Additional Photos of the Webinar:

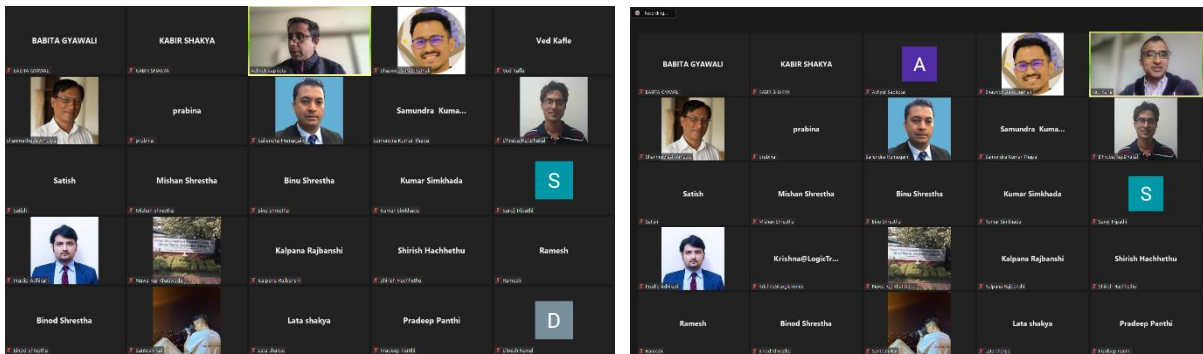


Fig. 7. Dr. Achyut Sapkota (left) and Dr. Ved P. Kafle (right) chairing their respective session during the webinar.

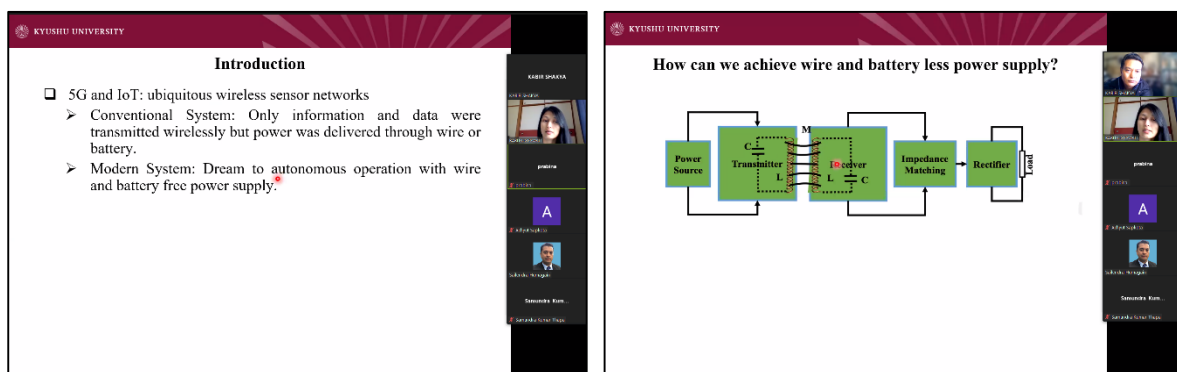


Fig. 8. Additional pictures of the presentation made by Er. Babita Gyawali.

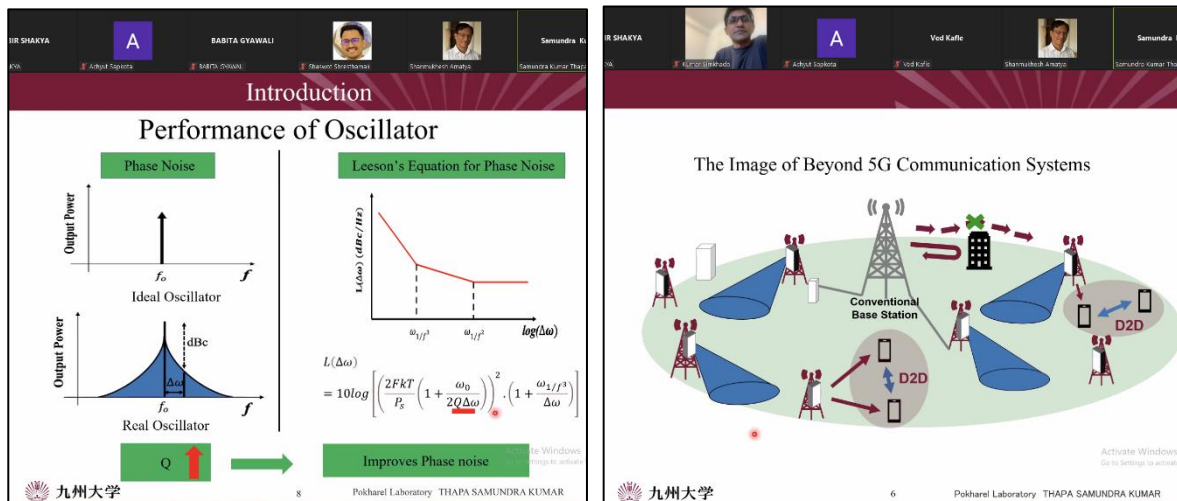


Fig. 9. Additional pictures of the presentation made by Er. Samundra Kumar Thapa.

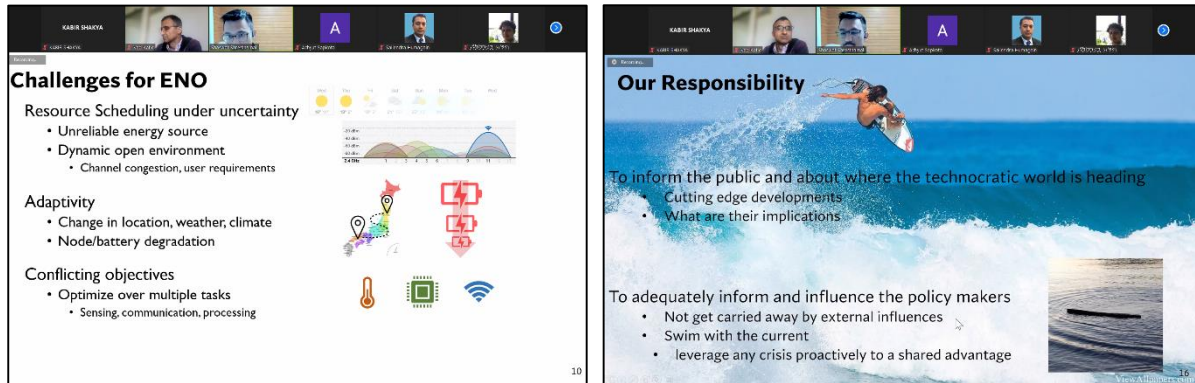


Fig. 10. Additional pictures of the presentation made by Dr. Shaswot Shresthamali.

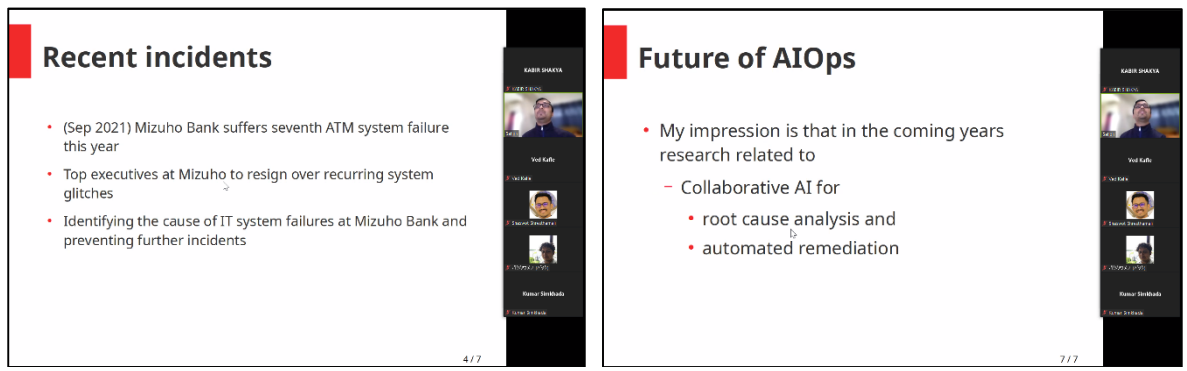


Fig. 11. Additional pictures of the presentation made by Er. Satish Jaiswal.

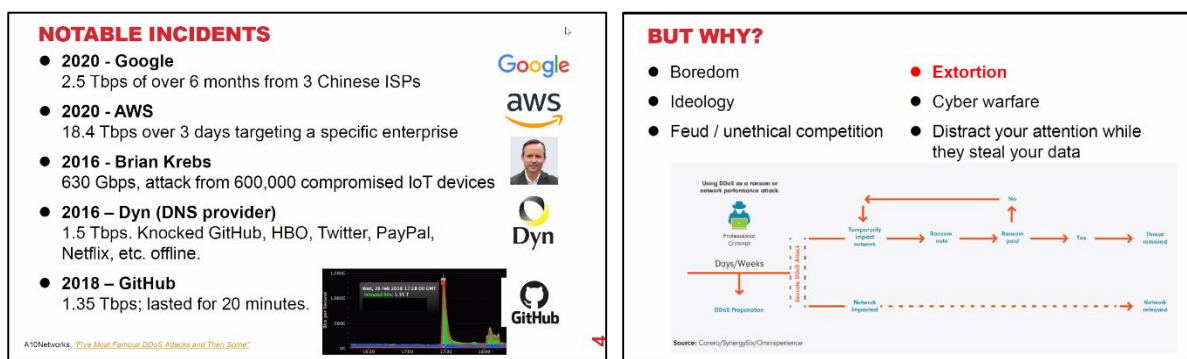


Fig. 12. Additional pictures of the presentation made by Er. Kumar Simkhada.



Message from the 5th Executive Committee of NEAJ:

We would like to express our sincere gratitude to all the presenters, session chairs and participants who participated actively and helped this program to achieve its objectives. The presentations gave us information about current research problems in the field of electronics, AI and IT, and the discussions after each presentation were very fruitful. First of all, from the academic session, we would like to thank Er. Babita Gyawali for her presentation on necessity of wireless power transfer (WPT) system in the future and different High Power WPT applications. The research work highlighted by Er. Samundra Kumar Thapa on frontend system design for beyond 5G applications is also one of the promising work in the field of wireless communication system.

From the professional session, we would like to thank Dr. Shaswot Shresthamali for sharing his research works on utilizing machine learning with IOT applications and how this system can be applied to smart agriculture system in Nepal. Furthermore, the presentation from Er. Satish Jaiswal was focused on the utilization of artificial intelligent system for IT operations (AI Ops). Er. Kumar Simkhada presented different kinds of Distributed denial of service (DDoS) attacks and its mitigating measures. Last but not the least, we would like to thank Dr. Nawaraj Khatiwada, *president, NDRI* for his suggestion and contribution on empowering the students of Nepal from the rural areas by providing knowledge on recent technology.

In future, several such programs will be conducted. The executive committee is also planning a regular multi-disciplinary symposium, where the participants could be from Nepal as well. We will send the information through e-mail once the schedule is finalized. Please share the information to your friends and people that can help them get benefit of the shared knowledge and information through our regular webinars, symposiums, conferences, etc. More information and program reports could also be obtained from our homepage: <http://www.neajc.org/> and facebook page: <https://www.facebook.com/nejapan>. The recordings of our programs are available on official YouTube channel of NEAJ: https://www.youtube.com/channel/UCwH_hCFb1XTzdOmAloe1FnA . If you have any suggestions and proposal for conducting future programs, please let us know. The 5th executive committee will be very happy to facilitate every activity within its scope.

Thank you.



Nepalese Engineers Association, Japan (NEAJ)

THE FIFTH EXECUTIVE COMMITTEE (April, 2021 ~)



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Member

Er. Aavash Ghimire
Tokyo Institute of Technology

Brief biographies of presenters:

Academic research work presentation:

Er. Babita Gyawali:

Babita Gyawali is currently a master student at Graduate School of Information Science and Electrical Engineering in Kyushu University, Japan with Mitsubishi Corporation Scholarship. She did her Bachelor's in Electrical Engineering from Institute of Engineering, Central Campus, Pulchowk, Lalitpur, Nepal.

Er. Samundra Kumar Thapa

Samundra Kumar Thapa is currently a Ph.D. Scholar with MEXT Scholarship at Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan. He completed his master's degree from the same department in March, 2021. He did his Bachelor's in Electronics and Communication Engineering from Tribhuvan University Nepal. He is currently working in high-frequency RF system design based on Substrate Integrated Waveguide (SIW) resonators, filters for VCO design for THz applications.

For additional details: <https://www.researchgate.net/profile/Samundra-Thapa>

Professional experience presentation:

Dr. Shaswot Shresthamali:

Shaswot Shresthamali is a postdoctoral researcher in Kondo Laboratory at the Faculty of Science and Technology, Keio University. He is currently involved in projects related to Edge Computing, Fault-tolerant Computing and Quantum Computing under Prof. Masaaki Kondo. He has received his PhD from the Graduate School of Information Science and Technology, The University of Tokyo under the supervision of Prof. Hiroshi Nakamura.

He completed his undergraduate from the Department of Electronics and Communications Engineering, Pulchowk Campus, Institute of Engineering, Tribhuvan University. Upon graduation, he worked for two years in Sagarmatha Engineering College as an Assistant Professor before moving to Japan for postgraduate research.

Er. Satish Jaiswal:

Satish Jaiswal received his BE and MS degree from The University of Tokyo, Japan. Currently, he is affiliated to Hitachi Ltd., Japan.

Er. Kumar Simkhada:

Kumar Simkhada received his BE and MS in Information Technology from Tohoku University in 2005 and 2007 respectively. Since 2007, he has been affiliated with KDDI Corporation. His 14 years of experience in industry includes designing, developing and project managing business applications, managing Enterprise Solutions, Data Centre and Network services, and planning telecom services for consumers.

Note: Unauthorized use of the contents and pictures are strictly prohibited. Pictures of the presentation could be provided upon reasonable request.