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CHAPTER REPORT

Social Distancing Monitoring System to Control the Spread of COVID 19 at the University of Technology, Jamaica

By Christopher Udeagha, Devon Gayle, Dave Muir, Janeel Anderson, Treshell Constable, and Damain Patterson, IEEE Jamaica Section ComSoc Chapter

Radio-frequency identification (RFID) is the use of a wireless non-contact system that uses radio-frequency electromagnetic fields to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking of the system. Some tags require no battery and are powered by the electromagnetic fields used to read them. Others use a local power source and emit radio waves.

RFID tags are used in many industries. An RFID tag attached to an automobile during production can be used to track its progress through the assembly line. RFID identity cards can give employees access to locked areas of a building, and RF transponders mounted in automobiles can be used to bill motorists for access to toll roads or parking.

RFID tags can be attached to clothing, possessions, or even implanted within people (mainly criminals) for the purpose of tracking them. Therefore, the possibility of reading personally-linked information in humans without their consents using RFIDs could create an opportunity to monitor social distance, thereby controlling the spread of the Corona Virus of 2019.

At the tail end of 2019, the virus called Corona Virus of 2019 started in Wuhan, China, and has now spread worldwide and has been declared a pandemic by the World Health Organization (WHO). This virus is mainly transmitted through droplets generated when an infected person coughs, sneezes, or speaks. These droplets are too heavy to hang in the air, and quickly fall on floors or surfaces. You can be infected by breathing in the virus if you are within one meter of an infected person, or by touching a contaminated surface and then touching your eyes, nose or mouth before washing your hands.

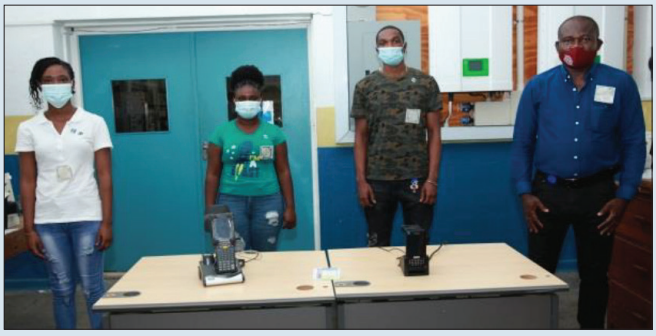
This work may attempt to design and implement sensitive tags and RF readers for the purpose of social distance monitoring in supermarkets and other public places, and in institutions, at certain radio frequencies to control the wide spread of the virus. Pilot testing will be used to monitor sensitive areas at the Faculty of Engineering & Computing, University of Technology, Jamaica. An algorithm has to be developed so that if cluster of tags within people are detected, an alert sent via text will have to be sent to the RF reader on the network.

The successful implementation of this work can be applied in Jamaica and in the world to control the spread of the virus, thereby solving real-world problems.

How the Project will Work

The top photo shows a typical RFID system. In every RFID system, the transponder Tags (on the shirts) contain information. This information can be as little as a single binary bit, or it can be a large array of bits representing such things as an identity code, personal medical information, or literally any type of information that can be stored in digital binary format.

How RFID works.



The project team members within social distance of one meter apart. From left are Janeel Anderson, Treshell Constable, Damain Patterson (students), and Christopher Udeagha (senior lecturer and principal investigator).

As shown on the picture above, an RFID reader with the teacher communicates with passive tags on the three students via a transceiver field. Passive tags have no power source of their own and instead derive their power from the incident electromagnetic field. The heart of each tag is a microchip. When the tag enters the generated RF field it is able to draw enough power from the field to access its internal memory and transmit its stored information.

When the transponder tag draws power in this way, the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. This effect is utilized by the tag to communicate its information to the reader. The tag is able to control the amount of power drawn from the field and by doing so it can modulate the voltage sensed at the transceiver according to the bit pattern it wishes to transmit. Based on the decision transmitted to the micor-processor or computer, it can be determined that social distances are in order or not.

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CHAPTER REPORT

Asia-Pacific Distinguished Series of Lecture at Harbin Chapter, China

Intelligent Communication Empowers the Internet of Things

By Weixiao Meng, Chair of the IEEE ComSoc Harbin Chapter, China

With the help of the Harbin Institute of Technology (HIT) and the IEEE Communication Society, the IEEE ComSoc Harbin Chapter organized the Asia-Pacific Distinguished Series of Lectures from July 12 to 23, 2021. The activities attracted many scholars and students from around the world, and also won high praise.

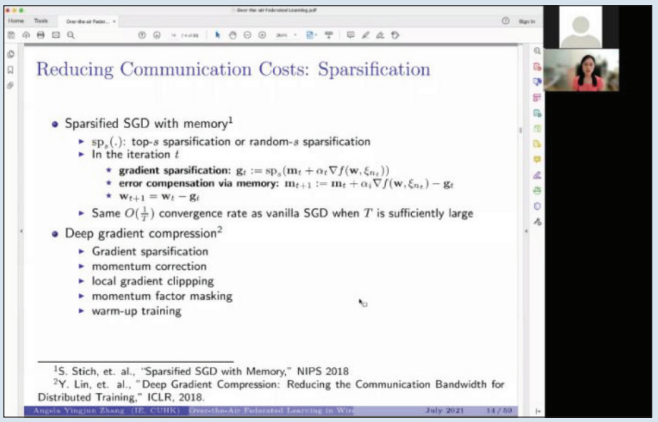
The theme of the lectures was "Intelligent Communication Empowers the Internet of Things". The academic activities consisted of three parts, including academic lectures, teaching and innovative practice. A total of 23 scholars were invited to give a specific theme lecture, which mainly focused on cutting-edge technologies, i.e., artificial intelligence (AI), intelligent Internet of Things (IoT), and industrial big data. The students were guided to understand the latest development status and future trends in the field of communication technology. In this case, students can develop their interests in information and communication technology, AI and related interdisciplinary research areas.

Prof. Yingjun Zhang gave a lecture called "Over-the-Air Federated Learning over Wireless Communication Systems". Prof. Zhang introduced federated learning (FL) basics and its unique challenges in wireless fading channels, and discussed the state-of-art of works on FL mechanism design in wireless channels. She also introduced several recent works such as RIS and relay to enhance the FL performance and practicality.

Dr. Tao Chen discussed the application of AI/machine learning in radio access networks (RAN) to solve resource optimization problems.

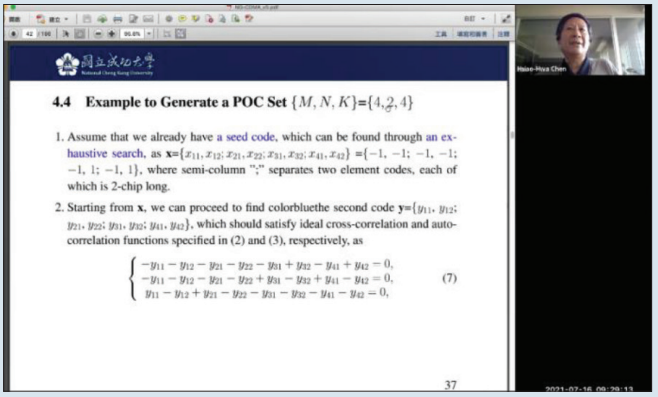
Prof. Hsiao-Hwa Chen talked about their works on the NG-CDMA technologies to solve the difficulties of B5G wireless communications.

Different advanced academic ideas were exchanged in the Asia-Pacific Distinguished Series of Lectures held by the IEEE ComSoc Harbin Chapter. The activities left a deep impression on the teachers and students who attended.



The lecture given by Prof. Yingjun Zhang.

The lecture given by Dr. Tao Chen.



The lecture given by Prof. Hsiao-Hwa Chen.

CHAPTER REPORT

World LASER 60th Anniversary and Four Decades First Thai Beam

By Keattisak Sripimanwat (D.Eng), IEEE ComSoc Thailand Chapter Chair

Based on a pre-seminar and a successful project of "Light & Quantum Milestones" that was supported by the IEEE Foundation in 2019, it was consequently extended to another important milestone on the International Day of Light (IDL) 2020 (www.quantum-thai.org/idl-2020-thailand), celebrating the 60th anniversary of the invention of laser by Theodore Maiman. The Thai ComSoc Chapter celebrated this anniversary jointly at IDL 2020 with the 40th anniversary of a related story.

In 1980, the first Thai laser was beamed at King Mongkut's Institute of Technology (KMITL) with the underserved environment of 40 years ago. From the previous year, a seminar that tracked back its history in order to survey how innovation had been created in such an environment, was organized. This year's project is then to build those contents up as a movie with seminars. However, due to the first wave of the COVID-19 pandemic, the entire 2020 activities were converted to online events.

On May 16, the honored opening speech of IDL 2020 was given by Dr. Kosol Petchsuwan, the former KMITL rector. Following by a full story of local laser invention, two parts on the oral history and technical story were released at https://youtu.be/sfBg6MB44O4 & https://youtu.be/QLpKDo_dQA8 respectively. As a result, we produced another consequential output for the chapter's series on "Learning History for the Better Future". Moreover, based on this year's experience and infrastructure, it will also result continuously to a further short movie for the coming year, "The Golden Jubilee Hologram & Milestone".

Thai IDL 2020 poster and a video thumbnail.

The Thai ComSoc chapter would like to thank all supporters and sponsors: the Institute for the Promotion of Teaching Science and Technology (IPST) and faculty of engineering at KMITL. Hopefully, this 2020 movie could stimulate various target groups of audiences. The story of this local technological history should be another source of inspiration for students, researchers and many others.

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How the Project Will Address Pandemic Issues

This work may attempt to design and implement sensitive tags, and RF readers for the purpose of social distance monitoring in supermarkets and public places, and in institutions, at certain radio frequencies to control the wide spread of the virus in Jamaica and in the world at large.

The Project's Support to the Community

The pilot testing will be used to monitor sensitive areas at the Faculty of Engineering & Computing, University of Technology, Jamaica. An algorithm has to be developed so that if cluster of tags within people are detected, an alert sent via text will be sent from the RF reader to the display unit on the network. The successful implementation of this work can be applied in Jamaica and in the world to control the spread of the virus, thereby solving real-word problems.

Who are the Project Team Members?

There are six team members in total. Two of the team members are academic staff; one of the team members is from industry; three team members are students of the Faculty of Engineering & Computing, University of Technology, Jamaica.

The team members will ensure that social distancing is maintained. Wearing of masks and laboratory gear will be observed during the design, implementation and prototype testing in the laboratory. We must adhere to all the rules of Covid-19 as stipulated by the Government of Jamaica and the World Health Organization (WH0).

In addition, and to ensure the successful completion of the project, each team member is responsible for a specific assignment.

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