Research

Mohd Hisham produces high-frequency RFID antenna to upgrade Malaysia’s RFID toll system

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PEKAN, 3 February 2023 - *Radio frequency identification* (RFID) is no stranger today.

However, the use rate is still minimal due to the many negative perspectives regarding the failure of RFID systems at toll road operators in Malaysia, whereas RFID has an excellent record in other countries that also operate using the same system.

Looking at the negative perspective on RFID, lecturer of the Faculty of Electrical and Electronic Engineering Technology (FTKEE), Universiti Malaysia Pahang (UMP), Mohd Hisyam Mohd Ariff, 42 upgraded the potential of RFID in several aspects, namely getting a higher reading speed system, detecting more tags in a short period and a wider detection coverage area.

This project also joined by FTKA lecturers, Dr. Noor Zirwatul Ahlam Naharuddin, Ts. Dr. Mohammad Fadhil Abas and lecturer at the Centre for Mathematical Sciences (PSM), Dr. Rahimah Jusoh@Awang.


UHF
RFID

According to Mohd Hisham, the current technology's rapidity requires a faster and more effective medium of information transfer and RFID is a form of wireless communication that uses electromagnetic fields to automatically identify and track tags attached to objects.

"The use of RFID is widespread and can be applied in various industrial sectors such as supply chain, health care and agriculture.

"In the agricultural sector, RFID can be used to track livestock, while from a manufacturing point of view, RFID helps review the supply of raw materials or manufactured products.

"RFID provides more effective wireless identity tracking than barcodes," he said.

He added that the RFID developed can be connected for internal faculty use such as recording student attendance, tracking staff vehicles and inventory of equipment assets.

"The RFID system consists of four main components: an antenna, a reader, an electronic tag and a computer that uses radio frequencies to read information from the tag.

"Each RFID tag will be incorporated with a radio frequency chip activated when an RFID reader emits a detection signal.

"The antenna on the reader for this research can detect tags without the need for special orientation and has a reading distance between readers and tags exceeding 3 meters," he said.

In 2021, UMP offered a prototype grant (PDU) to finance this research and it is expected to be fully completed by 2023.

He said the ultimate goal of this study is to be more focused on managing and tracking data electronically efficiently and orderly.

"Larger scale data management is extremely difficult to manage without an effective storage and tracking system.

"The amount of time, manpower and human error when entering data manually can be reduced, thus increasing the productivity of industry or society.

"As this RFID system can provide faster readings and covers a wider range of readings, it can help overcome the problems that occur in the Malaysian highway tollbars," he said.

He further added that it could also be used to manage goods and inventory, as well as identification data in travel documents such as passports and baggage managed by airlines.

"In the future, these RFID systems can be integrated with mobile phones so that large-scale data collection can be done more quickly anywhere," he said.

This research involves collaboration with RF Ident Sdn. Bhd. which provides access to the standards and real needs of society and industry in Malaysia.

He said the estimated overall cost to develop the system is RM4,000 to RM5,000.

From 2015 to 2018, he conducted research on RFID systems and applied them in the livestock sector for data collection and monitoring of livestock.

In the future, the use of this system can be improved and expanded in educational institutions, health and national security.

This research won a gold medal and Special Award (Automotive Excellence Award) in the Creation, Innovation, Technology and Research Exposition (CITREx) 2021.

The research also won a silver medal at the International Invention, Innovation and Technology Exhibition (ITEX) 2022 which took place at the Kuala Lumpur Convention Centre (KLCC) on 26 and 27 May 2022.

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