ORIENTATION-INSENSITIVE CHIPLESS RFID TAGS

RFID (Radio-frequency identification) is a technological progression to optical bar codes that allows the identification of objects without line of sight. Two types of RFID tags are available: tags with and without Integrated circuits (IC). This novel technology is a chipless RFID tag that is orientation insensitive.

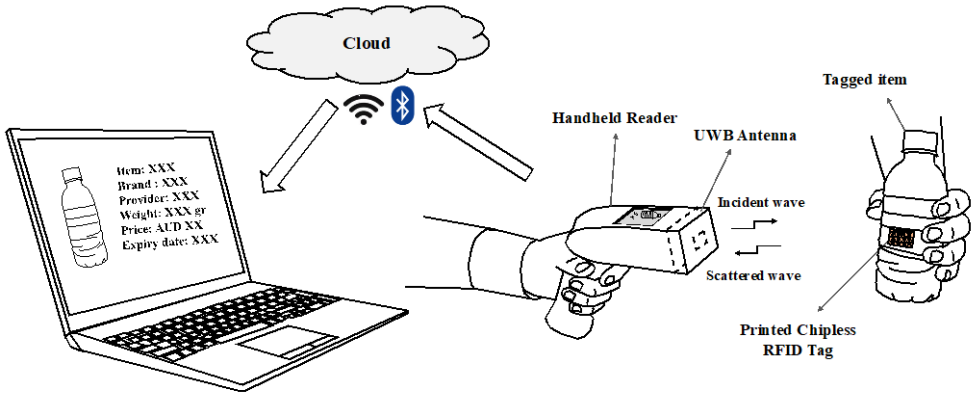
- **Orientation-insensitive tags**
- **Inexpensive yet resilient**
- **Printable tags**
- **No IC chips required**
- **Works with standard readers**

THE CHALLENGE

A typical RFID system consists of a transponder (tag) that contains an identifier code and a reader that emits and receives signals for reading the identifier code on the tag (see Figure).

Designing RFID systems with chipless tags is challenging, as these simple tags cannot actively emit a signal. However, if successful, the tags can be printed onto materials such as paper and plastic, which in turn makes the system cost effective.

To overcome the challenge of detecting chipless RFID tags, multiple systems have been proposed. Some systems utilize co-polar antennas, while others utilize cross-polar antennas. The advantage of cross over co-polar based systems is an increased reading reliability. However, traditional cross-polar RFID systems are orientation sensitive, which reduces their industrial applicability. Our technology overcomes this limitation and allows the detection of tags irrespective of their orientation when using cross-planarization.



THE TECHNOLOGY

Our new technology is a method to produce orientation-insensitive chipless RFID tags. The design of orientation-sensitive chipless tags is well-known, however how to make them insensitive to orientation remains a challenge.

We have invented a system that is able to turn nearly any traditional tag design into an orientation-insensitive tag. This is achieved by cleverly rearranging and optimizing standard designs.

The result of using our technology is a cost-effective RFID system that utilizes the robustness of cross-polar antennas with the convenience of reading them in any direction.

Intellectual property: An Australian provisional patent was filed in 2019.

The Team

The team who have developed this technology is lead by Professor Nemai Karmakar from the school of Electrical and Computer Systems Engineering at Monash University.

THE OPPORTUNITY

Chipless RFID tags can be used for tagging items in supermarkets, agriculture and supply chain management. Other applications include the production of secure documents and identification cards.

The team is currently looking for a licensing partner who is eager to bring this technology to market.

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