Lab 04 - RFID Sensors Lab

Name of student (Batch No / Roll No)

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Performance of Experiment	Journal Submission	Total Marks	Remarks	Instructor Sign

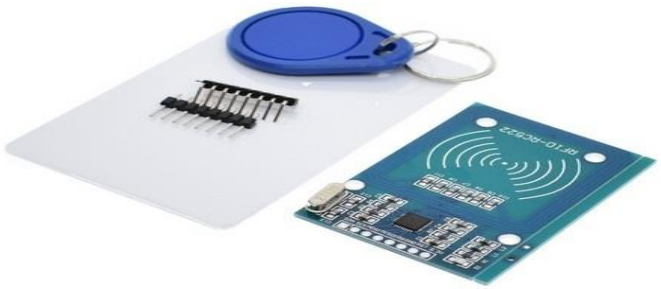
Aim: To use RFID sensors to detect something which is used in malls, Attendance system using RFID Card.

Journal content- Theory and frequently asked questions and experiment

- What is RFID sensor ?
- RFID Reader
- How does RFID Works ?
- RFID Tags and Smart Labels
- RFID Applications
- Conclusions

1. What is RFID Sensor ?

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. An RFID tag consists of a tiny radio transponder; a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to inventory goods. There are two types. *Passive tags* are powered by energy from the RFID reader's interrogating radio waves. *Active tags* are powered by a battery and thus can be read at a greater range from the RFID reader; up to hundreds of meters. Unlike a barcode , the tag doesn't need to be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of AIDC.

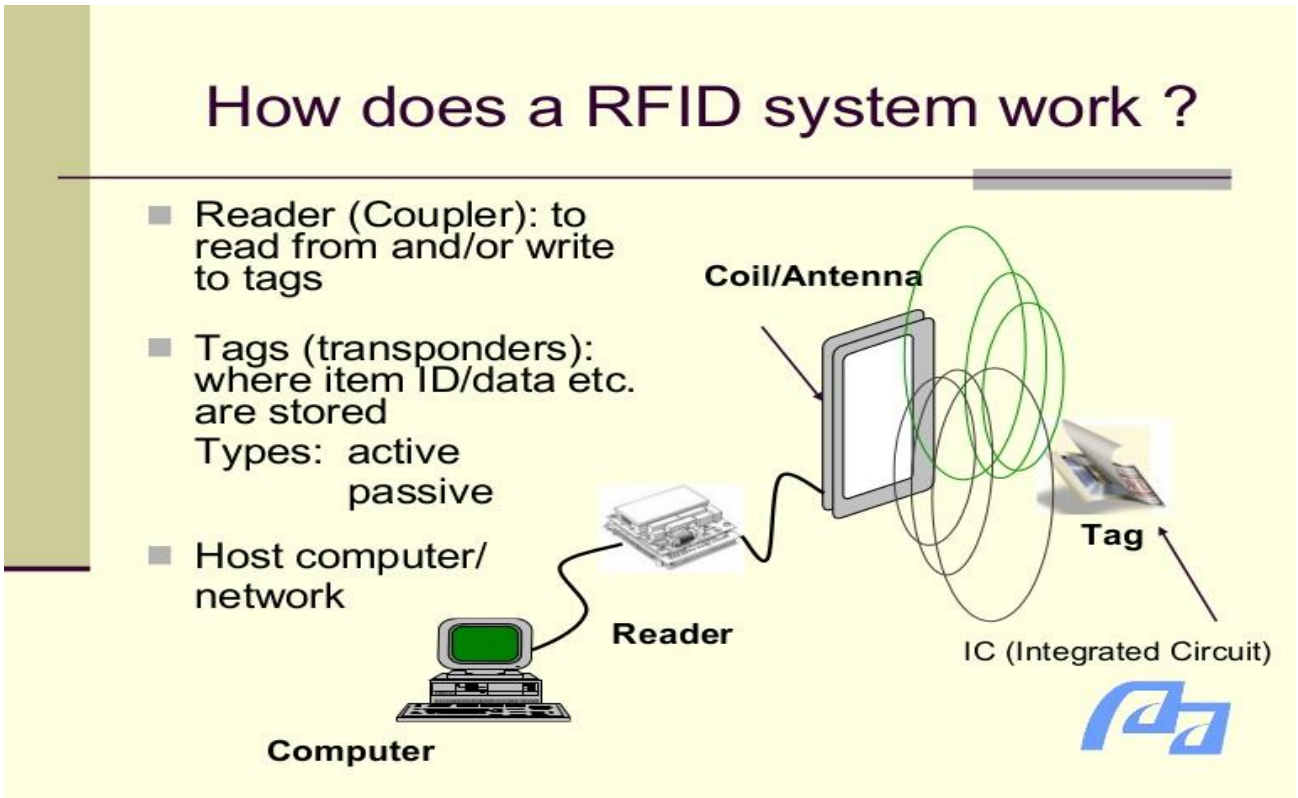


2. RFID Reader

RFID Reader is a device that uses radio-frequency waves to wirelessly transfer data between itself and a RFID tag/label in order to identify, categorize and track assets. When combined with the right RFID Software, a RFID reader can identify objects quicker, more accurately, at a reduced overall cost, and at various points of the object’s lifecycle.

3. How does RFID works ?

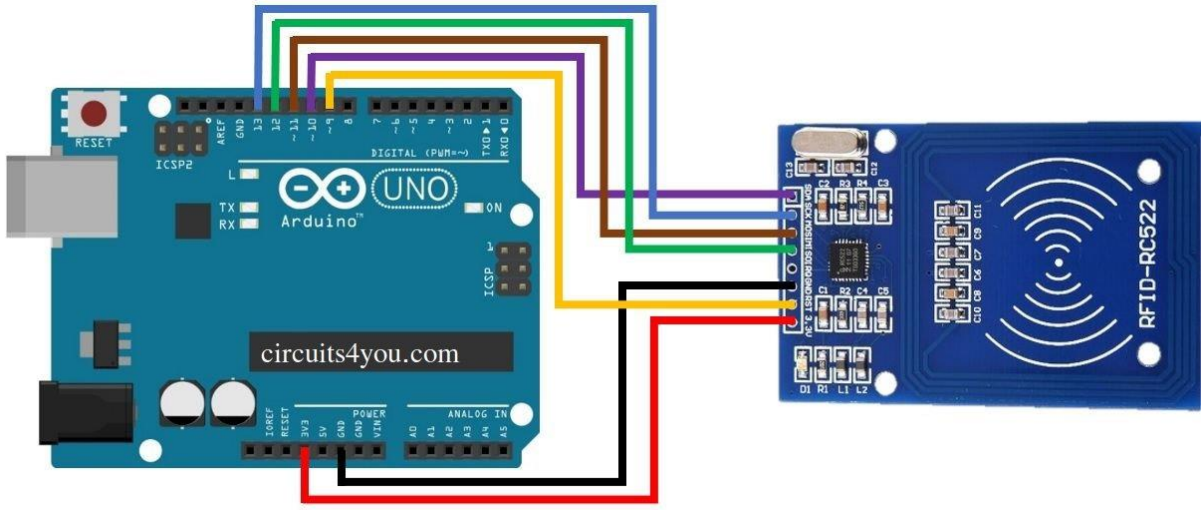
RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention. RFID methods utilize radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.



4. RFID Tags and Smart Labels

An RFID tag consists of an integrated circuit and an antenna. The tag is also composed of a protective material that holds the pieces together and shields them from various environmental conditions. The protective material depends on the application. For example, employee ID badges containing RFID tags are typically made from durable plastic, and the tag is embedded between the layers of plastic. RFID tags come in a variety of shapes and sizes and are either passive or active. Passive tags are the most widely used, as they are smaller and less expensive to implement. Passive tags must be “powered up” by the RFID reader before they can transmit data. Unlike passive tags, active RFID tags have an onboard power supply (e.g., a battery), thereby enabling them to transmit data at all times.

Smart labels differ from RFID tags in that they incorporate both RFID and barcode technologies. They’re made of an adhesive label embedded with an RFID tag inlay, and they may also feature a barcode and/or other printed information. Smart labels can be encoded and printed on-demand using desktop label printers, whereas programming RFID tags are more time consuming and requires more advanced equipment.



5. RFID Applications

RFID TECHNOLOGY IS EMPLOYED IN MANY INDUSTRIES TO PERFORM SUCH TASKS AS:

– Inventory management
– Asset tracking
– Personnel tracking
– Controlling access to restricted areas
– ID Badging
– Supply chain management
– Counterfeit prevention (e.g. in the pharmaceutical industry)

Although RFID technology has been in use since World War II, the demand for RFID equipment is increasing rapidly, in part due to DOD and Wal-Mart requiring their suppliers to enable products to be traceable by RFID. Whether or not RFID compliance is required, applications that currently use barcode technology are good candidates for upgrading to a system that uses RFID or some combination of the two. RFID offers many advantages over the barcode, particularly the fact that an RFID tag can hold much more data about an item than a barcode can. In addition, RFID tags are not susceptible to the damages that may be incurred by barcode labels, like ripping and smearing.

6. CONCLUSION

Thus learned about RFID Sensors , Tags and it’s Applications in various domains.