**RFID BASED SECURE ENTRANCE SYSTEM**

**INTRODUCTION:**

Radio frequency is an automatic identification process used for transmitting data between an RFID tag and RFID reader with the help of radio-frequency electromagnetic fields. The RFID tag is a device used to store data of any stuff, persons, books, animals, etc.  RFID tags are of different types some tags can be placed near to the RFID reader and some can read from far away distances beyond the line of sight of the reader.

**AIM:**

To design an RFID based secure entrance using ESP 32 and ThingSpeak Cloud.

**COMPONENTS REQUIRED:**

* ESP 32
* RFID Reader Module RC522
* RFID Cards
* Arduino IDE
* Servo Motor
* Buzzer
* LED

**DESCRIPTION OF THE COMPONENTS:**

1. ESP 32 :

It is the main processing unit of the project. It controls output devices, it also reads input from RFID reader.

1. RFID READER MODULE RC522:

It detects the card and sends an alphanumeric unique code on the serial port.

1. RFID CARD:

An RFID tag comprises a microchip containing identifying information and an antenna that transmits this data wirelessly to the reader.

1. SERVO MOTOR:

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servomechanism.

1. BUZZER:

We have used piezoelectric buzzer. This is a warning / indication that an invalid attempt is made to gain access to system.

**DESCRIPTION**

RFID or Radio Frequency Identification system consists of two main components, a transponder/tag attached to an object to be identified, and a Transceiver also known as interrogator/Reader.

A Reader consists of a Radio Frequency module and an antenna which generates high frequency electromagnetic field. On the other hand, the tag is usually a passive device, meaning it doesn’t contain a battery. Instead it contains a microchip that stores and processes information, and an antenna to receive and transmit a signal.

To read the information encoded on a tag, it is placed in close proximity to the Reader (does not need to be within direct line-of-sight of the reader). A Reader generates an electromagnetic field which causes electrons to move through the tag’s antenna and subsequently power the chip.

The powered chip inside the tag then responds by sending its stored information back to the reader in the form of another radio signal. This is called backscatter. The backscatter, or change in the electromagnetic/RF wave, is detected and interpreted by the reader which then sends the data out to a computer or microcontroller.

**WORKING:**

* When a person swipes the RFID tag against the RFID Reader and the reader reads the data stored in the card.
* If the data matches with that of the stored data, the system authorizes the person and allows entry into the secured area by driving the servo motor into an ON state.
* If the data does not match with the stored data, the system no longer allows the person to access the secured area indicating an unauthorized user.
* The system alerts this unauthorized entry with a buzzer sounds as an indication of entering or providing wrong information.

**APPLICATIONS:**

* Device control and Authentication in Industries
* Tracking books in library
* Intelligent Tollgate System
* Authentication of Passport details
* RFID technology is also used to access secured areas like research centres, defense sites, schools, hospitals, business organizations etc.

**ADVANTAGES**:

* RFID tags are very easy to install/inject inside the body of animals, thus helping to keep a track on them. This is useful in animal husbandry and the poultry industry, wherein the installed tags give information about the age, vaccinations, and health of the animal.
* It is better than barcodes, as it cannot be easily replicated, and therefore, increases the security on a product.

**DISADVANTAGES:**

* RFID proves to be too expensive for many applications as compared to other tracking and identification methods, such as the simple barcode.
* It is difficult for an RFID reader to read the information in case the tags are installed in liquid or metal products. The problem here is that, liquid and metal surfaces tend to reflect radio waves, which makes the tags unreadable.