

Vehicular Protection Using RFID tag-to-tag Communication

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ABSTRACT

As the number of urban vehicles grow rapidly, vehicle theft has become a shared concern for all citizens. The main idea of this project is to incorporate RFID tags in the vehicle and on the number plate which has the details of the vehicle. Both the RFID tags will have same data. These two tags are synced with each other wirelessly. When one of the tag is not in sync with the other, the adjacent tag senses and responds indicating a problem. The reader is programmed to read the data in such a way that when the data in both the tags are matched, it displays matched along with the vehicle details and if the data is not matched it displays mismatched and indicates the theft of the vehicle.

Keywords—RFID tags, Reader, Automatic Identification, Wireless Communication

I. INTRODUCTION

Radio frequency Identification (RFID), is a generic term for technology that use radio waves to automatically identify people and objects. There are several ways of identification, but the most common way is to store a number that identifies a person and object, and perhaps other information or code on a microchip which is attached to an antenna. RFID is one member in family of automatic identification and data capture technologies. It is fast and reliable means of identifying objects. There are two main components RFID reader and RFID tag. RFID reader has transmitter and receiver. It acts as an interrogator. RFID tag is composed of miniscule microchip and antenna. Communication between them occurs wirelessly. Here we are using two RFID tags. If the data is matched in both the tags then it indicates Authorized person and if there is a mismatch in the data, it indicates that the vehicle is been stolen and the person using that particular vehicle is an unauthorized person. The companies like car rental agencies, car dealership and carwash facilities uses RFID tag to access the information about the vehicles. By using unique RFID tag and addition of software companies can get the record of the vehicles. Identical vehicles are rented by some Rental companies and dealerships. Without trying to detect and compare multiple VINs the Unique RFID tag provides them with unique identification. The fields of logistics and supply management, manufacturing and assembly, networking, smart anti-theft uses RFID technology. This technology is a non-contact automatic identification technology which automatically identifies the target and access relevant data without any physical contact using radio waves. It has wide range of applications due to its non-contact transmission.

II. RELATED WORK

2.1 Pavel V. Nikitin [4], “Tags communicate by modulating the external field and backscattering the commands to each other. Tag 1 sends data to tag 2 by backscattering RF CW signal from the external source. Tag 2 demodulates this signal and can respond to tag 1 in a similar manner. This explains the concept of tag-to-tag communication”.

2.2 Mandeep Kaur [5], “RFID does not require line of sight for the identification from a distance, and it is not like earlier bar code technology. It uses a vast set of unique ID’s than barcodes and can adopt additional data such as manufacturer, product type and measure environmental factors such as temperature”.

III. BLOCK DIAGRAM AND METHODOLOGY

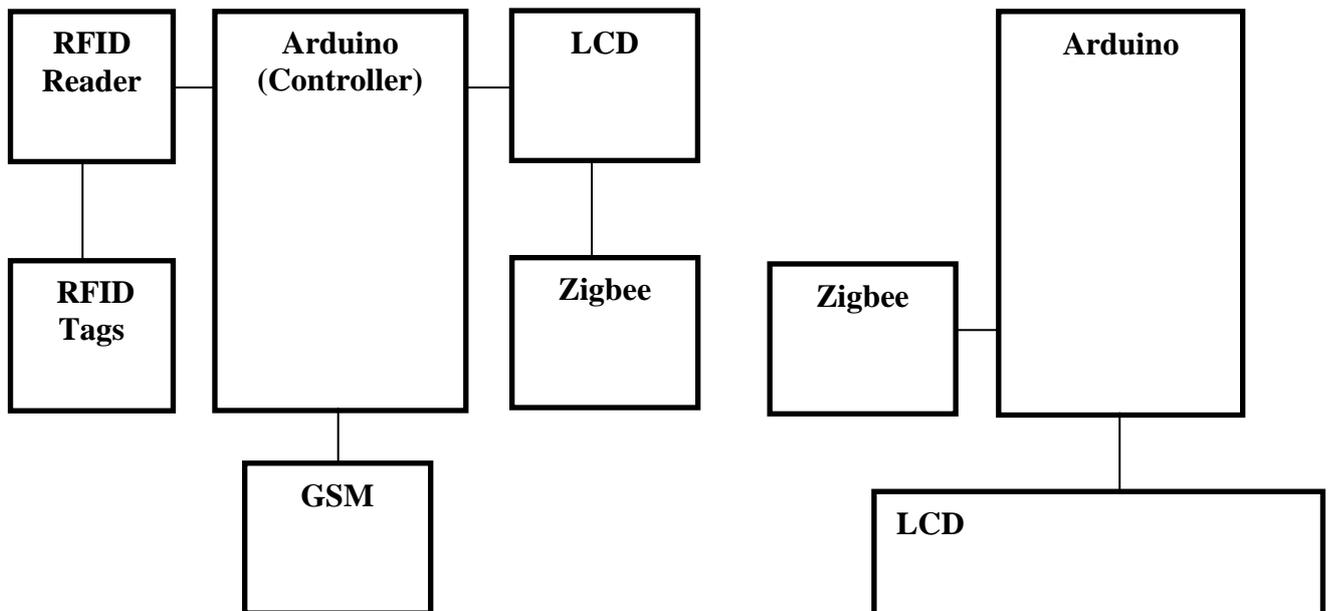


Fig2.1 Block Diagram

VEHICLE MODULE DETECTOR MODULE

The high frequency RFID tags operate at 13.56 MHz and read ranges between 10cm and 1m. They can be found anytime via the readers of the RFIDs and the networked database system and they can be managed throughout their life-cycle. [2] RFID tags are silicon chips with their IDs, radio frequency functions and some additional logic and memory. Most of the RFID tags are supplied with power through radio frequency communication from external readers. We are using two RFID tags, one for vehicle number plate and one for the vehicle itself. These tags are loaded with the vehicle details such as engine number, vehicle colour, VIN number, vehicle company, etc.

RFID readers are self-contained with their own batteries and antenna. Their wireless communication allows them to connect to a network and capture the data. The reader is programmed to read the data in such a way that when the data in both the tags are matched, it displays matched along with the vehicle details.

In case of vehicle theft or if they change the number plate, it can be detected using the reader with a display device which shows the details of vehicle. When details of RFID tag in vehicle mismatch with details of RFID of number plate it is displayed in the LCD of detector.

RFID TAGS AND READERS



Fig 2.2. Images of RFID tags and reader

IV. HARDWARE AND SOFTWARE REQUIREMENTS

Table 4.1

HARDWARE REQUIREMENT	SOFTWARE REQUIREMENT
<ol style="list-style-type: none"> 1. RFID Tags 2. RFID Readers 3. Arduino (Controller) 4. LCD 5. Passive Components 6. GSM module 7. Zigbee 	<ol style="list-style-type: none"> 1. Arduino

V. RESULTS

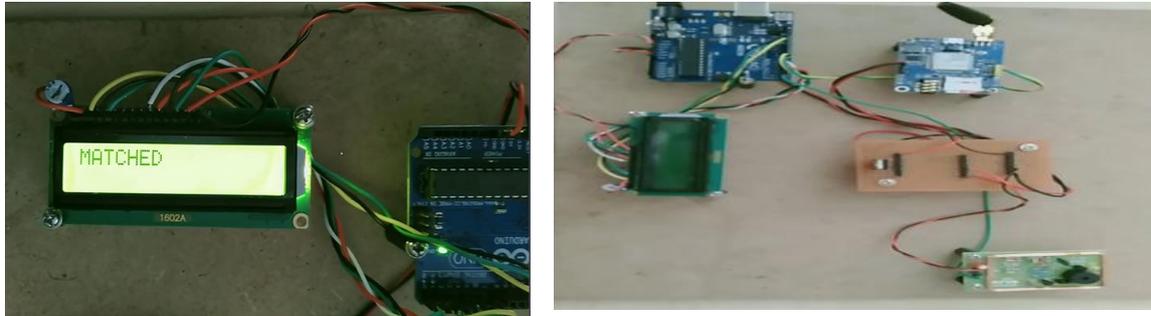


Fig 4.1 Result images

When the RFID tag in the vehicle and the RFID tag on Number plate have same information then ‘Matched’ is displayed on LCD. If the information does not match, then the LCD displays ‘Mismatched’ and the location of Vehicle is sent to the authorized user of the vehicle.

VI. CONCLUSION

With RFID rapidly becoming a pervasive technology, the security and privacy considerations of RFID tags are paramount. Designed a system in which RFID tags are embedded on to the vehicle and the reader will read the card details, and automatically validates the owner details and their corresponding data. If any mismatch found the system will automatically send alerts to the user. Another facility provided by the system is lost vehicle detection and/or vehicle robbery tracking. The owner and police department can see the vehicle location. So it will be much easier to find out the vehicle.

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