

Vehicle Anti-Theft and Regaining System

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Abstract: Automobile is the important modes of transportation of people. There is a drastic increase in the number of vehicle and this would lead to the increase in the theft of vehicles. This can be avoided by using anti-theft mechanism. To improve the security system of vehicle we use Radio Frequency Identification (RFID) Based Access Control Security system which helps to prevent unauthorized access to vehicles. RFID is operating at the frequency of 13.56MHz. The microcontroller is programmed to send signals to DC motor, relay, buzzer, LCD and GSM Modem. The RFID tag contains user's unique information is scanned by RFID reader. Once the information is matched the motor starts ON. Else, the motor is in OFF condition. The program for microcontroller is written in assembly language. Hardware simulation can be carried out by Proteus version 8.0. The RFID based access control system is used to increase the level of security

Keywords: RFID, LCD, GSM, Access control, unauthorized.

1. Introduction

The number of vehicle users in world keep on increasing each and every year. As we said earlier automobile is the important modes of transportation and this triggers probability of criminal activities especially in vehicle theft. According to times of India 1 vehicle stolen every four hours. Over 44k vehicle stolen only 5k have been found. The estimated worldwide auto-theft rate is 75.8 per 100000 residents. Security systems play an important role to prevent unknown user to access your vehicle. There are enormous identification technologies such as barcode, magnetic stripe, RFID applied in secured systems. Radio Frequency Identification (RFID) is an emerging technology and enhancing the segments of today's automatic identification data collection sector. It offers superior performance over other system because it is not optical technology like bar coding. It does not require any inherent line of sight between the RFID reader and estimated worldwide auto-theft rate is 75.8 per 100000 residents. Security systems play an important role to prevent unknown user to access your vehicle. There are enormous identification technologies such as barcode, magnetic stripe, RFID applied in secured systems. Radio Frequency Identification (RFID) is an emerging technology and enhancing the segments of today's automatic identification data collection sector. It offers superior performance over other system because it is not optical technology like bar coding. It does not require any inherent line of sight between the RFID reader and RFID tag.

In this system we use RFID tag which contains integrated

circuit that is used for storing, processing unique information, modulating and demodulating the radio frequency signal that are transmitted. RFID tag contains user's unique information, once this information matches the RFID reader, the motor turns ON else the motor is in OFF condition. RFID reader is connected to arduino It is an open source platform, which is actually a microcontroller. Arduino Integrated Development Environment(IDE) make it to write code and upload it.

2. Existing system

In existing methodology, they have used GPS and GSM technology. By using this technology, After the vehicle has been lost they can track the exact location of the vehicle and also the distance between the vehicle and the owner can be exactly measured. The owner will be notified by a message alert. In this technology they have just used the tracking system and there are some drawbacks in this technology.

A. Drawbacks

- The vehicle can be stolen using the duplicate key.
- The motor will be working even the key is duplicate and the
- alert will come only after the vehicle is reached to Some extent.
- The motor will not be turned off if the key is duplicate and this
- is the main drawback of this technology.

3. Proposed system

A. Bits and pieces together

In proposal we are using RF modules. RF modules includes both the RFID tag and RFID reader [3]. The RFID's are mostly used in the secured systems, so for the safety of our vehicle's we are using the RFID tags in our project. In this we are using Arduino nano, RFID reader and the motor driver will be connected to the Arduino nano pins. RFID reader will always have an RFID tag which contains a unique number. The vehicle will be installed with a RFID reader and the user will be provided with the key which also contains the RFID tag and the motor of the vehicle will start only when the RFID tag matches with the RFID reader of the vehicle. If the RFID tag doesn't match with the vehicle's RFID reader the motor will not start and a buzzer alert will be enabled in the vehicle which will alert

the owner instantly.

B. Advantages

- In this technology there is no way that the vehicle will be stolen using the duplicate keys.
- The wire starting of the car does not work in this scenario.
- The most important advantage of our project is that the vehicle's motor does not even start when the RFID reader could not find the matching key card of the vehicle. So, even after unlocking the door the thief could not start the car and also the buzzer will notify the owner instantly.

4. Block diagram

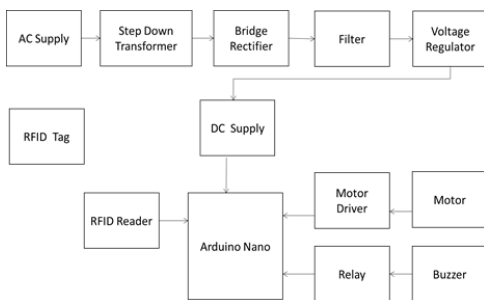


Fig. 1. Block diagram

A. RFID module

RFID is a flexible technology that is convenient, easy to use, well suited for automatic operation. Radio Frequency refers to electromagnetic waves that transfers data between an item to which an RFID device is attached to the RFID reader. RFID tags are classified into active and passive tags. Active tags are capable of transmitting to the reader independently. Passive tags needs an external excitation to transmit the code. We use passive type of tag operating at the frequency of 13.56MHz.



Fig. 2. RFID Reader and Tag

B. Motor driver

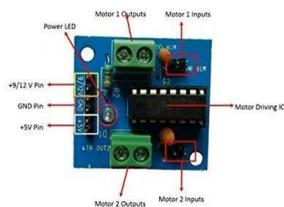


Fig. 3. Motor Driver

on either direction. It is a 16 pin IC which can able to control a set of two DC motors simultaneously in either direction. The concept behind this motor driver is that they use two h-Bridge circuit inside the IC.

C. DC motor

It is rotatory electrical machine that converts electrical energy into mechanical energy. It is used to periodically change the direction of the current flow. The speed of the motor can be controlled by using variable supply voltage or changing the strength of a current in its field winding.



Fig. 4. DC motor

D. Step-down transformer

The transformer has more turns of wire on the primary coil as compared to the turns on the secondary coil. This reduces the induced voltage running through the secondary coil which in turn reduces the output voltage Thereby, Increasing the current.



Fig. 5. Step-Down Transformer

E. Buzzer

Buzzer is a device which produce the sound under certain constrains as specified by the user. It is also called as beeper and is used as audio signaling device.



Fig. 6. Buzzer

F. Arduino NANO

Arduino Nano is very much similar to the arduino UNO. They use same processor but the difference between them is the size of the UNO is twice as big as Nano. It is an open source hardware user community that designs and manufactures single

L293D motor driver is used which allows DC motor to drive

board micro controller. FLASH and EEPROM are used for storage. It is programmed using the features of assembly language.



Fig. 7. Arduino Nano

G. Use of Simulation software

In our project, we have used proteus 8 software which is used to design schematic diagram, simulation and Printed Circuit Board layout design. We also used Arduino software. Arduino is an open source platform based on an easy to use hardware and software. It consists of a circuit board, which can be programmed by readymade software called Arduino IDE (Integrated Development Environment. It is used to write and upload the code to the board. You can control your board functions by sending set of instructions to the microcontroller on the board via Arduino IDE. Arduino IDE is programmed is using simple version of C, C++ and Assembly language.

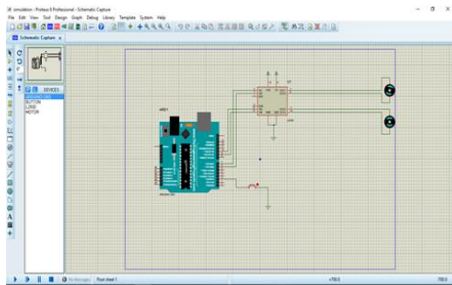


Fig. 8. Simulation result

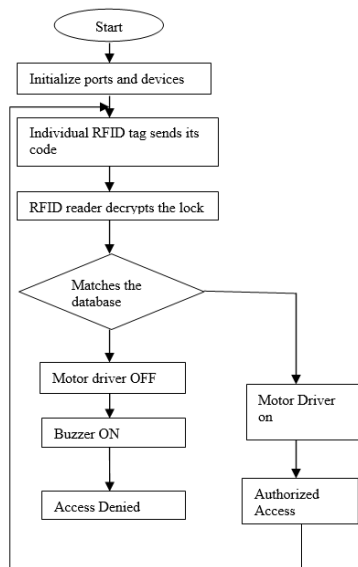


Fig. 9. Flow chart

5. Get peer reviewed

From the research of our project we found that in the existing system the motor of the vehicle can be turned on even if the key is duplicate. The alert system will alert only when the vehicle has been moved from the place and the owner will get only the location of the vehicle once it's stolen. We also found that the existing system which is installed in a vehicle can easily be removed from the vehicle once the vehicle is stolen.

6. Implementation

The RFID reader and tag will have unique number and this unique number is given to the passenger. When the passenger swipes the card at the door of a vehicle, it will automatically decrypt the door and will indicate that "AUTHORIZATION ACCESSED" and the motor will automatically turns ON. If the tag doesn't match the reader, then it will encrypt the door and indicate as "ACCESS DENIED" and motor will turned OFF and the buzzer will turned ON to indicate the user that someone is trying to larency their vehicle.

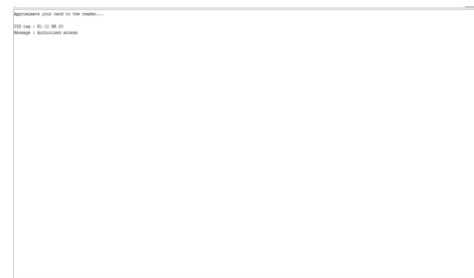


Fig. 10. Authorization access result



Fig. 11. Authorization denied Result

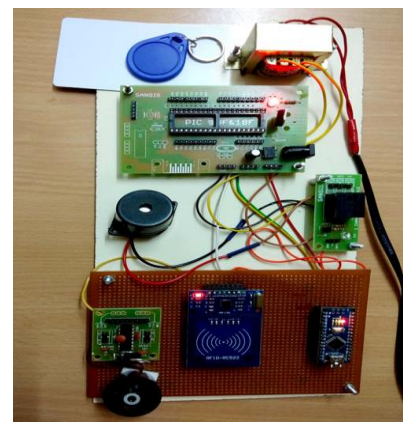


Fig. 12. Hardware Assembly

7. Conclusion

The vehicle will be installed with an Anti-theft and regaining system which will be having the RFID reader inside it. The user will be provided with the RFID key cards which will be readed by our system which is installed in the vehicle. Once this system is installed in a vehicle, the user must have the same RFID as it is installed in the vehicle. If the thief tries to steal the vehicle by using the duplicate keys the motor does not turn on and the buzzer will start to ring loudly which alert the owner of the vehicle instantly. The main advantage of our project is that the vehicle will not even turn on if the key does not match with the RFID reader.

8. Future work

For future work, this system can be developed with a technology which consists of a finger print sensor and also with a small camera which will be capturing the live photos of the person who is using the car and sending it to the owner's mobile instantly.

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References

- [1] Muhammad Tahir Qadri, Syed Shafi-Uddin Qadri, Rafia Khalid, M.Yasir Khan, "Automated Profile Vehicle Using GSM Modem,GPS And Media Processor DM642", International Conference on Computer Engineering and Applications, Vol. 2, 2011.
- [2] Abhay P. Bagade, "Cell Phone Usage While Driving Avoidance with GSM-RF based Accident Emergency Alert System", IJARCCCE, Vol. 2, Issue 5, May 2013.
- [3] M. Jyothirmai, D. Prashanth, J. Vamsi Krishna, "Automatic Toll Gate Management and Vehhicle Access Intelligent Control System Using Arm 7 Microcontroller", IJECS, vol. 3, no. 11, November 2014, pp. 9040-9042.
- [4] K.S. Alli, C. Ijeh-Ogboi, S. L. Gbadamosi, "Design and Construction of a Remotely Controlled Vehicle Anti-Theft System Via GSM Network", International Journal of Education and Research, Vol. 3 No. 5, May 2015.
- [5] M. Geetha, Priyadarshini. T, Sangeetha, B. Sanjana. S, "Anti-theft and Tracking Mechanism for Vehicle using GSM and GPS", Third International Conference on Science Technology Engineering & Management(ICONSTEM), pp. 5090-4855, January 2017.
- [6] Tareq Monawar, Shafayat Bin Mahmud,Avijit Hira, "Anti-theft Vehicle Tracking and Regaining System with Automatic Police Notifying Using Haversine Formula", 4th International Conference on Advances in Electrical Engineering, pp. 5386-0869, September 2017.
- [7] Peter. O. Ohiero, Julius. U. Ukang, Okpogo, Ota Ota "Vehicle Tracking System Using GPS-GSM Technology", IRJET, vol. 5, no. 7, July 2018.
- [8] Viska Mutiawani, Sarah Rahmany, Taufik Fuadi Abidin, "Anti-theft Vehicle Monitoring and Tracking Android Application Using Firebase as Web Service", International Conference on Electrical Engineering and Informatics (ICELTICs), pp. 5386-6140, September 2018.
- [9] Ramalatha M, Ramkumar. A. K, Selvaraj. S, Suriyakanth. S, "RFID Based Personal Medical Data Card for Toll Automation", Elysium Journal of Engineering Research and Management, vol. 1, Special Issue 1, September 2014.
- [10] S. Boopathi, K. Govindaraju, M. Sangeetha, M. Jagadeeshraja, M. Dharnasu, "Real Time Based Smart Vehicle Monitoring and Alert Using GSM", International Journal of Advanced Research in Computer and Communication Engineering, vol. 3, no. 11, November 2014.