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System for Authentication and Security of User in Car

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Abstract

In current era, numbers of car on our roads are increasing day by day, but there is also need of safety factors. Now a day's car comes with lots of safety features. To increase safety of car and the driver the present invention use various safety features and to increase security of car to reduce human efforts. One of the important security systems in cars is door access control. Most doors are controlled manually, through the use of handles and locks with key to operate the locks. The present invention proposed the used of RFID to use for opening of car door automatically. And essential safety features that need to be installed in car are that the car engine will start if and only if when driver is wearing a seat belt.

Keywords*- RFID Tags and Reader, Raspberry pi 3, Sensors.*

I. INTRODUCTION

The Number of vehicles on roads is increasing day by day, also the technology has developed but the safety factor is always needed to be considered. These technologies can be used in the security of cars to reduce human efforts. One of the important security systems in cars is door access control. Now a day's Most of doors are controlled manually, through the use of handles and with key to operate the locks.

The proposed system uses RFID tags and reader from preventing any unauthorized person from accessing car door. There are multiple ways to start car engine. We start car engine by using keys or startup push button. But mostly what happens even though drivers start the car they don't wear seatbelt and because of that there are multiple chances that they suffer severe injuries if accident happens.

The proposed system provides security as well as convenience to the driver, because for example a family member has
key and is not available at that time then it may be inconvenient to other family members because they don't have the key. To resolve this problem the proposed system introduces the use of RFID to access the car door.

II. LITERATURE REVIEW

In April 2013 Shiv Sutar, Kalyan Kapratwar, Rahul Rayate. proposed a system in which the Accessing of car door using USB provided to car owner and third party but authenticated person.. Their approach is to make secure car access by the USB pen drive through pass code is send to the car owner . [1]

In Taiwan Jie-Ci Yang , Chin-Lun Lai , Hsin-Teng Sheu and Jiann-Jone Chen. introduced a Intelligent Automated Door Control System Based on a Smart Camera. **:** This system can first identify a person from the scene, and track his trajectory to predict his intention for accessing the entrance, and finally activate the door accordingly [2]

In Chennai R. Prakash. l, K.Saikrishnai. l, C. Sathishkumar. l, and S. Vivekanandan. l proposed a system consists of a ring gear setup which lies below the seat. The seat belt is mounted on the ring gear which is meshed with a pinion driven by a motor. Provisions are made to adjust the ring gear setup based on the position of the buckle which can be altered according to the convenience of the passenger. [4]

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Vehicles' are normally locked and unlocked with physical key. The remote control locking and unlocking system is used for car door access. This is convenient feature for the driver.
A remote control locking and unlocking entry system built into an ignition key. Pressing the button of the one of the key unlocks the car door and by pressing another button locks the car door. And it creates the chirp sound when unlock and lock buttons are pressed. And now days it is widely in used. Keyless remotes uses the radio signals to unlock and lock the car doors.

In Remote control keyless system the driver need to keep the key with them. If the driver leaves the vehicle and key is in the car and the car will locked, it is will be inconvenient for the driver to access the car at that time. But our RFID car door locking and unlocking system provides security as well as convenience to the driver, because for example a family member has key and is not available at that time then it may provide inconvenience to other family members because they don't have the key. To resolve this problem we introduce the use of RFID to access the car door.

Another scenario may be that the car owner lost his car keys and there is possibility the unauthorized person gains access to key then he can unlock the car door. To avoid this scenario the owner can use RFID System to unlock the car door.

Another advantage of the present invention over previous system is that in case the user lost his keys he needs to make another key or keep multiple copies of key to give it to family members to access the car it is not very feasible and inconvenient. Instead of this we use RFID system in which even if the car owner lost RFID tags then authorized person can restrict that particular identification number of RFID tag so unauthorized person who is having that particular RFID tag will not be able to use.

The present invention uses RFID tags and reader from preventing any unauthorized person from accessing car door.

There are multiple ways to start car engine. We start car engine by using keys or startup push button. But mostly what happens even though drivers start the car they don't wear seatbelt and because of that there are multiple chances that they suffer severe injuries if accident happens

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III. SYSTEM ARCHITECTURE & REQUIRMENT ANALYSIS

The proposed system suggests use of Radio Frequency Identification (RFID) for opening of vehicle door automatically.

RFID is a technology to record the presence of an object using radio signal.

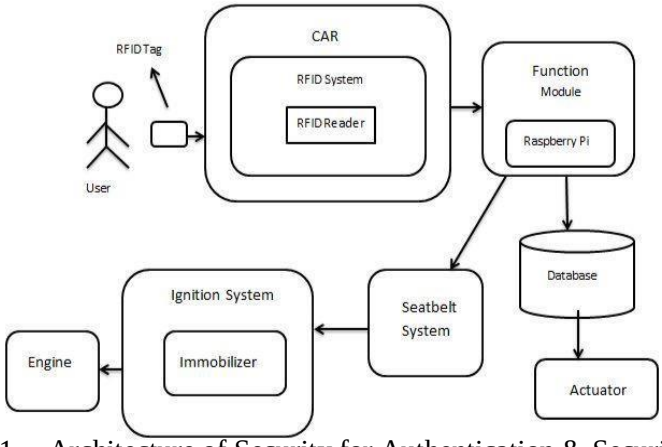

Fig. 1. Architecture of Security for Authentication & Security of user in car system.

Referring now to Figure 1, it illustrates vehicles door access using Radio-frequency identification (RFID). RFID is a technology to record the presence of an object using radio signals. The proposed system use of RFID for opening of vehicle door automatically. In proposed system the RFID tag & RFID reader is used for vehicle door access. The proposed system uses technology in which a RFID tags uses for vehicles which includes a RFID reader connected to a vehicle's door for preventing an intruder from unlocking the vehicle unless a proper RFID tags detected.

It illustrates how the proposed system uses RFID to access and automatically open door. The process begins when RFID receiver receive a signal from RFID tags, then signal is further transmitted to raspberry pi through Bluetooth, the system then check the database for the RFID holder's information, then a signal is send through raspberry pi to body function module and to actuators . Actuators will work only if RFID card is authorized and then door will open.

In above Figure seat belt mechanism illustrate. In this module of system we are making sure that the driver is forced to wear seat belt otherwise the car engine will not start. This module uses sensor to sense whether the seat belt is successfully plugged in seat belt socket.

Ignition mechanism to start the car engine is as the negative terminal of the battery is connected to key lock, when the driver starts the engine the negative current passes to relay and then relay regulates the current and passes it to solenoid, at the same time positive current of battery is passed to solenoid via positive terminal. Then Spark is generated which push the gear and engine start.

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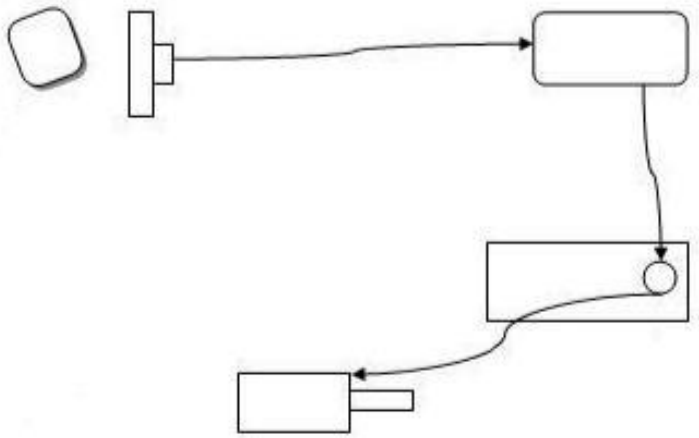

Fig. 2. Working of RFID

Referring now to FIG. 2, it illustrates how the present invention uses RFID to access and automatically open door. The process begins when RFID receiver receive a signal from RFID tags, then signal is further transmitted to raspberry pi through Bluetooth, the system then check the database for the RFID holder's information, then a signal is send through raspberry pi to body function module and to actuators. Actuators will work only if RFID card is authorized and door will open.

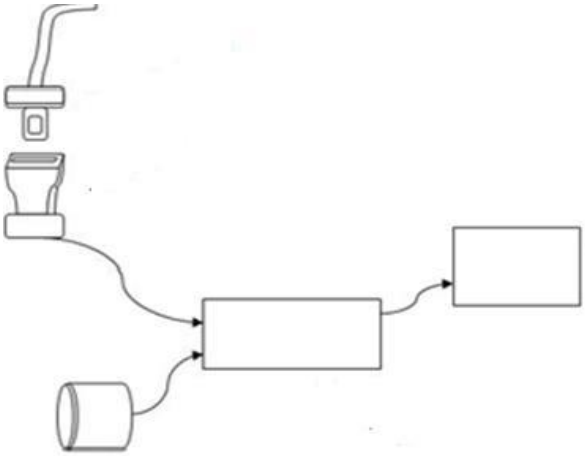

Fig. 3. Seat Belt Locking Mechanism

Referring now to FIG. 3, it illustrates the seat belt mechanism. In this module of system we are making sure that the driver is forced to wear seat belt otherwise the car will not start. This module uses sensor to sense whether the seat belt is successfully plugged in seat belt socket.

Advantage

Avoid losses due to accident

Prevention is better than cure, Due to compulsory seal belt It is responsible to prevent damages from accident as well as It protects driver from any harm. Most of the accident will cause death due to unavailability of seal belt.

Avoid unauthorized entry

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RFID door access will prevent unauthorized user to get entry into the car. It is responsible for avoid loss of Car/ four wheeler.
It is also responsible to inform authorized person if any unauthorized attempts happen with his/ her Car.

Increase rate of human security
It will increase rate of human security in the car. So it is responsible to decrease fear ration of the person to use Car.

System is not limited with this. User has to carry his/her credential with respect to RFID is concern. System will not come into functioning unless and until user will not wear the seat belt while driving. In more precise way OTP is added, if RFID credential is successful then system will generate OTP (one time password) and user have to provide OTP credential to the system. In this way system can restricts to misuse of RFID credential from unauthorized access. Moreover some biometric credential will limit the uses of vehicle particularly to the authorized person, but it again cause to some drawback. Car door access retina authentication from large distance may be possible into this system. By checking the position of retina car door will lock will open and in reverse it will get locked.

IV. IMPLEMENTATION

As per discussed in above system requirements and proposed model, we can add different types of sensors in car so as to provide more security. We can fit speed sensor in car's anti-lock breaking system(ABS), which automatically transmits your vehicle's speed to switches and then that information is shared with application on which this is to be implemented and pop up message is given to registered mobile number.

This is one of the part of implementation for car security. On other hand, when information of speed is given to switches at the same timing child lock or door lock systems are activated automatically. So that any child sitting in the car could not open the door when car is rushing very fast to destination. When the speed of car decreases sensors will send that value to locking mechanism, which will be set with zero value parameter, as soon as car will stop i.e.speed is zero that locking system will release the outer lock so anyone seating inside car can willingly open the door.

V. FUTURE SCOPE

This mechanism of security of user in car is very much important as far as vehicles are used on roads on a large scale. Security mechanism also be implemented for following scope

V.1 Pop up messages given to registered mobile numbers on rash driving or in case of accidents [7].
An android application is developed in which device i.e. car is connected with sensors, which on rash driving will give pop up message to registered mobile number through application server. Application server is connected to GPS (Global Positioning System)and through which device is tracked.

V.2 Indicator bip or sound on fuel level indicator.
In this mechanism liquid sensors are attached at lowest level of fuel box in the car. As soon as fuel level will get decreased sensor will give any sound bip or indicator sound so that user can understand that fuel level is on its lowest value.

V.3 Fog detection sensors are used to avoid road accidents. In this module, fog detection sensors are fitted to head light side of the car , it will analyze the fog percentage , it will be assigned with some threshold value, when percentage of fog is above that value, then it will give notification that its very danger to ride a car in that environment.

V.4 Sudden break, sudden left, sudden right detection by sensor and messages given to registered mobile number.

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If unfortunately breaks of the car will get failed, then sudden left-right may be taken by user. So for that immediate message will be given to registered mobile number. Also if sudden break is applied then it may be for any obstacle in the road otherwise in case of accident, pop up messages given to the registered mobile number to through this application [7].

VI. CONCLUSION

The proposed system is to insure user security and safety in Car. its purpose is to reduce human efforts and prevent vehicle accidents. Its efficient and effective approach in the modern era of motor vehicle.

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