

Smart Security System for Motorcycle Utilizing RFID with Apps

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ABSTRACT: Recently, motorcycle theft is at a staggering high. This project's goal was to develop Smart Security System for Motorcycle by using RFID with Apps. The objectives were to design a modern hi-tech security and a keyless system to motorcycle security framework using Radio Frequency Identification Detection (RFID) and Android Apps and to develop the connection between the RFID and Android Apps functionality to the motorcycle system for a better safety system. Arduino Nano microcontroller was set as the core controller for governing the input and output of this project. This security anti-theft system is built using the Radio Frequency Identification (RFID) for authority detection purposes. Besides, Android Apps are adopted using Bluetooth as the communication devices between the owners through keying in the username and password in the android apps. Therefore, motorcycles will be more secure with this new anti theft system.

Keywords: *RFID, Android Apps, Smart Security, Motorcycle security framework*

1. INTRODUCTION

Motorcycle thefts have been prevalent in the nation for years. The reasons for this are due to the ease with which motorcycles may be traded and the absence of security measures [1]-[6].

The Scorpio Ride "Core" Cellular Motorcycle Alarm and GPS Tracking System, which uses an iOS or Android app and a module placed inside the bike to notify users by Short Message Service (SMS) [1,] is one such option for motorcycle security systems. It has the ability to track. During a theft attempt, the location of the car is known, but there are no preventative measures in place. RFID has been used in several research [2]-[6]. A vehicle parking system based on RFID technology that employs both GSM and RFID technologies. RFID readers were used in conjunction with other applications in references [3]-[6].

The current security and anti-theft system was developed with the aim of authority detection being achieved via the use of Radio Frequency Identification (RFID). Another important thing to mention is that Android Applications were adopted as communication devices between owners via the usage of Bluetooth, which was accomplished by entering the user name and password into the Android apps. The Arduino Nano microcontroller was chosen as the central controller for this project, with its input and

output being controlled by it. Designing a modern hi-tech security and keyless system for the motorcycle security framework using Radio Frequency Identification Detection (RFID) and Android Apps, as well as developing the connection between the RFID and Android Apps functionality to the motorcycle system for a better safety system, were the primary objectives of this study.

2. METHODOLOGY

2.1 Designing the Smart Security System for motorcycle

The methodology focused on designing the smart security system for motorcycle. Figures 1 and 2 show the design and system operation.

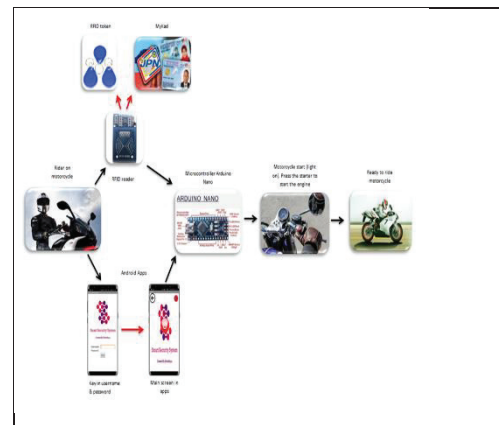


Figure 1 Smart Security System design

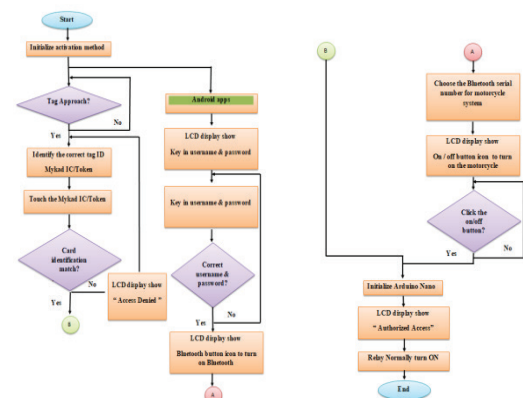


Figure 2 System Operation

While Figure 1 illustrates the design, Figure 2 shows a flow chart where the Arduino Nano board go about as a "central commander" to control the stream of the framework.

3. RESULTS AND DISCUSSION

3.1 The Smart Security Design and system operation

In terms of Design, the Smart Security System for motorcycle was using RFID with apps. If the rider wants to use the RFID system, the rider must have a registered token or Mykad to enable the system.

For authorized accessibility: If the EPC number of the authorized tag matched to stored EPC in the module, the LCD showed welcome content on the serial screen. The relay will change from an open circuit to closed circuit, enabling the motorcycle to switch circuit. Figure 3 shows a condition for authorized accessibility.

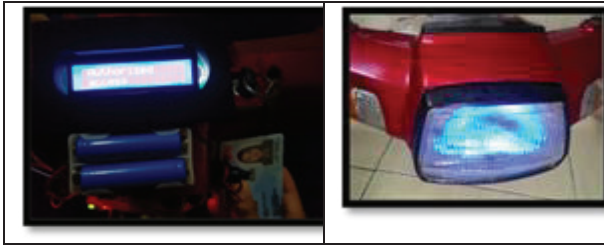


Figure 3 Authorized accessibility

For unauthorized accessibility: The program has proclaimed that the token tag ready to access to the framework while others will be denied. "Access Denied" appeared on the LCD screen. The transfer changed to open circuit and no move was present in the start circuit of the motorcycle. Hence, the relays remove the voltage supply from the batteries. In the meantime, the hand-off emitted red LED.

3.3 RFID Analysis and Bluetooth analysis

RFID and Bluetooth analyses were performed and yield positive results where the security system estimated range by using RFID tag were the minimum reading of 0.5CM at 0.3 seconds detection speed and the maximum reading range was 5 cm at 3 seconds detection speed. Thus, the reading range was quite fast and very flexible to carry the RFID tag everywhere. In addition, the position of each RFID tag is flexible.

The security system via Bluetooth was estimated by each 30 seconds, the nearest range was 0.3M at 30 seconds of detection and the maximum reading range was 3 meter at 300 seconds of detection. Thus, the reading range was quite unusual and not very flexible to use it as the reading of the seconds took 30 seconds minimum to detect. Each device is equipped with Bluetooth connectivity with features that requires both software and hardware components.

3.4 Discussion

The framework is to some extent in rhyme with other studies on the Android Apps security system for a motorbike [2]-[6]. RFID innovation is one of the trusted

frameworks that is able to actualize on the security framework and the Android Apps system providing Bluetooth to connect to the motorcycle security system. This is in rhyme with other studies [2]-[6]. This study provides the preventive measures during theft attempt.

4. CONCLUSION

In conclusion, this security anti-theft system is built using the Radio Frequency Identification (RFID) for authority detection purposes. Besides, Android Apps are adopted using Bluetooth as the communication devices with the owners through keying in the username and password in the android apps. Therefore, motorcycles will be more secure with this new anti-theft system. This study is beneficial for Motorcycle industry. For future study, the IoT applications can be utilized to control the security framework rather than the short-range RFID framework.

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