

A Design Thinking Approach on Keyless Electric Scooter with Anti-Theft System

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Abstract

Vehicle security is an important issue these days due to the rising number of vehicle thefts. Another issue with vehicles is handling its keys. Here, we propose a solution to this problem by Using a fingerprint authenticated vehicle starter system with signal transmitting and receiving device is used for just unlocking the two-wheeler's handle bar. This system is designed using Arduino ESP32 MCU. Only when the brake lever is depressed will the fingerprint be recorded. If we need to give the two-wheeler to someone else, we can enter the six-digit pin on the number pad.

Both methods are available for user convenience. The two-wheeler will shut off and the handlebar will automatically lock when the signal transmitter leaves its range automatically. The project only unlocks the two-wheeler and makes use of Arduino components, which can send and receive signals. If we need to give the two-wheeler to someone else, we can use the number pad to input the six digit pin, and then they can drive it.

The fingerprint will only register to access the two-wheeler if the brake lever is depressed. When the signal transmitter's range is exhausted, the two-wheeler will cut off and the handlebars will automatically lock. The sensors and gadgets will be controlled by an Arduino microcontroller.

Keywords: Design Thinking, Fingerprint Unlock, Keyless Entry, Safe Scooter

1. Introduction

- A remote keyless system (RKS), also known as keyless entry or remote central locking, is an electronic lock that controls access to a building or vehicle by using an electronic remote control (activated by a handheld device or automatically by proximity).
- Widely used in automobiles, an RKS performs the functions of a standard car key without physical contact. When within a few yards of the car, pressing a button on the remote can lock or unlock the doors, and may perform other functions.
- A remote keyless system can include both remote keyless entry (RKE), which unlocks the doors, and remote keyless ignition (RKI), which starts the motor/engine.

2. Empathy

- The biometric system provides a secure and hassle-free way to start the vehicle and the also we can use dial pad for entering six-digit pin.
- By this technology we have more safety against traditional vehicle entry system

- The two-wheeler will shut off and the handlebar will automatically lock when the signal transmitter leaves its range automatically.

3. Define

- The project only unlocks the two-wheeler and makes use of Arduino components, which can send and receive signals.
- If we need to give the two-wheeler to someone else, we can use the number pad to input the six-digit pin, and then they can drive it
- The fingerprint will only register to access the two-wheeler if the brake lever is depressed. When the signal transmitter's range is exhausted, the two-wheeler will cut off and the handlebars will automatically lock
- The sensors and gadgets will be controlled by an Arduino microcontroller.

4. Ideate

- Designing an efficient device which is reliable and easy to work with.
- We are going to mount the devices which are connected in the Arduino device and it gives/ receives signal from the sensors.
- By this technique, it is safer and less power consuming.
- The project outcome is easy to access and trust worthy to the customers

Table 1: Components Used

1. Finger print Reader	7. Key Pad.
2. ESP32.	8. LCD Display
3. Bread Board.	9. Hub Motor
4. Jumper Wires	10. Solenoid type lock.
5.12V Relay	11. Power Supply
6. GPS Module	

The above data is pictured in the next Figure.

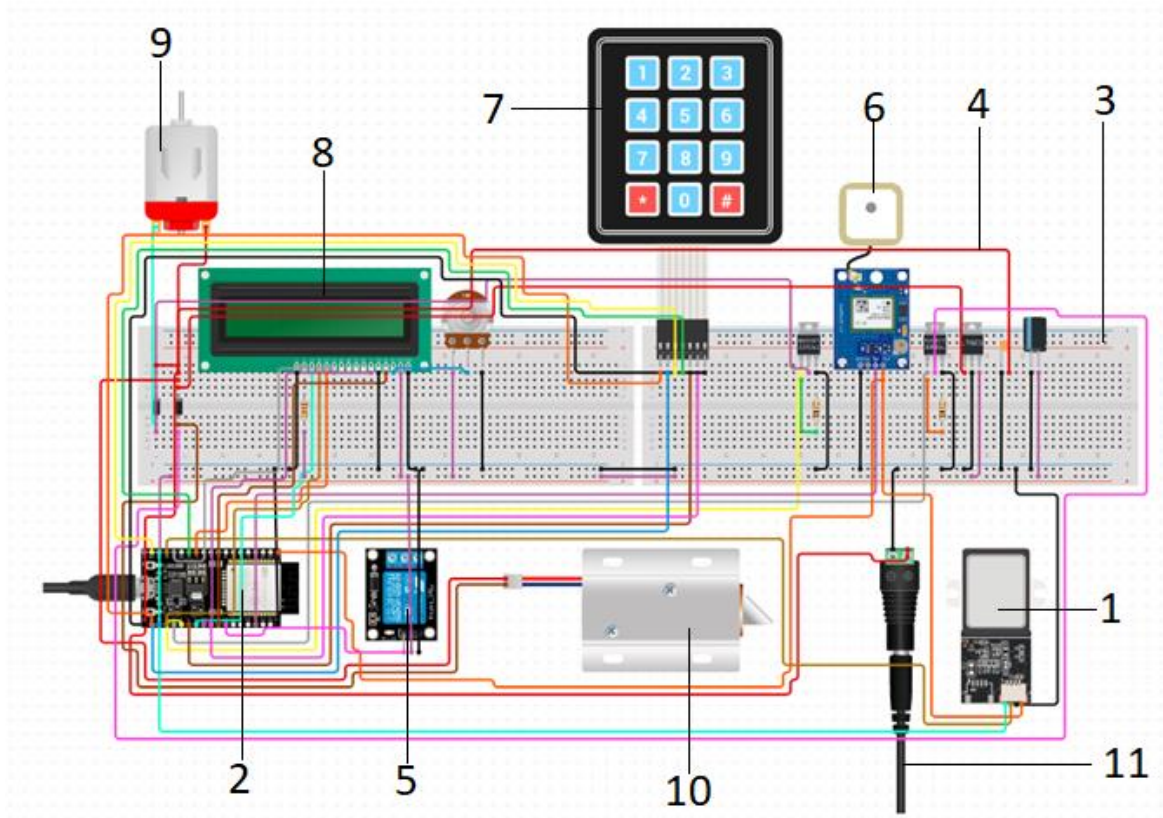


Figure 1: Block Diagram

5. Prototype

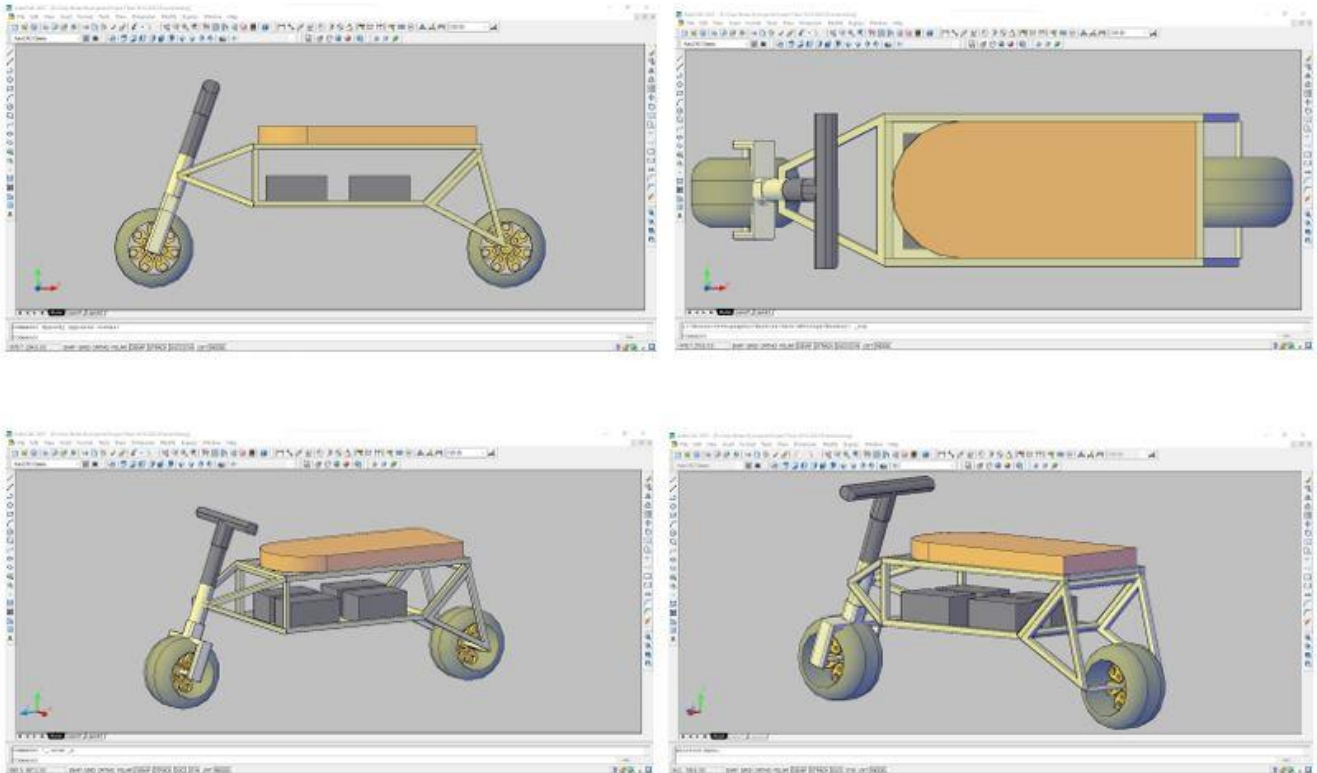


Figure 2: Prototype

6. Objective of Project

The objective of our project is to be key less operated and create a potentially safe two wheelers. The Following Below:

- It should be able to avoid theft and vehicle misuse.
- It should be responsive and safe for public usage
- It should keyless and easy to use.
- These days people switch to smarter and easier way of transport, we provide such facility.
- Other than authenticated users, 4-digit pin can also be used for driving.

7. Problem Formulation

These days, car theft can occur anywhere and at any time. Due to their ease of access with the key function, two-wheelers account for the majority of thefts. Due to this problem, we have Dialpad and biometric recognition integrated for user authentication. Finally, a continuous signal transmitter and receiver is used to open a car that is within reach.

8. Methodology

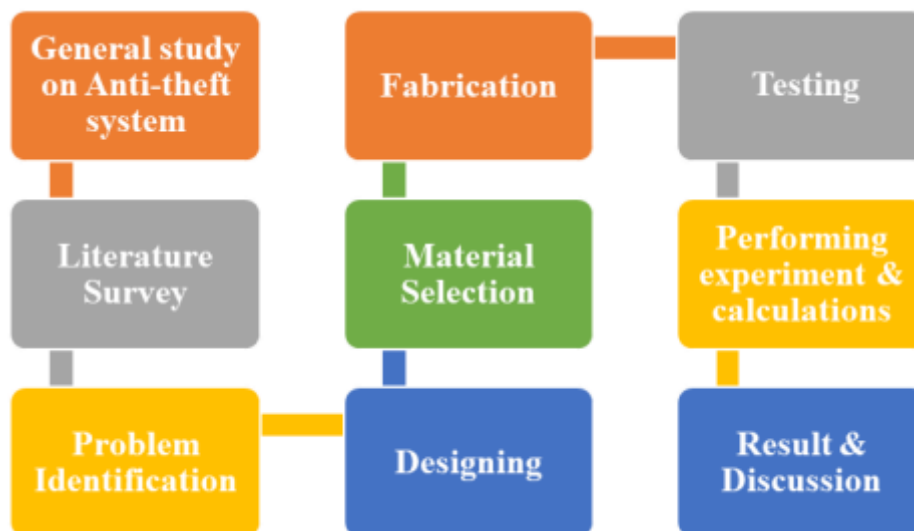


Figure 3: Methodology for undergoing project

The project is proceeded according to the planned methodology. First the general study is made on the basics of keyless electric scooter with anti-theft system working of its various applications, advantages and disadvantages and their future scope. First the general study is made on the basics of keyless electric scooter with anti-theft system advantages and disadvantages and their future scope. The concept of keyless electric scooter with anti-theft system.

Before designing, the planning is done for the outline of the project. According to that, the anti-theft system is to be made in a ESP32 Then the design process is carried out as per the planned dimension. The model is designed in the CAD software. Then the next process is to select the material for each component. The working each component is analyzed and studied, according to its application the material will be selected. The next step is the fabrication of the anti-theft system. The material will be procured and the fabrication will be according to the planned design. Then after fabrication certain test were conducted.

Working Principle

When the mobile phone comes near the Esp32 MCU, signal transmits from the mobile to the receiver, this continuously checks the distance between the mobile and the MCU. When the mobile is near the vehicle, the scooter's handlebar automatically unlocks. After handlebar unlock the fingerprint sensor is switch ON. The sensor switches ON position only after the mobile is near the vehicle. Once the mobile is out from the range then the scooter's handlebar will lock immediately. The fingerprint sensor is now accessible for placing the finger for vehicle authentication. Once the fingerprint is authorized the scooter can be driven accordingly. If the scooter is to be given to other peoples which are not authenticated. They can dial 6-digit numbers in the number pad on the dashboard of the scooter.

9. Solenoid Handlebar Lock



Figure 4: Solenoid Handlebar Lock

A solenoid lock is a latch used for electrical locking and unlocking. It is available in locking, keeping, and unlocking power-on mode types, both of which can be used under various conditions. The power-on unlocking type enables unlocking. Solely when the solenoid is activated. A door of this kind is secured and not opened during a power outage or wire cut, offering good safety. This kind is frequently used in places where crime prevention is required.

10. USAGE OF ESP32

The ESP32 family of system on a chip microcontroller features integrated Wi-Fi and dual-mode Bluetooth and is inexpensive and low power. The Tensilica Xtensa LX6 dual-core or single-core microprocessor, Tensilica Xtensa LX7 dual-core, or a single-core RISC-V microprocessor are used in the ESP32 series, which also has integrated antenna switches, RF baluns, power amplifiers, low-noise receive amplifiers, filters, and power-management modules.

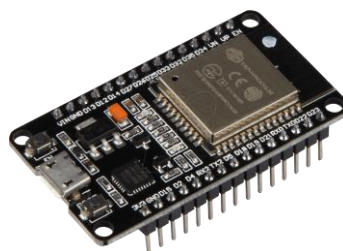


Figure 5: ESP32

11. Fingerprint Sensor

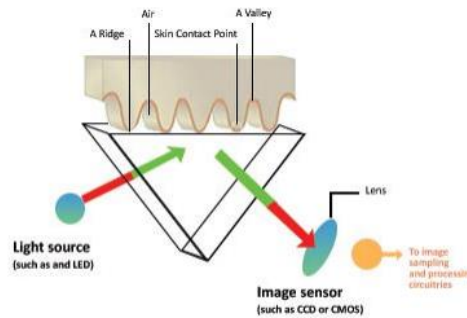


Figure 6: Working Principle of Fingerprint Sensor

This fingerprint scanner has two processes: enrollment and fingerprint matching. This R307 scanner requires that each module recognize the address. When this module communicates with the system, each data source is delivered as a data package that includes the address item. The scanner will only respond to data packages whose value corresponds to the address value.

12. Conclusion

The biometric system provides a secure and hassle free way to start the vehicle and the also we can use dial pad for entering six-digit pin. By this technology we have more safety against traditional vehicle entry system. The two-wheeler will shut off and the handlebar will automatically lock when the signal transmitter leaves its range automatically. The modified keyless electric scooter with anti-theft system has been fabricated successfully according to the designed value. The coding includes etc. Hence the keyless electric scooter with anti-theft system is designed, fabricated and the required output has been obtained.

13. Acknowledgement

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