

# FINGERPRINT BASED CAR IGNITION SYSTEM USING ARDUINO AND RFID

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**Abstract:** - This effort focuses on keeping autos safe from unwanted usage and preventing theft. Only approved individuals can start the vehicle using a biometric fingerprint security system. This protects the car. The use of security systems is expanding and is becoming increasingly required around the world. Biometrics such as fingerprints are commonly employed in factories, buildings, and schools. This project is concerned with vehicle security, which leads to the development of an anti-theft system in a car using the ATmega328. To detect the fingerprint, an inside-the-vehicle fingerprint sensor is used. The fingerprint sensor data reading obtained in the ATmega328 is analyzed using the pre-assigned data. The engine ignition system starts after recognizing the person as the car owner or an authorized fingerprint user who can take control of the car. If an intruder is present, the engine will not start. Other security systems can be hacked, whereas in this case, a fingerprint is used as the key, which is unique to each individual and thus provides improved security. We also used an RFID sensor for the car's ignition. If the fingerprint sensor fails, the RFID tag can be used to start the car by simply scanning it. In the event that the fingerprint sensor fails, this code will be stored in the RFID tag he/she is carrying.

**Keywords:** - Ignition system, Fingerprint, RFID, Vehicle.

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## I INTRODUCTION

The use of biometric-based systems has grown at an exponential rate in the twenty-first century. This is due to tremendous progress in this field, which has allowed them to lower their prices. Biometrics is quickly becoming a cutting-edge method for security systems. Biometrics are used to provide secure access to major operating systems such as ATMs, cellular phones, automobiles, laptop computers, offices, and other items that require authorized access. Biometrics have made significant changes in security systems, making them more secure, efficient, and cost-effective than before. The fingerprint biometric security system is widely used. Because each person's finger is unique, this method is more secure. Vehicle security is becoming increasingly important these days. More vehicles are stolen and cannot be recovered. A security system, such as a fingerprint system, can help to reduce theft, particularly in automobiles. Fingerprint sensor and Arduino are combined. The vehicle's starting system has been modified. The basic connection is from the ignition switch to the voltage regulator, then to the Arduino to turn it on and off, and when input is given to the fingerprint sensor, it scans the finger. Matching fingerprints will activate the relay that controls the starter relay. This will start the engine. The fingerprint sensor will then turn off. If no finger was scanned or the image did not match, it will display finger not found. Please try again. The fingerprint sensor will not start the vehicle engine. It will only activate or deactivate the starter relay, preventing or

allowing the engine to crank. The fingerprint sensor is used to create fingerprint-based security on vehicle engine start-up and shutdown, particularly for motorcycles. The distance and speed of the vehicle are calculated based on the flash obtained and how long the flash lasts. In real-time functions, this is not used. The ARM processor is used to control the engine starting system. The purpose of this paper is to design a fingerprint-based engine starter to improve and develop higher security in a vehicle, particularly in cars. The vehicle ignition system is controlled by an Arduino UNO with a fingerprint sensor, which identifies the person's fingerprint and determines whether or not the person is authorized.

## II LITERATURE REVIEW

1. Design and development of a fingerprint-based car starting system by C. O Folorunso, L.A. Akinyemi, A.A. Ajasa and Oladipupo Kazeem.

The goal of this project is to design and develop a fingerprint-based car ignition system in order to reduce car theft and deter unauthorized users. Modern security solutions are required to protect vehicles from theft and unauthorized use.

2. Vehicle starting system using fingerprint by Dr.V. Nandagopal, Dr.V. Maheswari, C. Kannan.

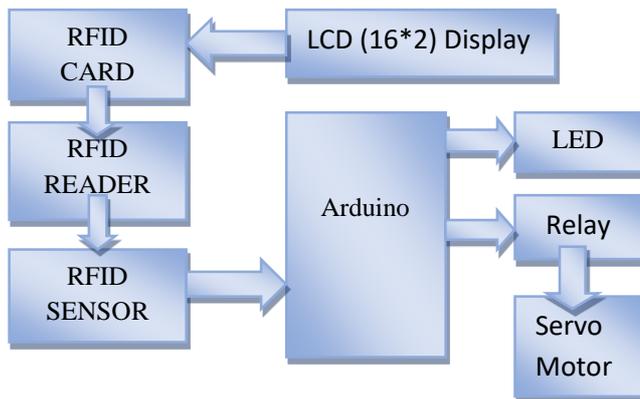
This paper discusses how the problem of car hijacking caused by easy access to the vehicle's functional system can be mitigated by employing a biometric system. In the future, the

proposed r will detect the presence of a fingerprint and scan it automatically with an RFID scanner.

### 3. Arduino and RFID-based fingerprint-based car ignition system

This paper describes how an RFID sensor and RFID reader are used to restrict access to only authorised individuals in a vehicle.

### III PROPOSED SYSTEM



The Components included in our proposed system are:

1. Arduino Uno
2. R305 Fingerprint sensor
3. EM18 RFID reader
4. 16\*2 LCD
5. Relay
6. Servo motor
7. Power Supply

### IV METHODOLOGY

Firstly, 230V AC supply is being given to the 0-12V transformer which is the step-up transformer. As we know, A transformer in which the output (secondary) voltage is greater than its input (primary) voltage is called a step-up transformer. The step-up transformer decreases the output current for keeping the input and output power of the system equal. Then the LCD display, displays car ignition system. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. This LCD has two registers, namely, Command and Data. We have used three 4 buttons: UP/DOWN, ENROLL, D/T, OK. By the use of these 4 buttons, we can store and delete the fingerprints. So, for that Press UP/DOWN button, then press OK to set the location of the fingerprint for e.g., 1,2,3, ... Once we have set the location press D/T button, then it will display Please wait and after that it will show place the finger on the fingerprint sensor that is R305 sensor. Finger Print Sensor Module or Finger Print Scanner is a

module that captures finger's image and then converts it into the equivalent template and saves them into its memory on selected ID (location) by Arduino. Here all the process is commanded by Arduino like taking an image of a fingerprint, convert it into templates, and storing location, etc. And then it will display image taken and then remove the finger and place the finger again. After that, the LCD will display STORED! So, again it will display press UP/DOWN button and then place the finger. After placing the finger, it is showing Gate opened that means, the car is ignited. And the ignition is done by the servomotor. For the ignition, we have used the servomotor. As we know, Servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration.

Another method is the RFID. In this the RFID tag is put close to RFID reader and the RFID sensor will sense the RFID tag. There are two cards one is valid and another is invalid. If RFID reader finds a valid RFID tag, then the car will get ignited.

### V1 RESULTS

Our project's expected outcome is that the car will only start when the approved person scans his or her finger on the fingerprint module. The biometric ignition system is designed to give the vehicle a high level of security and protection. Only an approved user's fingerprint and an RFID card that is programmed to ignite the car will control the ignition circuit. The system verifies and unlocks the ignition circuit in 0.3 seconds which makes the system robust.

### VII CONCLUSION

This paper primarily focuses on vehicle ignition using sensors, which will benefit users in a variety of situations. The use of fingerprint sensors allows legitimate and registered users to be authenticated. We also used an RFID sensor for the car's ignition. If the fingerprint sensor fails, the RFID tag can be used to start the car by simply scanning it. In the event that the fingerprint sensor fails, this code will be stored in the RFID tag he/she is carrying. Fingerprint Sensor for Vehicle Ignition There are several enhancements or functionalities that could be applied to the current version of this framework to boost its protection and portability. If the registered user finger is defaced, defective, or colored, the device will not allow the user to start the vehicle. Our proposal divides the project into two modules: one with an LCD crystal display that shows and displays the value, and the other with a fingerprint sensor that accepts input from the user side.

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