Industrial Engineering Journal
ISSN: 0970-2555
Volume : 52, Issue 5, May : 2023

DESIGN THINKING APPROACH AND IMPLEMENTATION OF ANTI-THEFT SECURITY SYSTEM FOR VEHICLES USING IOT

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Abstract
In today's global motors shape a vital asset to us, without which our existence might be incomplete. Nevertheless, on the subject of the safety of our motors, we are very helpless. It is of a top-notch concern, in particular in metropolitan cities, in which those incidents arise every and each day. Therefore, on this paper, I actually have focused on the safety of motors. This method includes a combination of software program and hardware. In software program, I can be the use of an android application, and in hardware, a Raspberry pi board B+ model, a jaw or a gripper and different hardware devices. This complete gadget will permit you to hook up with your car from anytime, everywhere and verify its security. A car is typically the maximum costly and vital asset subsequent to a home, so this gadget permits you to maintain this asset at your fingertips the use of Wi-Fi technology. Think of it as a Wi-Fi leash on your car.

Keywords: Android Application; Hardware; Internet; Raspberry pi board B+ model; Software; Vehicular Security System

I Introduction

Vehicle safety is paramount in today's world. One is an Android app and the other is a device installed in the vehicle. I was able to control the vehicle via the app. App-created functions communicate with and control devices in the vehicle. However, for this system to work, your Android smartphone and device must be connected to the internet. This means that the system uses an internet connection for communication, so the communication range is unlimited. This means you can control your car from anywhere in the world, unlike today where you connect your car remotely to your keys. With the help of this system, you can connect to your car anytime; anywhere with the click of a button on your Android, app.You can then lock your vehicle with your smartphone with just a few clicks.

II Background of the Study

A device is bring together of associated additives creating a whole device. Security device is a device that offers an alarm when a person attempts to interrupt into the automobile. Earlier humans had been dependant on easy methods of alert to breach in safety. Approximate seventy percentage of the motors nowadays have a far-flung keyless access (RKE) device [12, 15]. Most far-flung keyless structures alert the automobile towards theft, lock and free up the doors. Remote key- much less structures are made from a key fob transmitter and a receiver that is set up in the automobile. These structures use a

frequency of 315 Mega Hz withinside the U.S. and Japan, and 433.ninety-two Mega Hz in Europe [6]. The demanding situations for the far-flung keyless access designs are reaching low power intake in each RKE transmitter and receiver, while reaching accurate variety and reliability for the RKE device [6, 7, 8, 9]. Traditionally, the Security Systems had been liable to thefts as they had been now no longer very steady as withinside the paintings of Ji Shin [14] in 2009. Later the improvements in safety of motors turned into added with the aid of using Mon taser N. Ramadan, Mohammad A. Al-Khedher, Sharaf A. AlKhedher[2] in 2012. After that, sizable upgrades has been made closer to Security of Vehicles, extensively with the aid of using N. M. Z. Hashim, M. H. A. Halim, H. Bakri, S. H. Husin, M. M. Said [16] in 2013 and Harish Chandra Mohanta, Rajat Kumar Mahapatra, Jyotirmayee Muduli[7] in 2014. Further upgrades had been observed withinside the paintings of Shubhankar Shome, Rabindranath Bera [5] in 2015 and Michal Czubenko, Zdzislaw, Kowalczuk, Andrew Ordys[9] in 2015

III Technologies Used

3.1 ADT (Android Developer Tools)

ADT is an Eclipse [1] plug-in with a set of tools built into the Eclipse IDE. ADT helps you develop Android apps. The ADT has SDK and UI design tools for rapid prototyping of applications, design and UI creation. The application is developed in the Java programming language using the Android SDK[19,20].

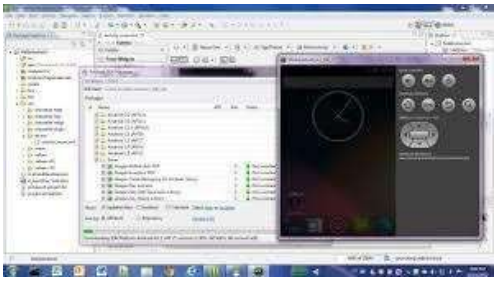

Fig.1: Emulator for android app

3.2 Java

Java is a programming language developed by Jammer Gosling at Sun Microsystems. The Syntax of Java is developed from C and C++. Java apps are compiled to bytecode that can run on any java virtual machine. It is the most popular language used today. We have used Java programming language, so that our application is secure, no one can easily hack it.

3.3 Python

Python is a new open-source programming language. It is an interactive, interpreted, object-oriented programming language. Python is a language that is portable to all major hardware and software platforms.

IV Hardware Used

4.1 Raspberry pi Board B+ model

The Raspberry pi Board B+ model[3] is a debit card-sized single board computer developed in the UK by Raspberry pi foundation. It is a low cost computer that can be plugged into a

computer monitor or a TV and uses a keyboard and a mouse. It is a little device that many people can use to explore computing and to learn how to do programming in scratch and python. A very strong feature of Raspberry pi board is it's GPIO(general- purpose input-output) pins , along the top-edge of the board. GPIO pins are the input/output pins, and any of the GPIO pins can be designated(in software) as an input or output pin, which can be used for a wide range of purposes. In our system, raspberry pi board B+ model forms a part of the device, which would be installed in the car.

Fig. 2: Raspberry Pi Board B+ Model (Vertical Section)

Fig.3: Raspberry Pi B+ Model (Horizontal Section)

4.2. A jaw or a gripper

Jaws or Grippers are hardware used to grasp objects. Our system is installed at a specific angle near the shift, accelerator and brake pedals inside the vehicle. Therefore, if a thief is trying to steal your car, they can grab their claws with the push of a button on your phone. Can. So that thieves cannot move our cars, gears, accelerator pedals, brakes, thieves drive a motor (driven by a voltage generated over the internet) forward to keep the pedals in place.

Fig. 4: A jaw or a gripper

4.3 Wi-Fi Dongle

A Wi-Fi Dongle is plugged into the Raspberry pi board. It will allow us to connect to a wireless network anywhere.

Industrial Engineering Journal
ISSN: 0970-2555
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Fig. 5: Wi-fi Dongle

4.4 Keyboard, Mouse and Adapter

We will be needing a keyboard, a mouse and an adapter that are all connected to the Raspberry pi Board B+ model[6,10].

4.5 A Memory Card

A memory card will be inserted in the raspberry pi B+ model to store the python coding done on Raspberry pi B+ board,.

4.6 Integrated Circuit(IC)

We have used L239D IC[15], to which all the motors are connected through jumpers(wires) and inputs from the raspberry pi board are given to the IC and IC generates the corresponding output function, which rotates the motors in clockwise and anti- clockwise direction.

Fig. 6: Integrated Circuit(IC)

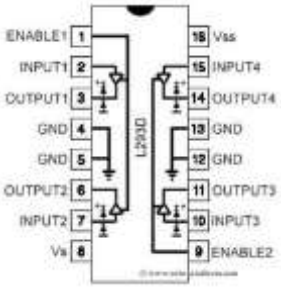

Fig. 7: IC diagram

4.7 A step down transformer

A step-down transformer [2] is used to step down the high voltage to the normal bearable range i.e. bearable to the device from AC 220V to AC 20V.

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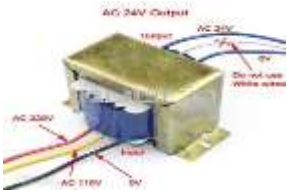

Fig. 8: A Step down transformer

4.8 Diodes

Four diodes are used on the board for the conversion of AC into DC voltage. Diodes [10] are connected in such a way that part of sine wave in the negative portion is made to occur on the positive portion.

Fig. 9: Zener Diode

4.9 Capacitor

A Capacitor [1] forms a part in conversion of AC into DC voltage. The sine wave formed by the diodes is passed through a capacitor, rendering waves, which do not touch the x-axis, and they lie far above the x-axis.

Fig. 10: Capacitor

4.10 Voltage Regulator

A Voltage regulator [1] regulates the voltage and step-downs it further to the nominal voltage bearable by the IC's 1 V or 1.5 V.

Fig.11: Voltage regulator

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4.11 A resistor

A resistor [2, 3] is used to offer resistance to the current so that the current remains in the bearable conditions and offers nominal voltage to the IC.

Fig.12: Resistor

4.12 Motors and Jumpers

I have used **motor** for locking system and door movement

Fig. 13: Motor

Jumpers are wires used to connect the motors and the Raspberry Pi board to the IC board.

Fig. 14: Jumper wires

V The Working of the System

5.1 Overall description

The user can control various functions of the vehicle, lock the vehicle`s gas pedal for safety reasons, change gears, and press the brake pedal. If a thief steals or tampered with our car, they immediately leave a text message of him on our phone or app. After receiving the SMS, go to the Android app and click the gas, gear and brake buttons displayed in the app. The corresponding values are sent over the internet to the in-vehicle device, generating a voltage of

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ISSN: 0970-2555
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3. 3 V and received by the Raspberry Pi board. Inside the device is another circuit board with two ICs. The jaws or grippers are connected to ICs on the circuit board. My motivation for making this board was to match the voltage and lower it to a nominal range that the device can handle, rotate the jaws or gripper motors via ICs, and keep the jaws forward via throttle, gear and brake boards is to the IC is sent to a motorized jaw or gripper. When tension drives the motor, the jaws move forward, holding the accelerator, transmission, and brake pedals in place. Additional motors can also be used to control car functions such as locking/unlocking doors. Even if a thief breaks into your car, they cannot move it.

5.2 Description of the Device that will be installed in the car

The device that will be installed in the car contains a Raspberry pi board B+ model and another board containing the IC's. In order to simulate this system, we have used a Raspberry Pi Board B+ model. In addition, I have used a mouse, a keyboard, a monitor and a Wi-Fi dongle. These can be connected to the ports of raspberry pi board. A memory card is also inserted into it. We have done python coding on the GPIO pins to provide various functions of the car and for locking. When we click a button on the app, a value is passed to the raspberry pi board, and a power of 3.3V is generated which is received by the GPIO input pins and then this voltage is fed through the GPIO output pins to the board containing the IC's, which will regulate the voltage. This voltage and the regulated external voltage of the device will move the jaws or grippers in forward direction to hold the accelerator, gear and brake pedals, in their position.

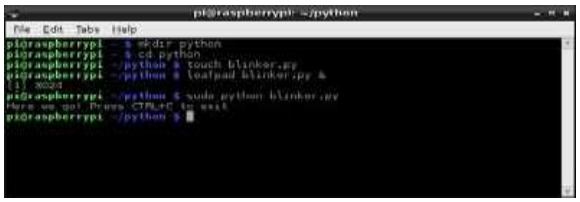

Fig. 15:Raspberry pi board Interface

Fig. 16: Python coding on Raspberry pi Board

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Fig. 17: GPIO LED Output

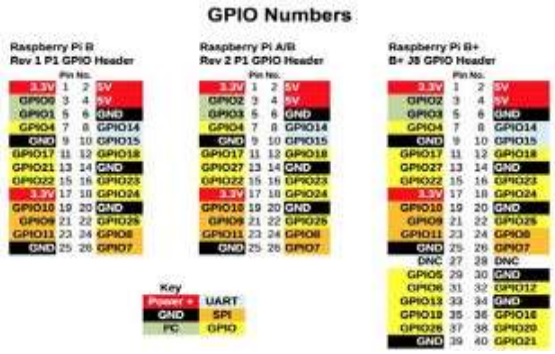

Fig. 18: GPIO Numbers

VI Conclusion

In this paper, we have made an android app, which is used to communicate with the device installed in our vehicles, which in turn will control the functions of the vehicle, as well as ensure the locking of the accelerator, gear and brake pedals, so that the vehicle does not Thus, the most expensive and important asset of all of us, will be on our fingertips and fully secure. This will prove to be a great technique to prevent the theft of the vehicles, especially in metropolitan cities, where theft cases are being reported and every day.

VII Future Work

In future, we are planning to install a GPS system [8, 19] into the device, with which the location of the vehicle can be instantly located at any time remotely from anywhere. Furthermore, more functionalities to automate the vehicle remotely from anytime anywhere with the app are under process too. I am also planning to increase the security of the vehicle by cutting off the battery supply to the vehicle, thus adding to its security.

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