

A Study on Accidental and Theft Systems for Two Wheelers

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Abstract

People all throughout the world are increasingly using automobiles, particularly motorcycles, as their primary mode of mobility. Aside from the increase in motorcycle users, motorcycle robbery has been on the rise for quite some time. In this regard, a framework for motorbike burglary anticipation that is less demanding and faster has been developed. The customer of this framework will be notified via an alert if the motorcycle is transferred to a long distance or if any cables are disconnected and stolen. Bike theft is readily detected using Raspberry Pi Technology, which uses hardware-based relay operations that are linked to software in a mobile application. Whenever the bike is attempted to be stolen or escapes without being seen by the user, the relay circuit in the bike activates and emits a buzzer sound with bright illumination, indicating an alarm to the user in his/her mobile application. Another system concept was to notify a relative user in the event of a bike collision in any situation and to indicate fuel levels in two-wheelers in litres. Both systems are reliant on smartphone applications such as blynk and Google Assistant, which allows the user to issue an alarm to the user who is grappling with an accident. A gyroscope mounted on the bike sends signals to the Raspberry Pi, which sends notifications to the rider at any moment. In the other instance, if the user is not injured, he or she can reset the system's functionality. Finally, users may have difficulties determining trip plans due to the analogue depiction of gasoline in a two-wheeler. So, in this system, ultrasonic technology installed in the bike at the fuel tank lid monitors

the gasoline level in the bike and provides the data to the user via the same mobile application using a Raspberry Pi.

Keywords: *Raspberry Pi, Accelerometer, Vibration sensor, Ultrasonic sensor, Global Positioning System (GPS), Global System for Mobile Communication(GSM), Internet access Google Assistant.*

INTRODUCTION

People in today's age are more likely to be seen operating vehicles such as two-wheelers for ease of use and discovering efficient ways to execute tasks swiftly and reliably. There are several downsides to these phenomena, such as securing the motorcycles with safety management and upgrading for planning route plans. On exhibition days, the rate of mishaps might swiftly increase. Because of business, the use of vehicles such as automobiles and motorcycles might be extended; as a result, catastrophes can occur owing to excessive speed and irresponsible driving.

People are in danger as a result of their excessive pace, and the incidence of mishaps cannot be reduced owing to the inaccessibility of advanced techniques. In this suggestion, different strategies for renewing two-wheelers with high security systems and additional features are addressed. The prototype is created in comparison to existing approaches from the initial impression of the idea. Based on

the appearance of the present system, the concept of theft warning, accident, and fuel notification is being created utilising advanced technology and the Raspberry Pi. The basic model is described about "Theft Prevention System" for a specified title development of unintentional and theft notification systems for two wheelers. There are technologies available for theft vigilance, such as Bluetooth alert and GPS notification to the user. When the bike is stolen, the Bluetooth installed in the bike, using Arduino-based technology, sends an alarm to the user through a buzzer.

As technology advances, the tactics used by burglars or third-party users have progressed to short lengths of Arduino base. They first locate the key slot wire and cut it short, after which they may normally start the motorcycle without a key by using the self-start button or kicker [3].



Figure 1: Bike Theft Methods in Two Wheelers by Thieves

A Relay Circuit is located near the ignition battery and is coupled to it for the Theft Alert System. Whenever a thief or a third-party user attempts to cut the battery's wiring as shown in Figure 1.

To start the bike, a relay circuit connected to the ignition battery triggers an alarm with a buzzer sound, which sends a notice to the user's phone through Raspberry Pi. The Google Assistant is used in this way to locate the bike and inform the user through voice command via the Blynk App.

The next planned system was to provide the client with an accident alert system, which would save the client's life instantly if the client was involved in an accident.

As illustrated in Figure 2, the technology of IOT with Arduino Automatic alarm system for automobile accident was first utilised to notify clients of the accident. The primary goal is to prevent accidents by delivering a notification to the registered mobile phone via wireless communications.

When an accident happens in a city, a message is delivered to the registered mobile phone via the GSM module in a short amount of time. The Arduino is the system's brain, assisting in the transmission of messages to various components. Magneto resistive sensors will be used by IOT to monitor the cars.

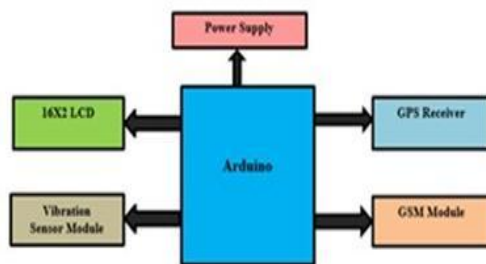


Figure 2: Block Diagram of Accident Detection and Alert System

In a two-wheeler, the gyroscope sensors are set in a safe position for the accident alarm system. The fundamental operation of a gyroscope is based on the notion of angular positioning. In typically, the sensor is situated at a fixed angle; however, if the angle changes due to an accident, the gyroscopes notify the user and also provide a loud siren for emergency assistance. If the bike appears to have collided with other cars, vibration is also applied. Fuel level will be indicated in litres in the proposed system.

There are a number established ways for promoting the Gas/Fuel within the engine

motorcycle. The readings that are not precise are presented inside the analogue metres mentioned below Figure 3. In today's digitalized world, if the gasoline indicator in vehicles is also improved, it will aid in determining the exact amount of fuel available in the fuel tank in litres.

If the gasoline tank capacity is 12 litres and we filled 6 litres, the fuel metre will display '1/2'. What's the problem here? If 1 litre of gasoline is consumed from a total of 6 litres, the display reads '1/2'. Fuel indication ultrasonic sensors are put in the necessary position in the fuel tank lid in this technique without causing any harm. Because the inaccuracy was approximately 0.02 litres, the accuracy level was up to 95–98%. On flat surfaces, it shows the precise litres, whereas on sloped surfaces, it gives the erroneous value. This value in litres will be expressed in numerical digits (e.g., 1.2, 1.3, 1.4) as well as in levels. For user friendliness, the identical technique is utilised with Google Assistant.



Figure 3: Existing Fuel Meters Existing Images

PROPOSED WORK

The suggested concept is being divided as a user-friendly prototype. In the "Theft Prevention System" model, thieves or any third party easily takes a two-wheeler without the need of any equipment by breaking the side lock of the bike with a rod or strong steel and taking it away from the customer, resulting in a safe with no need for keys[3]. They simply cut the wire connecting the Ignition Battery, causing the bike's engine to start without the user's keys being inserted[6]. As a result, the suggested model is based on a battery and key slot coupled system, with an extra relay circuit hidden somewhere on the bike. If a burglar attempts to cut the wire, the Relay will immediately activate and blast a high-decibel siren, alerting the user through a mobile application on the Raspberry Pi about the theft alarm system.

Regarding the next system, the "Accident Alert System," there are many concepts in the market that have dropped a lot of solutions, but they occasionally fail to work at the same time owing to two-wheeler over-damage. The accelerometer is combined with a vibration sensor in our system. If a client is involved in an accident, the accelerometer switches from a fixed to a variable position, sending a

new signal to the Raspberry Pi as a command, which is sent by the same high-decibel buzzer. Optionally, a reset switch is installed, which the client can engage if he or she is safe. Every vehicle has an analogue and digital metre in the final plan "Fuel Indication System," but it fails to perform a suitable litres. Our device, which uses ultrasonic sensors and is controlled by a Raspberry Pi, shows accurate litres. As a result, each system's whole function is controlled by a single Raspberry Pi Module.

THEFT PREVENTION SYSTEM

The model in this suggested system is primarily created to target the manner in which two-wheelers are stolen. When a criminal steals a bike by breaking and short-circuiting the electrical cables leading to the starter unit, the alarm built within the bike, as shown in Figure 4, emits a buzzer sound. Figure 4 shows the proposed burglary warning system, which includes a transfer with a Normally Open (NO) state with a buzzer and a blazing lighting unit. When the thief tries to cut the wire, the transfer switches to the Normally Closed (NC) state, triggering the buzzer (siren) sound shown in circuit diagram Figure 5. Figure 6 depicts the prototype model that was created.

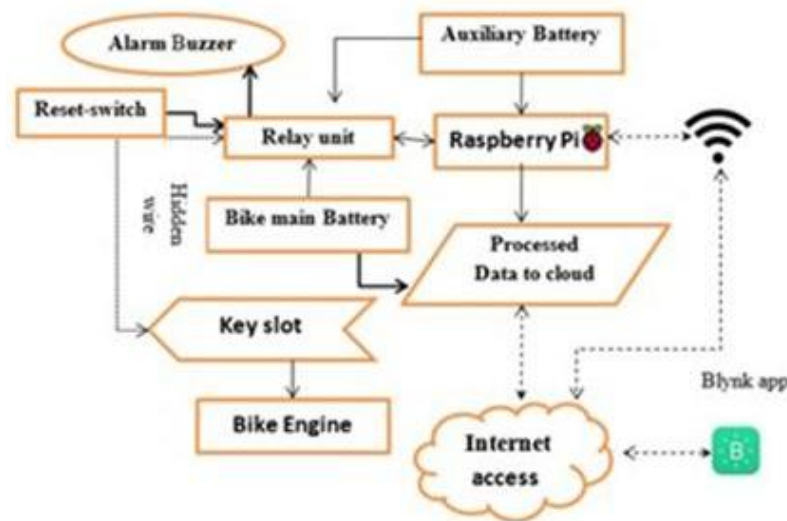


Fig.4 Block diagram representation of Theft prevention system

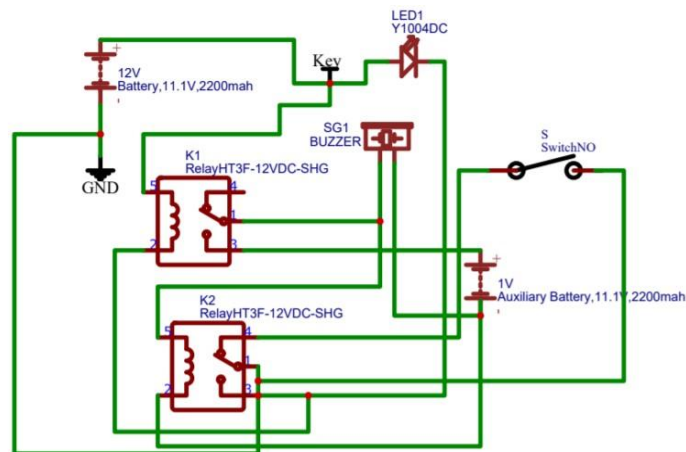


Figure 5: Circuit Diagram for Theft Prevention System

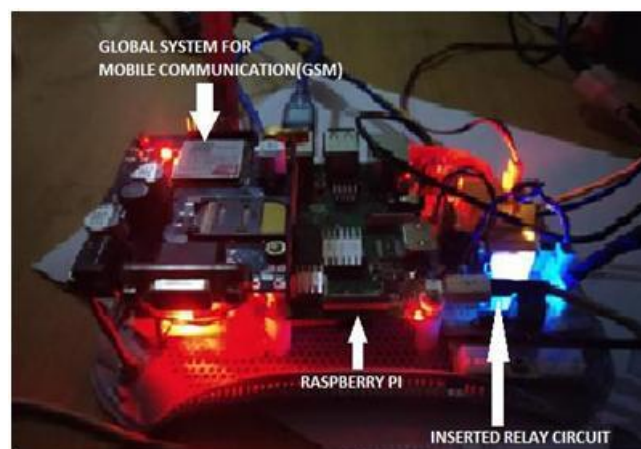


Figure 6: Developed prototype of Theft Prevention System

ACCIDENT ALERT SYSTEM

Today's use of vehicles such as automobiles and motorcycles might result in disasters owing to excessive speed and reckless driving. This study proposes an optimal setup to reduce the number of accidents in the country. The most important goal of the programmed caution framework for car accidents is to manage the mishaps by delivering a message to the enrolled user using remote communications procedures. To prevent such problems inside the country, this article proposes an excellent Raspberry Pi

setup that makes a difference in message exchange. A vibration sensor and a Spinner sensor, which are used as the mishap location module inside the framework shown in Figure 7, can detect the incidents.

When a mishap occurs, the vibration sensor and whirligig/accelerometer are activated, and the data is sent to the registered number through GSM module, as illustrated in Figure 8. The use of a GPS system will aid in locating the location of the mishap.



Figure 7: Developed Prototype of Accident Alert System

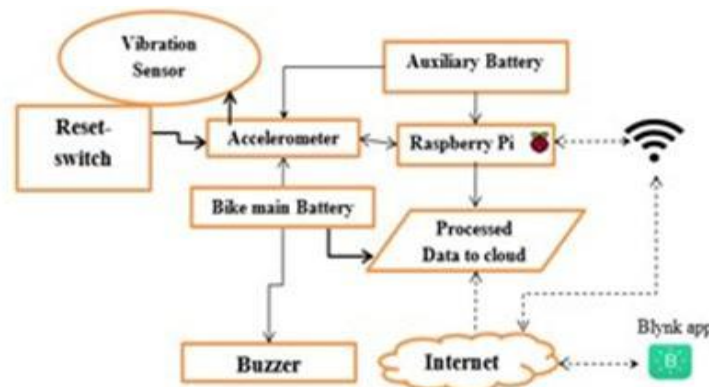


Figure 8: Block Diagram Representation of Accident Alert System

FUEL LEVEL INDICATION

Most motorcycles are willing to use tried and reliable gasoline within the machine, which helps the customer. The module produced in this research efficiently displays the fuel levels to users via a mobile application for a specific amount of fuel loaded within the motorcycle fuel tank in litres, as illustrated in Figure 9 and the

corresponding circuit diagram in Figure 10.

If the gasoline tank is full with three litres, the display accurately shows three litres. The ultrasonic sensor is a non-contact sensor that requires less power and has high accuracy. When the motorcycle is not in use, an ultrasonic sensor can be placed as shown in Figure 11 to monitor the precise level of petrol in the tank.

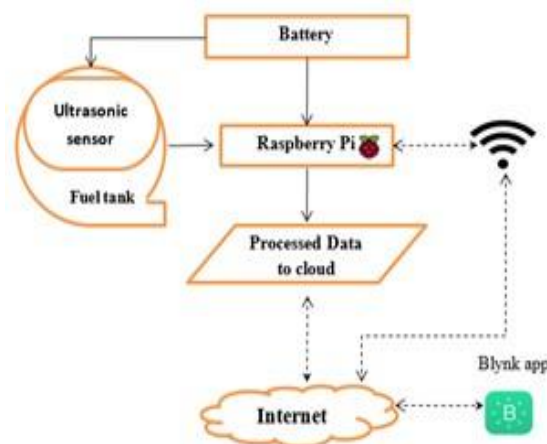


Figure 9: Block diagram representation of Fuel Level Indication System

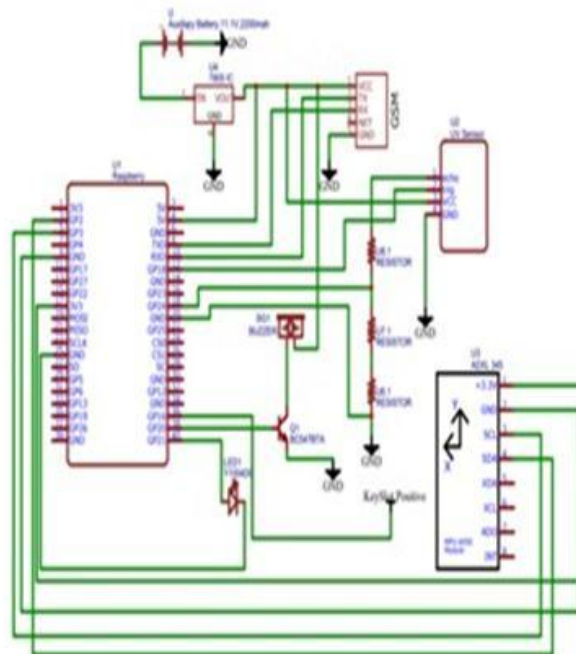


Figure 10: Circuit Diagram for accident alert and fuel indication system



Figure 11: Developed prototype of Fuel Level Indication System

RESULTS

The theft identification would be reported to the vehicle owner via the proposed module if the car is moved by unauthenticated individuals or attempted theft by someone, allowing the vehicle owner to stop the vehicle from his location.

The car owner is also informed of the vehicle's current position. When a user encounters an accident, another suggested module titled accidental notification unit will issue an alarm and communicate the current car position with the registered cellphone numbers.

The electronic solenoid designed for the gasoline tank prevents fuel theft by allowing fuel to enter the engine only when the appropriate key is inserted into the bike slot. Similarly, an ultrasonic sensor-based fuel indicator device ensures

accurate fuel availability notification. With the use of Google assistance, smart control over finding the bike in a busy place and turning on/off the bike ignition is made feasible in this work. The proposed effort transforms the bike system into a smart system.

CONCLUSION

The final model with proposed systems is completed as a real-time solution for two-wheelers with additional features as part of the conclusion.

The designed system was installed in a two-wheeler and all options for looking for a covert system to position the project to be aware of any third-party user or thieves in order to keep equipment such as a black box in an aeroplane secure were investigated. At every moment, the entire system executes three primary activities

through mobile application and Google Assistant performance.

The system also has a Mobile Charging port that uses an existing technology. Observations show that there are no vibrations when driving, and the user can comfortably operate the mobile with an adjustable port, allowing them to utilise Maps and other features without interruption. As an added function with improved progress, Google Assistant plays a vital part for the entire system in locating the bike in a vast region, shutting off the bike if the keys are taken away by an unknown user, and using Google Maps to determine the current position.

Keeping an eye on emerging technologies, the designed model is geared toward future research operations as a highly secure system with effective management in a variety of scenarios. As a result, these models will continue to be researched and refined in order to produce high-quality results.

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