

Two-Wheeler Vehicle Wheel Locking System with Fuel Theft Detection

Aishwarya J¹, Bhuvaneshwari S M², Sheshank R V³, Prof. Yashwanth S D⁴, Prof Puneeth K M⁵

^{1,2,3}Students of Automotive Electronics, Engineering, JSS science and Technology University, SJCE campus Mysuru

^{4,5}Department of Electronics and Communication, Engineering, JSS science and Technology University, SJCE campus Mysuru

Abstract - Now a day's automobile fuel thefts are increasing at an alarming rate all over the world. So it is important for the vehicle users to monitor their vehicle in order to escape from fuel theft of the vehicle. With the advancement of technology, vehicle user can safeguard and monitor their vehicle by using their mobile phone. Most of the proposed systems are only for four wheelers and the major drawbacks of these systems are that they will not support multi-users and they are not cost effective. There are many systems proposed for vehicle security where most of them have used technologies like fingerprint detection, RFID technology, face recognition technique and CAN bus for the security of cars. But these techniques requires internet connection, which is difficult to provide for moving vehicles. so in order to avoid this issues, this prototype aims in providing a reliable method for security system of vehicle by locking the front wheel and preventing fuel theft from the fuel tank of the vehicle.

Index Terms - Solenoid valve, relay, dc motor, ignition switch, battery, DPDT switch, fuel theft preventing.

I.INTRODUCTION

Remarkable progress in automobile industry has seen a rapid rise in the number of vehicles. With this tremendous increase in number of vehicles, there has been increase in number of crimes involving vehicle fuel theft. Many security systems are developed related to vehicle theft detection and fuel theft detection, and most of them used techniques like finger print detection, the RFID technique and face recognition technique. But these techniques are costly and it is difficult to use in two wheelers. It is also difficult if more than one person uses the same vehicle in case of fingerprint and RFID technique.

Another problem faced by the two-wheeler user's is fuel theft. When the vehicles are parked fuel thefts take place. In order to overcome these security problems, in our project we aim at providing a security system to vehicle by locking the front wheel of the vehicle, especially for two wheeler. And also preventing fuel theft from the fuel tank of the vehicle using solenoid valve and other mechanical components. This avoids the use of electronic gadgets and it more effective and reliable method compared to other technologies.

Every motor vehicle comes with the simple tap with main or reserve option for the fuel delivery mechanism. In the existing system anyone can remove the petrol from the fuel tank without any trouble as capacity of petrol tank is at least 10 litres. So in order to overcome this problem a mechanism has been developed to prevent the fuel theft from the vehicle. Here we make use of solenoid to detect the fuel theft and also to avoid the stolen of the fuel from the vehicles. The solution strategy of this project is explained in two different subsystems one is for the locking of the vehicle and other is for the fuel theft prevention of the vehicle. The current technologies can only detect fuel theft from the vehicle but cannot prevent it. So this model helps in preventing the problem of fuel theft from the vehicle.

II.LITERATURE REVIEW

Many systems were proposed for vehicle security. [1][9] Working of this system is simple where vehicle parameters like speed, fuel level and location are fed to microcontroller which is transferred to server using SIM808 GSM module. These parameters are stored in database on a webserver and webpage is created to display vehicle parameter data. Simultaneously

vehicle location data is linked with google maps to display vehicle location on map. The problem with the use of GSM module is it does not support live streaming of data like vehicle position. In paper[2][8] security system works on identifying user fingerprint. Fingerprint must be recognized by the system otherwise the vehicle ignition will not occur, and then an alert message is sent to owner mobile after this for every ten seconds SMS will be sent with updating of location of vehicle till proper fingerprint is given. [5] In this system they have provided password based protection as a backup for fingerprint protection system. The drawback of this system is it's vulnerable to password hacking. As only one password is set if the thief is able to enter the right password then the system fails to prevent vehicle theft. [3] Here the system can be divided into three subsystems. In first a button will be present in the helmet if the user wears helmet then H pulse is sent to alcohol detector where alcohol detection test is done. If the test gets passed then the system will ask the user to give fingerprint if it is recognised by system then the ignition of vehicle will start. The drawback of the system is even if one subsystem fails, the system will not allow ignition.[6] Many of them have used RIFD technology which is very similar to fingerprint technology the difference is instead of giving fingerprint a unique RFID tag will be there with the user which has to be read by RFID reader in security system in order to start the ignition. The drawback of this system is if the user loses his RFID tag then system will not allow vehicle ignition. [7][11] In this system password based security is provided in case of vehicle theft, the owner can immobilize the ignition by sending a SMS as command to the controller of this system using SCR circuit. The drawback of this system is that it relies on the central controller system to take necessary actions in case of theft. The vehicle is not stopped immediately as it takes time for information to pass from owner to central system and then to the security system. Many vehicle thefts have occurred using auto lifters, to prevent these type of theft many of them have proposed [13][12] system which has the angle sensor which detects the tilt of the vehicle in both x and y axis which in turn notifies the fall of the vehicle to the user through SMS. In [4][10] they have proposed system to measure the fuel level in fuel tank. They have used two types of sensors like ultrasonic sensor and flow rate sensor. Ultrasonic sensor produces sound wave which

when incident on obstacle produces an echo. This range will be converted into litres by writing code. Flow rate sensor consists of rotor and hall effect sensor when liquid flow rotor rotates based on its speed hall effect produces corresponding pulse signal in litre/minute.

Summary

Overall literature survey provides the details about different concept on wheel locking system with fuel theft detection. As compared with available techniques on security system for wheel locking and fuel theft detection, our technique provides a high security and reliability to the vehicle by designing a innovative system. since this project does not uses electronic components, it is more reliable.The moving vehicles does not have the network properly while travelling. So in order to overcome this issues, the fuel theft from two wheeler and security to it is done mechanically here.hence this model is maintainable and reliable. Hence the fuel supply opens only when the ignition system of an automobile gets switched ON . This provides more protection to the vehicle even when the key fob is stolen.

III.PROBLEM STATEMENT

The project improves the function of locking system only for disc break bike and to prevent the fuel theft from the two-wheeler vehicle. The main theme of this project is to control the vehicle ignition key in LOCK state and release the movement of vehicle when the ignition key is in ON stat.

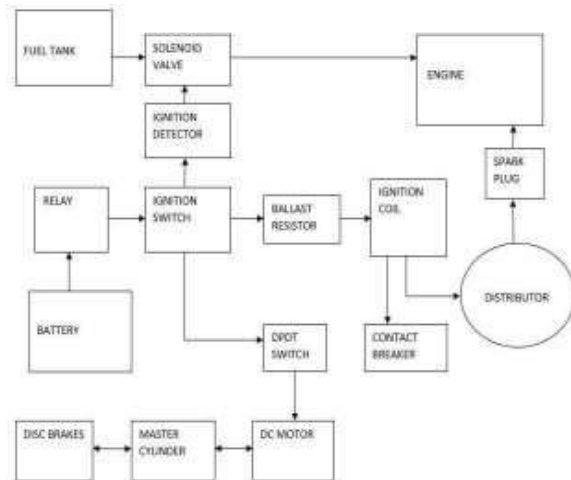


Fig.1 Block diagram wheel locking system with fuel theft Prevention

The Fuel theft is controlled in two-wheeler vehicle using solenoid valve. It could be easily assembled and maintainable which incorporates two different systems in a single prototype.

IV. PROPOSED SYSTEM

The block diagram shows the block diagram for wheel locking system with fuel theft prevention. It consists of fuel tank, solenoid valve, ignition detector, relay, ignition switch, ignition coil, battery, DPDT switch, Dc motor, master cylinder, disc brakes.

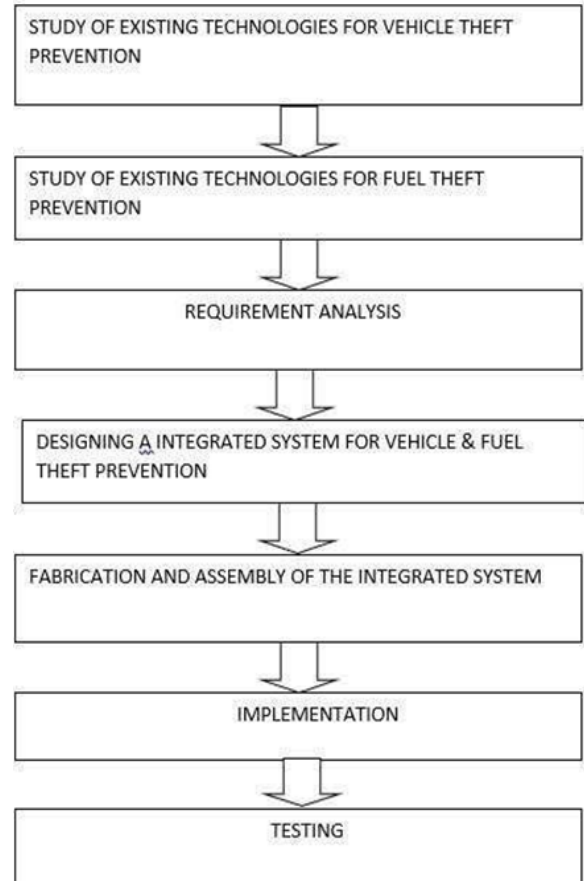
A. Working

As specified in above block diagram, there are two sub systems being integrated into a single system as two wheeler vehicle locking system with fuel theft prevention. Here the main objective is to stop vehicle and fuel theft, hence this system is designed. In this system when the ignition switch is turned ON, the solenoid valve gets actuated as it is supplied with power from the battery. Here in solenoid valve, the coil in it gets energized as the magnetic field is created around it and moves the plunger upwards allowing the fuel to flow from the fuel tank to the engine through fuel tap.

The solenoid valve here is placed where the fuel exits the fuel tank. This sub system designed for prevention of fuel theft. The other sub system being integrated is the vehicle locking system for two wheelers. Here as shown in the diagram, the DC motor is connected to the master cylinder which controls the shaft movement in the master cylinder.

The DC motor is controlled using DPDT switch for bidirectional rotation. Keeping the ignition switch ON the DPDT switch allows the rotation of the DC motor that pushes the shaft compressing the fluid in the master cylinder which makes the brake calipers to hold the disc locking the vehicle. Then to unlock the vehicle, the DPDT switch allows the opposite direction rotation of DC motor hereby releasing the disc brakes. Here both the subsystems get power from the battery through relay as the relay prevents direct connection which can start both the systems. Hence the ignition switch acts as switching for the relay for completing the circuit.

Fig.2 Flowchart for proposed model Working of locking system using 2 stages:



1)When the ignition key is in OFF state. 2) When the ignition key is in ON state.

When the ignition key is going to OFF state:

- When key is going to lock state, the DC motor runs, so that the brake fluid is passing from the reservoir to the calliper.
- Then the brake piston presses the brake pads against the disc.
- Due to this, friction will be generated and brake is applied.

When the ignition key is going to ON state:

- When key is going to ON state, the DC motor runs in opposite direction, so that the pinion will rotate and this causes the bar will release the brake piston. This helps the piston to retract.
- The brake fluid is passing from the calliper to the reservoir.
- So the brake piston releases the brake pads against the disc.
- Due to this brake is released.



Fig.3 Working Model Applications

- This prototype is used in two-wheeler vehicles to increase the security system.
- It prevents the theft of fuel from fuel tank in the vehicle.
- It can also be implemented in four-wheeler vehicles also.
- Electronic control is not required and it is easily maintainable.

V.CONCLUSION

- With the help of this project, we can restrict the major problem of fuel theft of two-wheeler which is increasing day by day rapidly in India.
- At a very minimal cost we can reduce the crime of fuel theft by proposing this model by combining two subsystems such as Two-wheeler vehicle locking system and fuel theft detection to a single prototype.

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