# A Review of Bike Security System Using Fingerprint GSM&GPS

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**ABSTRACT:** In modern days a vehicle anti-theft system is of prime importance. Currently public having an own vehicle, theft is finding on parking and sometimes during insecurity places. The safe of vehicle is extremely essential for public vehicles. The first layer of protection in the system is a Fingerprint recognition, based on which the locks are opened. The Fingerprint matching is done by utilizing the minutiae based Fingerprint recognition scheme. The vehicle is became on only with the bike key. One turned on the user should keep them finger to the fingerprint sensor. If the finger ridges match, Solenoid value is opened for fuel supply and also a message is sending to the user by using GSM [Global System for Mobile Communication]. If finger matches failed, it will result in vehicle getting immobilized and an alert message is sent to the mobile number of the owner. The seized vehicle can be tracked using a GSM which is also being attached. If the vehicle (or) bike is stolen by some person. The place of vehicle is identified by GPS tracker, when the theft identified. The responsible person send SMS to the ARM, then ARM issue the control signals to stop the engine motor. Authorized person want to send the password to controller to restart the vehicle and open the solenoid valve and Keil μ-vision software is used for program coding. This is more secured, reliable and low cost. The experimental results proved the functionality of the anti-theft system in working environment.

**KEYWORDS:** GSM [Global System for Mobile Communication], ARM [Advance Risc Machine], SMS [Short Message service].

## I.INTRODUCTION

**P**ASSWORDS remain the weakest component of many important security systems, so there is a related push from many directions to supplement passwords with less fragile security measures. While pushing it has some effects, particularly in environments that require more security, it has failed to replace passwords the vast majority of computer user's still use passwords on a day-to-day basis[10]. Since the security of passwords relies so heavily on user behavior, studies that empirically examine patterns of passwords creation and use remain important in the evaluation of security policies.

The main focus while developing the bike anti-theft system was to integrate the above features equally. The most significant feature is the vehicle security from theft and it as been ensured by providing three layers of anti-theft protection. First the entry to the vehicle is limited only to the authorized persons are stored into the database before hand and at the time of entry to the vehicle, scanned fingerprints are being cross checked with the database. The biometric scheme is used as the primary layer of protection.

The second layer of protection is produced by GSM (Global System for Mobile Communication) technology is used. It sends SMS (Short Message services) [1][3] to the owner if misuse of bike. If some person theft the bike, the place of vehicle is described by tracker. The third layer of protection is provided by solenoid valve. It is two port valves one is input and another one is output. It is attached to the fuel supply the valve is open and closed depending on the owners order.

This three layer are controlled by ARM (Advanced Risc Machine). It works faster than the microcontroller, its version is LPC2148.

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## II. LITERATURE SURVEY

1.R.Ramani ,S.Valarmathy , Dr.N.SuthanthiraVanitha , Selvaraju , M.Thiruppathi , R.Thangam,"Vehicle Tracking System Based On GSM and GPS", IJ Intelligent System and Applications, published online August 2013. In this paper, it describes the Tracking of vehicle and passwords were used to lock or unlock and also used keypad. GSM & GPS were controlled by microcontroller. This is implemented in the car.

2. Manjunath TK, N.Maheswari, Andrews Samraj, Sharmila Chidaravalli , "Locking and Unlocking of Theft Vehicles Using CAN", Proceedings of 2013 International conference on Green high performance computing, IEEE, March 2013. In this paper explaining locking or unlocking and it were implementing in car. CAN  is used to control all operations of the owner like message sending and closing the engine.

3. D. Narendar Singh, K. Tejasri, "Real Time Vehicle Theft Identity and Control System based on ARM 9", International Journal of Latest Trends in Engineering and Technology(IJLTET), Volume 2, Issue 1, January 2013. In this paper Face Detection System(FDS) were used for comparison result, ARM 9 processor triggers certain actions. If the result is not authentic means ARM produces the signal to block the car.

## III. SECURITY ALGORITHM

In Fig 1.1 illustrates that the part of the security algorithm,
    1. The user want to the start the bike, at first insert the key, the circuits are ON.
    2. In the Display of LCD shows "Welcome to Security Device".
3. And then it shows "Keep your thumb", the user need to hold the thumb in the fingerprint sensor.
4a. If the Finger is matched,
    Solenoid valve is open and the message is also send to the user mobile as "Valve is Open", then the bike is started to drive.
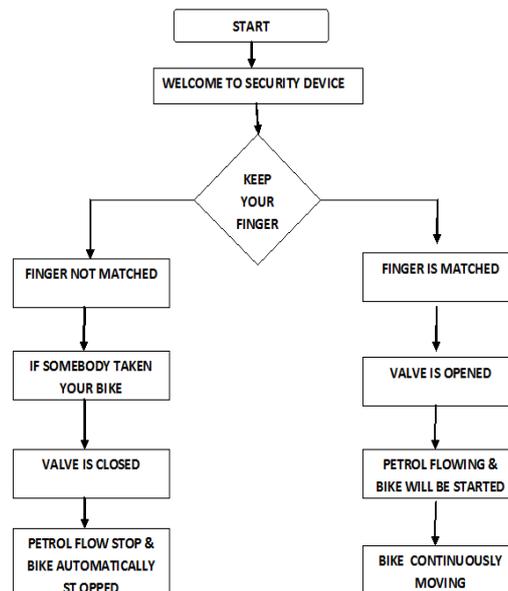


Fig 1.1 Security flowchart

Solenoid valve is open and the message is also send to the user mobile as "Valve is Open", then the bike is started to drive.

4b. If the Finger is not matched,

If unauthorized person is tried to start the bike, it shows the finger is not matched and the message is also send to the user mobile as "Somebody trying to start the bike", unluckily if the bike is began, By sending as message as "Close the Valve" from the user mobile to GSM module which have kept in bike,suddenly it closes the solenoid valve the flow of the petrol is stopped.

### III.SYSTEM MODELS

In  system model the block diagram can be described as shown in fig 1.2

Fig 1.2 Block Diagram of Security system

A.
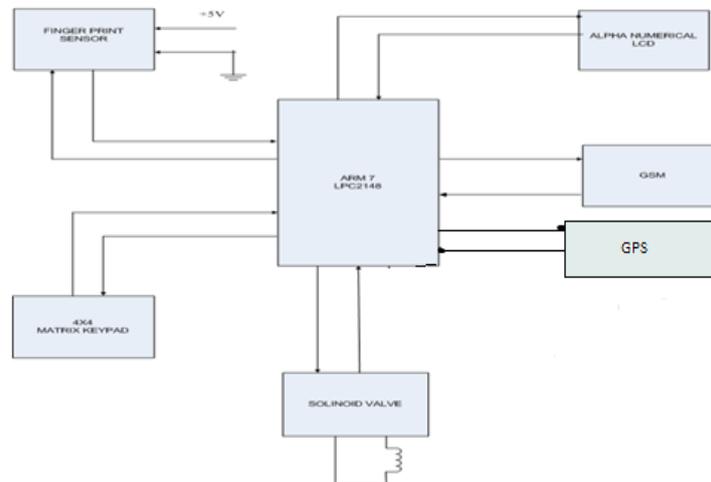


#### *FINGERPRINT SENSOR*

Fingerprint is the biometric security operation. Fingerprint system Authentication is a simpler  process. It involves conforming or rejecting a claimed identity by matching a live template with an existing one. A Fingerprint Sensor is an electronic  device.  It  is  used  to  capture  digital  image  of  the  pattern.  The  scanned  image  of  the  pattern  is  digitally processed and stored. Fingerprint Sensors are security systems of biometrics. Fingerprint recognition (or) Fingerprint Authentication refers to the automated method of verifying a match between two human fingerprints. Fingerprints are one of the many form of biometrics used to identify individuals and verify their identity[5].

In the Fingerprint Sensor there are three patterns of ridges. They are,
                          1) Arch    2) Loop   3) Whorl
          Using these three patterns it will differentiate the people. It's shown in Fig 1.3
Arch: The ridges enter from one side and exit the other side of the finger. This ridges form center arc.
Loop: This type of ridges enters from one side and exit at the same side which it enter and this forms a curve.
Whorl: This ridges present in center, forms circular on the finger.
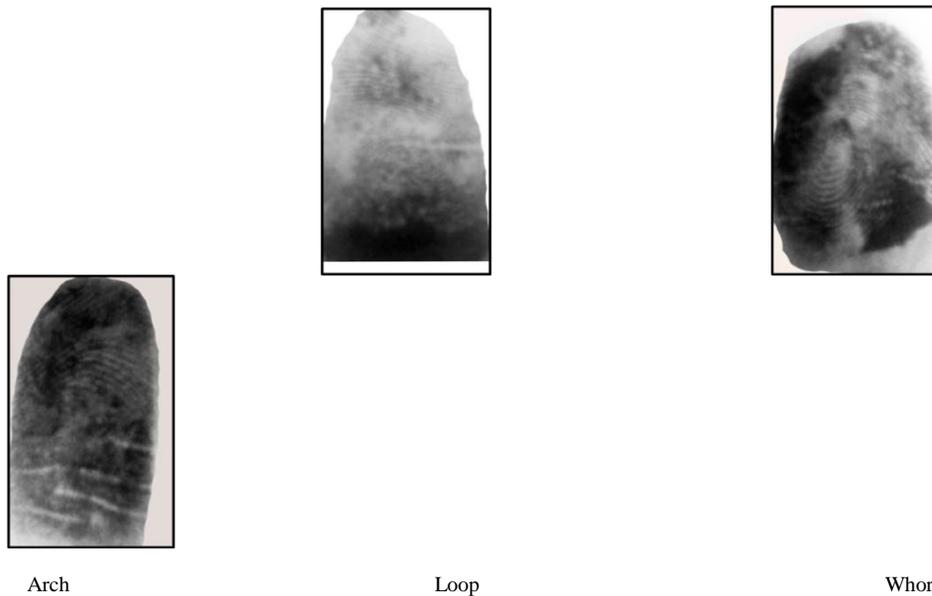
|  |  |  |
|---|---|---|
| Arch | Loop | Whorl |

Fig 1.3 Three patterns of Ridges

For further identification Fingerprint ridges are Ridge Ending, Bifurcation and Short Ridge. It's given below Fig 1.4.



Fig 1.4 Identification of Fingerprint Ridges

Ridge Ending: It is the level at which a ridge stops.
Bifurcation: It is the point which a single ridge is divides into two ridges.
Short Ridge: It is the ridge which is small compare to other ridges. These three ridges are minute features of Fingerprints

*B. GSM/GPS*

The GSM (Global System for Mobile Communication) module is required to develop communication link between the user of the vehicle and security system. In the SIM 900 module is used. AT commands were used to control this module.GSM Modem provides full functionally capability to serial devices to send SMS and data over GSM Network [4]. This SIM 300 provides GPRS service. The current usage is as low as 2.5mA in sleep mode. SIM (Subscriber Identity Module) is used to store information and messages. It communicates with ARM controller using asynchronous serial communication with a baud rate of 9600 and its voltage is 3.2 - 4.5v. If the bike is theft (or) taken by someone, by sending SMS to lock the bike [3][1]. GPS (Global Positioning System) is a Satellite based navigation system made up of a network of 24 Satellites [4]. It is used for tracking of the vehicle. Media Tek GPS MT3329 is used that supports up to 66 channels of satellite searching with -165dBm sensitivity and 10Hz maximum update rate for precise GPS. Using GPS we can able to identify the perfect (or) accurate location of the bike [3]. GPS satellite circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS Receiver takes this information and use triangular to calculate the user's exact location.

*C. SOLENOID VALVE*

A solenoid valve is an electromechanically operated valve. The valve is operated by an electric current through a solenoid valve in the case of a two – port valve. Solenoid valve are the most frequently used control elements in fluids and their tasks are to shut off, release, distribute (or) mix fluids.

The parts of the solenoid valve is described below is shown in fig 1.5

1). *Valve Body:* The body of the valve is called body valve. The valve is usually connected in the process flow of petrol in the bike.

2). *Inlet valve:* This is the port which the petrol enters inside the automatic valve and from here it can enter into the engine of the bike.

3). *Outlet port:* The petrol enters through Inlet port and leaves to engine by outlet port. The outlet port is eventually connected to the process where the petrol is required.

4). *Solenoid valve:* The body of the Solenoid coil is cylindrical in shape and it is hollow form inside the solenoid valve there is solenoid coil.

5). *Coil windings:* The coil form the shape of the hollow cylinder and it consist of several turns of the wire which is wound around the ferromagnetic material like steel (or) iron.

6). *Lead wires:* It is external connections of the solenoid valve that are connected for electrical supply.

7). *Plunger (or) Piston:* It is placed in the hollow portion of the solenoid valve and its shape is solid round metallic part.

8). *Spring:* It is round shape helps to movement of plunger. The spring performs very crucial action inside the hollow space. If the spring was not          there the plunger would have moved up when the petrol is present and moved down when the petrol is not there. Thus the spring actually drives the plunger to carry out the control of the fluid. It permit the movement of the plunger only to the extent when the electric current is flowing through the solenoid valve.

9). *Orifice:* The orifice is an important part of the valve through which the petrol is flowing. It is the connection between the inlet and the outlet port. The flow of petrol from the inlet port to the outlet port takes place from this port.
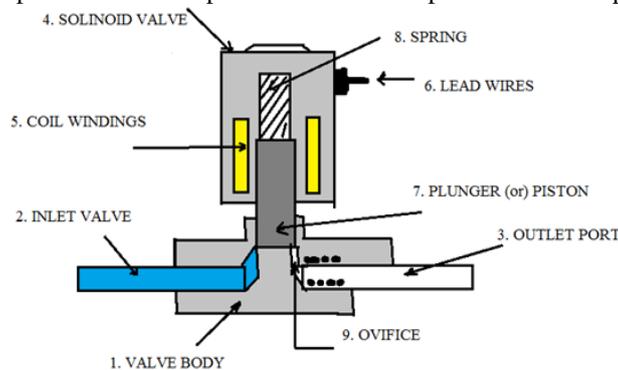


Fig 1.5 Parts of Solenoid Valve

*D. Working of Solenoid Valve*

The current is supplied to the solenoid valve Fig 1.6 from lead wires. The magnetic flux is generated inside the hollow space when the electric field is supplied plunger tends move vertically in the hollow space. The spring tends to stop the motion of the plunger this action of the spring against the magnetic field helps keeping the plunger in the position where the flow of current to the solenoid valve is stopped. Then the opening of the orifice is operated by the handle, but on the chances of the solenoid valves, the opening of the orifice is functioned by plunger. The movement of the plunger is in turn controlled by the spring and the current flowing through the solenoid valve. When the solenoid valve is excited, the current flows through these wires to the solenoid valve and it de-energized the flow of the current stops.
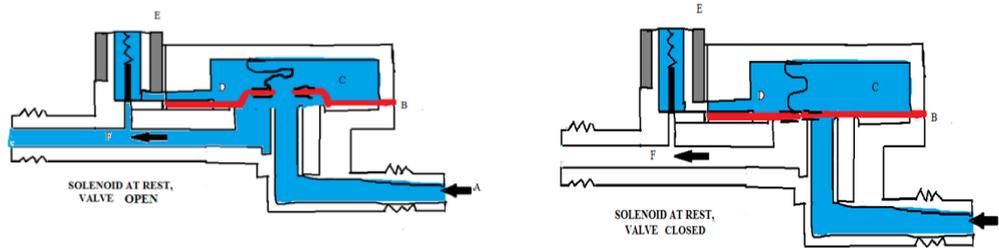
Fig 1.6 Working of Solenoid Valve

## IV. EXPERIMENTAL RESULTS

The results are obtained after carrying out the experimentation by using the following hardware components. The components are Fingerprint Sensor, GSM/GPS and solenoid valve and which is implemented by program code done by using Keil µ-vision Software. When the finger ridges of the user is matched. The bike will start and the port of the solenoid valve allows petrol to engine and also the message is sent to the user mobile through GSM mobile. When the user switch off the bike (or) the valve is closed and also the message is sent to the user mobile as shown in Fig.1.7.
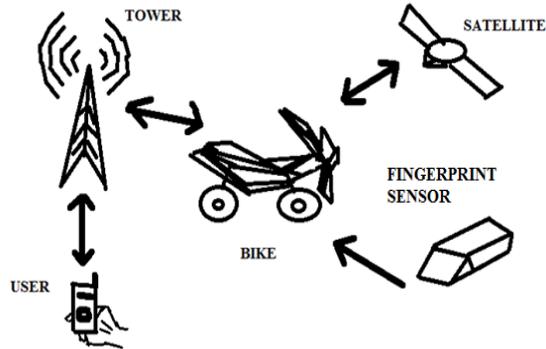


Fig.1.7 Overall view of Bike Security System

If the other users want to take bike, the finger ridges is matched. Then the message is sent to the owner. If the bike is theft, the user identified the bike by using GPS module. By sending "Valve off" message to the module. Suddenly, the flow of petrol to the engine stops.

## V. CONCLUSION

Our proposed Fingerprint, GSM/GPS based bike security system is the advanced and reliable version of security mechanism for two wheeler vehicles. Small size of the module is to be placed under the seat of vehicles. The solenoid valve is the hidden part which is placed near the petroleum valve. We believe that bike theft is minimized by installing our proposed security system. When the theft of the bike is identified, the SMS send to the ARM controller, from the controller it close the port of the solenoid valve. We can easily track the vehicle by using GPS.

## ACKNOWLEDGMENT

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## BIOGRAPHY

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