

# Fuel Theft Detection System

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**Abstract**—In this paper we have focused on developing an enhancement of the vehicle alarm security system via SMS. The system will manipulate a mobile phone to send SMS. Even though the SMS can be sent using the features available in the mobile, the objective of this experiment is to activate the SMS sending by the mobile phone using external program connected physically to the mobile phone. Antitheft security system utilizes an embedded system designed with GSM to monitor and safeguard a car. In attempt of theft the system sends text message to the car owner and at the same time starts up an alarm from the buzzer installed within the system. The safety of vehicles fuel is extremely essential for public so this project came to our notice due to the alarming rate at which vehicles fuel are being stolen in our country and with this design our vehicle can also be monitored irrespective of where it is parked, provided there is a GSM network coverage. Our model (theft detector) uses very few electronic components and looks very small and compact and can be mounted on vehicles easily.

**Index Terms**— Fuel tank, PIC controller, Liquid Level Sensor, GSM Technology, LCD Display, IR sensor, GSM module, Solar panels.

## I. INTRODUCTION

Nowadays all world become digital so that we can easily deals with real time system. At same time digital fuel meter also implemented in recent vehicle system but actual fuel present in fuel tank of bike not shown in term of digits that show in terms of bar or deflecting needle so that we did not get idea about actual fuel present in fuel tank of bike it only show level of fuel present in fuel tank. To solved this problem we developed system digital fuel meter that indicate value of fuel in digits and fuel theft value of fuel shown in digits such as 1lits, 1.5lits, 2lits etc. The digital fuel meter is applicable for only for two-wheelers bikes. In our project we can add features of such as distance travelled by bike within certain amount of fuel so that we can calculate performance of bike in terms of millage.

Sometimes customer fill fuel in terms of petrol from petrol filling pump they filled the petrol in digitally but in our bike there is no digital system there is bar or deflection needle system so that it not give the accurate fuel filled by customer so the petrol filling pump owner is cheated on customer but customer do not know about cheating due to traditional system because sometime fuel may minimum or maximum than filled value. All benefit goes to the petrol filling pump owner so that they many times cheated with customer.

All vehicle has bar or deflecting pointer measurement system so that they don't know the exact amount of bunk into bike so

that owner of petrol bunk station easily cheated on customer. Thus idea of Digital Fuel Meter is applicable for fuel indication and fuel theft also helpful to avoid cheating of customer from petrol filling station owner.

## II. FUEL THEFTING

Fuel theft from fuel tank is another measure problem in all over world fuel thefting is malpractice which consists of fuel stole from fuel tank omnipresence of owner of bike. The owner of bike unaware from fuel theft & he will know fill theft when he ride bike next time sometimes because of fuel thefting he have to face lot of problems. To avoid such problem Digital Fuel Meter should be implemented in bike. Because of Digital Fuel Meter in that PIC microcontroller used so that it send SMS to owner of bike when fuel get theft using GSM module and buzzer will start to indicate that fuel get theft all this process is real time so that more accurate and secure.

## III. MODELING AND DEVELOPMENT OF SYSTEM

### A. Block Diagram

GSM based Vehicle Fuel Theft Detection System with SMS indication has application in Car, Bikes and all other vehicles. This project has a GSM modem which send sms to owner of vehicle when there is fuel theft going on. Vehicle Petrol theft is one of the main concerns of many bike owners and car owners. Many times we have heard or some of us have already faced that petrol from their bike or cars has been stolen. Main intention of this project is to avoid such situation. In SMS based petrol theft detection system, we have used a Level sensor to detect the petrol level in petrol tank. If the level goes below certain threshold level then this sensor gives a particular signal to the microcontroller. Then microcontroller turns on the buzzer and sends SMS to the car/bike owner. Microcontroller is a main heart or Central Processing Unit of the system.

In this case petrol or the diesel level will decrease which can trigger the microcontroller through the level sensor. To avoid this situation we have taken a signal from ignition key. Whenever the bike owner or car owner or driver inserts key into the ignition lock and switch it on then at that time a signal will be given to the microcontroller. This way microcontroller understands that the bike/car has been started and so it will not monitor fuel level. We have provided bike ignition key with this project. Level sensor is turned on only when the key is removed from the ignition lock. So once the person gets out of the car

then he/she will remove the key and system is activated.

Circuit diagram is shown. We have used PIC 16F877A Micro controller. LCD16x2 is connected to Micro controller to display the level of fuel and gear. For sending a message of Fuel Thefting we have used GSM Modem. Buzzer is used for alert. Initially limit switch is used to turn ON ignition. After ignition LCD will display current value of fuel level and Gear level. By pressing start switch vehicle will start and it consume some amount of fuel present in the fuel tank. In running condition of vehicle we must have to change the gear level of vehicle, this changeable gear level is also display on LCD. After some time we will stop vehicle, at that time the current level of fuel is stored in micro controller memory. While fuel Thefting occurs then Fuel level goes down and message send to owner by using GSM Modem. At that time Buzzer will ON. From that we will come to know fuel thefting was occurred.

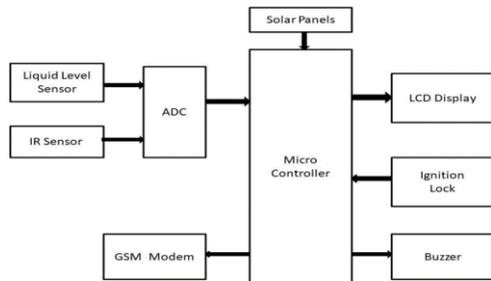


Fig. 1. Block diagram

### B. Solar Panels

In the above block diagram there will be an external power supply given to system. Because this entire system works only the when the vehicle is locked. But the digital fuel meter works even when the vehicle in moving. For giving the power supply to the we are using solar panels to charge the circuit. Because when the vehicle is locked the power supply of the vehicle will also be turned off so we are using solar panels to charge the circuit and store the energy and use that energy to run the circuit when vehicle sis locked. The pic microcontroller needs only five volts power supply if the power given by solar panels is more the we can use a five volt voltage regulator to bring the power supply to five volts.

According to the National Renewable Energy Laboratory, the sunlight received by earth in one hour is enough to meet the annual energy needs of all people worldwide. Solar energy is suitable for heating and electricity generation using photo voltaic cells. Solar power can restrict climate change as it produces no carbon emissions. Solar energy is the best alternative, which can replace the fossil fuels like coal and gas for electricity generation that create air, water, and land pollution. The solar power can be stored in a battery for future use. The efficiency of a solar charging system depends on the weather conditions. Solar panels generate the most electricity on clear days with abundant sunshine. Commonly, the solar

panel gets four to five hours of bright sunlight in a day. If the weather is cloudy, it affects the battery charging process and the battery does not get a full charge.



Fig. 2. Solar panel

### C. Algorithm

The digital meter follows a sequence as discussed above. The functions are as follows:

1. Start
2. Initializing the switch of vehicle
3. Start the engine of the vehicle
4. Display the level of the fuel and gear on LCD
5. Keep the engine ON, and display current value of fuel level and gear level.
6. Stop the engine of the vehicle
7. Store the petrol level value
8. If the petrol level goes down from stored value during thefting.
9. Then send message to owner and buzzer of vehicle will ON
10. If not then go to step no 7
11. Stop

### IV. EXPERIMENTAL RESULTS

As shown in figure we can see that digital fuel level as a zero. In this way we get the fuel level in the digital format. This is the complete simulation output for the project. When there is fuel thefting occurs buzzer will on and message will sent on owner mobile according to the delay time set in the microcontroller.

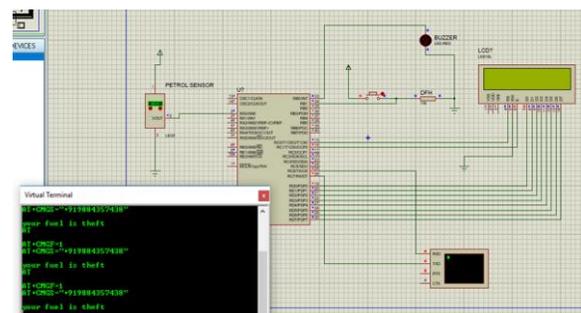


Fig. 3. Experimental results

### V. CONCLUSION

Digital Fuel Meter used for prevention from fuel theft & also

it display the available fuel in tank in digitally. This meter is more advantages over analog meter by PIC microcontroller and GSM owner of bike is aware from fuel thefting using buzzer or SMS to the owner of bike. We increase the standard of measurement system using Digital Fuel Meter because of Digital Fuel Meter cheating with customer by fuel filling station can be avoided and performance of system also improved with the help of Digital Fuel Meter.

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