



## Automatic Fuel Checker and Theft Indication for Automobile

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**Abstract**— *There is no maintenance of actual record of fuel filled and fuel consumption in vehicles. To avoid this we are implementing a ARM based fuel monitoring and vehicle tracking system. We have used the reed switch which works according to the principle of Hall Effect which sense the amount of fuel filled in the vehicle and amount of fuel consumed. This system stores the record for several logs[ 1]. we have used the GSM technology to track the vehicle. In this paper, the implementation of embedded control system based on the ARM is presented. The embedded control system can achieve many tasks like effective fleet management, such as fuel monitoring,antithefting, vehicle tracking. Using GMS vehicle tracking technology and viewing interactive maps enable us to see where it was losing money, time and wasting fuel. GSM system is installed in the vehicle for sending the information to the owner of the vehicle. costs of Fuel is rising constantly so it challenge fleet operators to maintain movement of vehicles and monitor driver behavior to avoid delaying traffic conditions by either, combining deliveries, reconfiguring routes or rescheduling timetables. This helps to maximize the number of deliveries while minimizing time and distance. Escalating oil prices are increasing costs for many businesses, particularly those with large vehicle fleets, adding a powerful financial impetus to the search for fuel efficiencies. Implementing real-time vehicle tracking as part of a commercial company's mobile resource management policy is essential for comprehensive operational control, remote driver security and fuel savings.*

**Keywords**— Microcontroller, Fuel Level Sensors, Flow Level Sensors, LCD Display ,GSM.

### Introduction

The petroleum products are important and rare creations of the nature. The proper maintain, use and distribution is important task to survive these products. Our system provides security of petroleum products distribution such as petrol, kerosene

and diesel, etc. the project we have developed. Which will use to provide security to the fuel distribution and helps the data keeping of the distributed fuel. The advancement of the project to large scale can aims financially to the industry indirectly. The main aim of our project satisfies all the requirement related to secure distribution of the industrial products.

The challenges of successful monitoring include efficient and specific design, and a commitment to implementation of the monitoring project, from data collection to reporting and using results. Applications of commercial vehicle tracking solutions in the fields of logistics ,transport, haulage and multi-drop delivery environments can include optimized fleet utilization, operational enhancements and dynamically remote-managed fleets. [2] Rising fuel costs challenge fleet operators to maintain movement of vehicles and monitor driver behaviour to avoid delaying traffic conditions by either, combining deliveries, reconfiguring routes or rescheduling timetables. This helps to maximize the number of deliveries while minimizing distance and time Escalating oil prices are increasing costs for many businesses, particularly those with large vehicle fleets, adding a powerful financial impetus to the search for fuel efficiencies. Implementing real-time vehicle tracking as part of a commercial company's mobile resource management policy is essential for comprehensive remote driver security, operational control, and fuel savings.



## I. Material and Methods

### A. Hardware Architecture:

Micro-controller LPC2138 is the heart of the project. Flow sensor is used for the measurement of the flow of the petrol in the tank, to check whether the petrol is filled correctly according to the amount entered by user through keypad. Keypad is used to enter the amount of petrol in the fuel indication mode.

There is button on keypad for the mode indication. There are two modes:

- 1] fuel checker
- 2] theft indication.

In the fuel checker mode, there is checking of fuel is done .i.e. fuel is filled according to the entered amount or not. For that purpose we are using flow sensor. When user enters the quantity of fuel, solenoid valve is open and flow sensor measure the quantity of fuel is equal with the entered quantity or not. If it filling is not complete then buzzer will on.

Second mode is the theft identification mode. In this mode, level sensor checks the level of the fuel. If level of fuel changes in standing position that is when vehicle is stop, then buzzer will get on. At the same time message will send to the particular person i.e. to the owner of the vehicle.

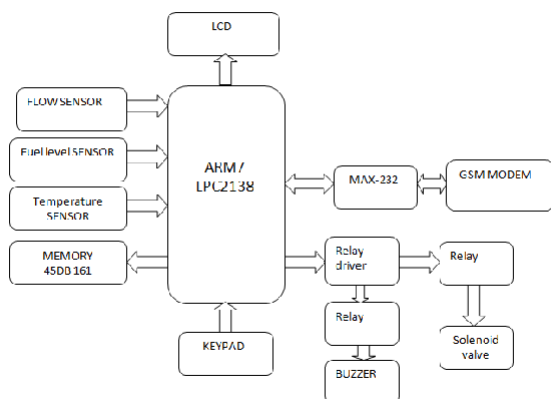


Fig.1.Block Diagram

An anti-theft system:

this system is a device or method used to prevent or detect the unauthorized appropriation of items considered valuable. Theft is one of the most common and oldest criminal behaviours.

Anti fuel system:

A highly accurate fuel level/consumption adapter, delivering a real time theft alert even when ignition is switched off (parking) and a very low deviation.

The eFuel solution incorporates:

- Non-intrusive, quick and simple installation
- Fuel level reading – similar to dashboard fuel gage

-Alert fuel theft at all times (!) including when switch is turned off

-Notification and details of refilling events eFuel is specially designed to report and alert of fuel theft and refueling events using the vehicle's original fuel sensor. eFuel converts the original float sensor data into clear, simple information and offers unique pull-up mechanisms designed to monitor changes during IGNITION On/Off. eFuel is designed to use ERM's proprietary eNet technology to transmit all events through the StarLink family tracking devices such as the StarLink Tracker. The combination of fuel reading capabilities and alerts even when ignition is switched off, makes eFuel a perfect solution for fuel management and fuel theft alerting.

Hardware specifications :

GSM:



Fig.3.GSM

GSM is Global System for Mobile Communication. it is the world's most widely used cell phone technology. GSM was developed to be a secure wireless system. It has considered the user authentication using a [pre-shared key](#) and [challenge-response](#), and over-the-air encryption. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. For digital cellular communication Global system for mobile communication (GSM) is a globally accepted standard. GSM is standardized in 1982 to create a common European mobile telephone standard that would evaluate specifications for a pan-European mobile cellular radio system operating at 900 MHz .It is estimated that many countries outside of Europe will join the GSM partnership.

Flow Sensor:

This sensor sits in line with your water line and contains a pinwheel sensor to measure how much liquid has moved through it. There's an integrated magnetic hall effect sensor that outputs an electrical pulse with every revolution. The hall effect sensor is sealed from the water pipe and allows the sensor to stay safe and dry

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Fig.2.Flow Sensor

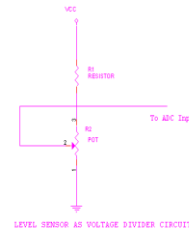


Fig.5.Variable resistance principles

#### Level Sensor:

Level sensor also called as fuel/petrol gauge is used in auto mobile industry to measure the level of fuel in vehicle. It operates on variable resistance principle. As the movement of float of the sensor takes place its resistance varies accordingly. The change in resistance is in the range of 1 Ohm to 100 Ohms. By connecting resistor of 100 Ohms in series with this level sensor we can create voltage divider circuit. The voltage divider circuit is shown in following figure.

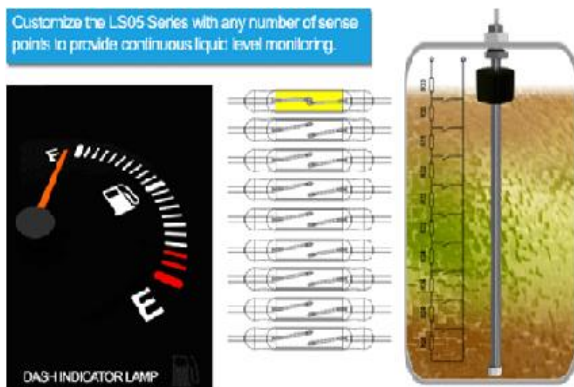


Fig.4.Fuel Level Sensor

As the resistance varies the voltage applied to the ADC get varied. Accordingly we get the output at ADC. Then by writing appropriate software we can display level on LCD.

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#### B. Algorithm:

1. Start
2. Initialize all the modules
3. Check the mode
4. If it is fuel checker mode,
  - Then,
    - i. Read the values from the keypad
    - ii. On the solenoid valve
    - iii. Check the amount of fuel entering from the flow sensor and compare it with the keypad entered value.
    - iv. Display the value on LCD
    - v. If it is matched the off the solenoid valve
    - vi. Else repeat step no. iii
5. If it is in the anti fuel mode,
  - Then,
    - i. Read the values from the level sensor input
    - ii. Check this values with the actual values
    - iii. Display the value on LCD
    - iv. If it is match then set buzzer signal as 0
    - v. Else
    - vi. buzzer =1 (beep the buzzer)
6. Stop

#### II. Result and Analysis

The obtained results matched our design goals as the vehicle was tracked with desired accuracy. quantity of Fuel was successfully sensed and transmitted to the required distance. Proposed system for Vehicle fuel Security System is the reliable, advanced and robust version of security mechanism for two wheelers and four wheelers.

#### III. Future Scope

- a .Hopping code algorithm could be used in Remote Keyless System (RKS) for added security.
- b. Presently only SMS feature is available, we can include the Call feature for more fast results.



- c. SIM 300 even supports GPRS coding schemes hence data network could be used to send alerts and receive control messages.
- d. Microphone could be interfaced to the GSM module so that during theft activity voice call could be established with the owner enabling him/her to be able to listen and record the conversation of people around the vehicle.
- e. Hall Effect sensor could be used to find the position of gear, which could be displayed with a single seven segment display

### **Acknowledgment**

We present a "AUTOMATIC FUEL CHECKER AND THEFT INDICATION FOR AUTOMOBILE".

With great pleasure submitted to 'Savitribai Phule Pune University, Pune.'

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