

Fuel Quantity Detector

A PROJECT SYNOPSIS

SUBMITTED BY

Ishan Modi(N18018)

Malay Sheth(N18010)

Ritu Swain(N18017)

UNDER THE GUIDANCE OF

Prof. Smita Kadam

**SUBJECT: EMPLOYABILITY SKILLS AND MINI PROJECTS (ESMP)
TE (ELECTRONICS AND TELECOMMUNICATION)**



**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION
HOPE FOUNDATION'S
INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY,
HINJAWADI, PUNE(MH)-411057
SAVITRIBAI PHULE PUNE UNIVERSITY
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Project Details

Problem Statement

Real Time Monitoring of Fuel Quality and Quantity

Introduction

The present world that we live in, where ever our eyes steer there we can see variants of automobile. Life has become faster due to them and so has it increased the fuel consumption rate. But the real question is the fuel consumption data that they show us actually true?

Why does it matter?

Oh it does.

Especially when you are a general public who reads, hears about fuel theft. The worse part is you are a victim even without knowing that you are.

Therefore here we are designing a project to eliminate this theft. A project that is based on ultrasonic fuel detection system. The Ultrasonic sensor in the setup will help detect the present fuel quantity in your tank to give you clarity regarding the actual fuel status. This will protect you from being a victim of fuel theft.

Objective

Objectives of the project are:

Real time quantity detection of fuel in the tank.

Outcome

After completion of project, we will be able to decrease the amount of fuel thefts, and ensure our safety from becoming a victim of a fuel theft scam.

Abstract

In recent years, control systems have created their spot in the developing world and have grown in importance in the field of development and advancement of modern civilization and technology. Practically, every aspect of day-to-day activities is af-

ected by some type of control system. Control systems are found in abundance in all sectors of industry such as quality control of manufactured products, automatic assembly line, machine-tool control, space technology and weapon systems, computer control, transportation systems, power systems, robotics, automobile sector as well. Nowadays, at many of the petrol pumps, we dont get the exact amount of petrol as shown by the filling machine. The amount of petrol we get is comparatively less than the amount we should actually get. In todays modern and digital world, if the fuel indicator in the vehicles is made digital, then it will help us to know the exact amount of fuel available/filled in the tank. The above limitation is challenged in our project. We have opted for a safer way of finding the fuel quantity. The exact amount of fuel available in the tank will be displayed digitally by making the use of an Ultrasonic sensor. The ultrasonic sensor makes a no-contact system, with low power requirement and good accuracy. It overcomes the problems of contact systems and also fulfils the requirement of fuel quantity detection. To summarise, this project is a contactless fuel level detector .

Project Category

Embedded Systems for automobile.

Proposed system

Our proposed system consists of an ultrasonic sensor to detect the fuel level and a LCD display to show the values. Ultrasonic sensors are known for their low-cost and easy availability to complete several distance finding requirements. Therefore in this work, HC SR-04 which is ultrasonic electric telemeter module was employed as ultrasonic transmitter and receiver. This has come handy to find the fuel level inside the tank letting you the real time fuel quantity. This module can measure a distance within 2 cm to 400 cm effectively and transform the data into impulse of different width. At first 5us, pulse is applied through the pin SIG of the module which triggers the transmitter to generate 40 kHz ultra sound signal string. At the moment the receiver

catches the reflected wave it generates a high pulse width which corresponds to the time that the signal takes to reflected back. By using this pulse width we can measure the distance as well as the fuel level.

Circuit Diagram

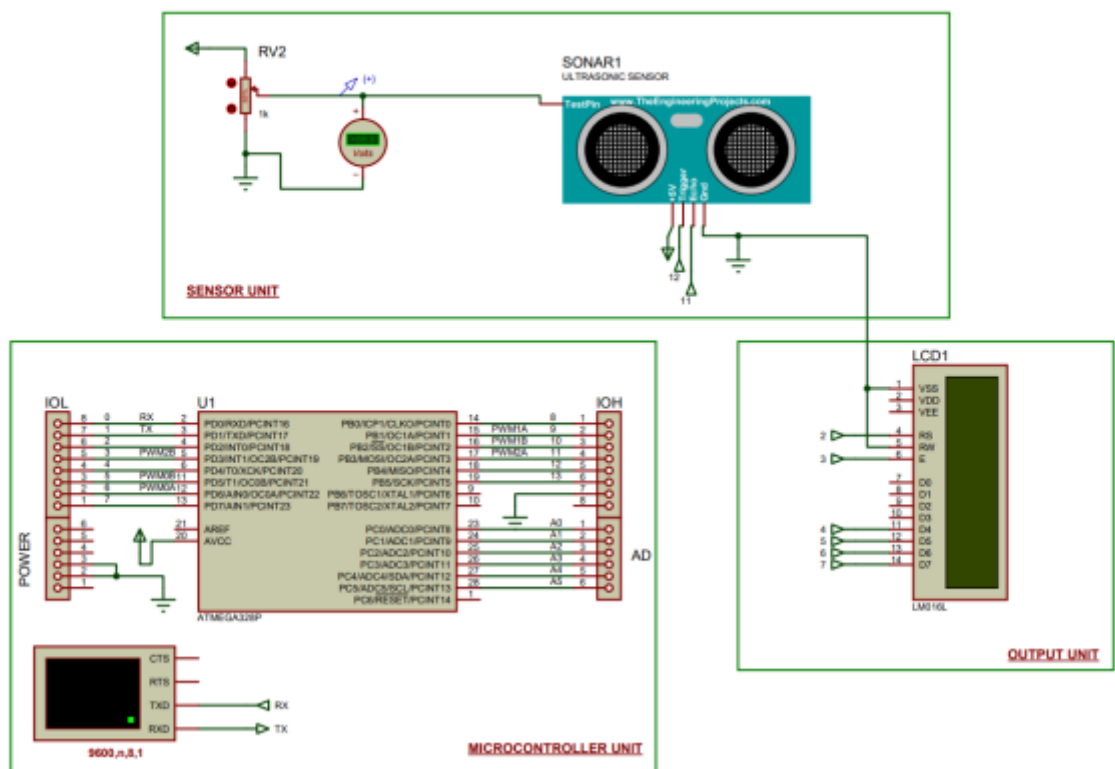


Figure 1: Circuit Diagram of Fuel Quantity Detector

Requirement of resources and limitation

Resources Required Are :-

- Atmega328P microcontroller IC
- HC SR-04 Ultrasonic sensor
- 16*2 LCD display
- PCB

- 5v button cells
- Mounting base to hold the components
- Proteus Software for Simulation

Limitations Of The Project Is :-

Different vehicles have different dimensions and styles of tanks, some of them are not straight cylindrical or cubical tanks, they are slant tanks of random shape. So in such cases this product might not give the correct/accurate results.

Impact Analysis

Impact of our project on society and environment:

- Usefulness (positive impact): LCD helps you see the quantity of fuel present in tank and prevents you from being cheated at fuel pumps.
- Harmfulness (negative impact): The major problem with this system is that, if proper connection is not done then due to short circuit there will be a blast in petrol tank.

Future scope and Further enhancement

This same project can be embedded with fuel quality detection system since fuel adulteration cases are in huge number reported every year in only India, and same is the situation in other countries too. Hence quality detection and generalisation of this product can be done in future such that it becomes compactible to fit on any kind of vehicle irrespective of its tank dimensions, shape and size.

Conclusion

The proposed idea consists of ultrasonic technique for fuel measurement that acquires

the measured fuel level and sends to the display unit which is present on the dashboard. The data acquired from the sensor is given to the microcontroller . The processor processes the data by calculating the liter value that send to the display unit. Through this data we can determine the fuel levels, which in turn will help in reducing fuel theft.

Table 1: PROJECT PLANNING: (Timing Analysis)

Parameters	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Formation of group	Y												
Identification of problem statement		Y											
Literature survey		Y	Y										
Objectives and outcomes			Y										
Proposed system (methodology)						Y							
Simulation/ Bread board testing)						Y	Y						
PCB designing and manufacturing								Y	Y				

Table 1: PROJECT PLANNING: (Timing Analysis)

Parameters	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Testing and verification										Y			
Report writing											Y	Y	
Final presentation/ demo													Y
(color the cells selected for the task/parameter to be perform)													