

Non-Contact Fuel Level Measurement System Using GSM

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Abstract- In earlier fuel level measurement systems, to measure the liquid in storage tanks a dipstick is used, that is inserted and then removed from the storage tank. While this may provide a general estimate of the amount of fluid in the storage tank in some circumstances, it is both cumbersome to use and subjective in how the fluid level is read. Traditional devices for sensing or providing information on fluid levels have generally been analog devices that had limited accuracy. Many of the prior systems also utilized electrical parts that created hazards due to the volatile nature of the gasoline or flammable liquid. Therefore, there is a need for a system and method that can accurately and safely determine the amount of gasoline or other flammable fluids in storage tanks, while being economical and easy to manufacture and install. In this paper, measure liquid level volume without making physical contact with the liquid it self using GSM.

Keywords- Ultrasonic sensor; Microcontroller; GSM

I. INTRODUCTION

The paper aim in designing a system that will measure the fuel level in containers or tanks. At petrol pump the tanks of fuel are underground. And it is not possible to measure the fuel level visually. Traditional devices for sensing or providing information on fluid levels have generally been analog devices that had limited accuracy. Many of the prior systems also utilized electrical parts that created hazards due to the volatile nature of the gasoline or flammable liquid. In this system the fuel level is measured without making direct contact with the fuel. We are using ultrasonic sensor to measure the fuel level in tank. GSM module is interfaced with this system. So if the level of fuel goes beyond particular level then it will send the message to the manager of installation and petrol pump owner. So that petrol tankers are sent to refill the tank. Using ultrasonic sensor, there is no physical contact with the fuel. So there is safety from hazardous nature of fuel. This paper shows the GSM as a modern technology that can be used to reduce the cost to replace the others traditional methods. It is intended to describe information regarding measurement of fuel using ultrasonic sensor.

II. METHODOLOGY

Ultrasonic sensor is used to measure the level of fuel in the tank. The measure level of fuel is display on the LCD. If level of fuel in the tank is below set point, using GSM message will automatically send to the Installation Site. Then the tanks are send by the Manager at petrol pump to refill the tank. One

provision in the system is that if the petrol tanker is going nearby the petrol pump, then the carrier of the tanker will ask the petrol pump owner about the level of fuel in tank. For security purpose password is kept, so that one having password can only use the system.

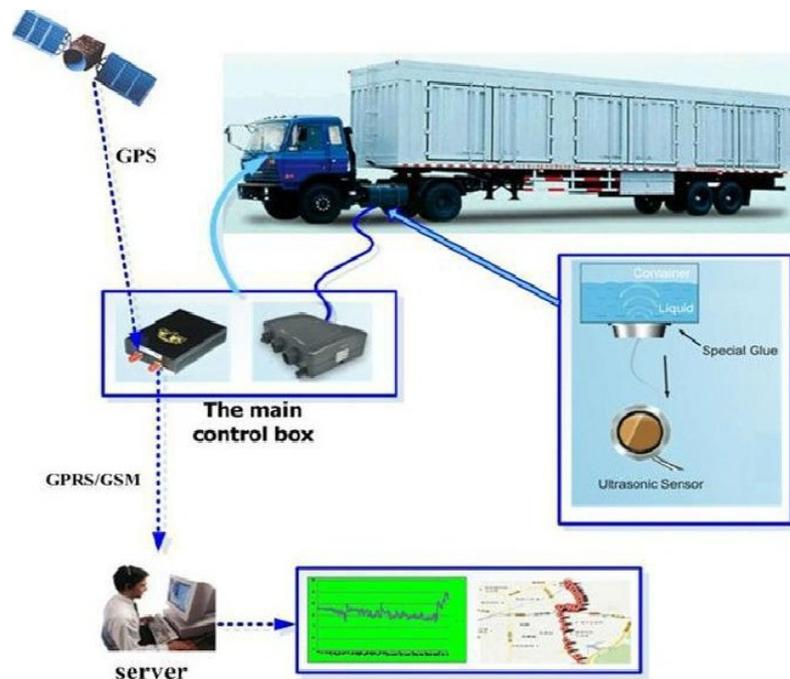


Figure 1. Methodology of System

III. BLOCK DIAGRAM

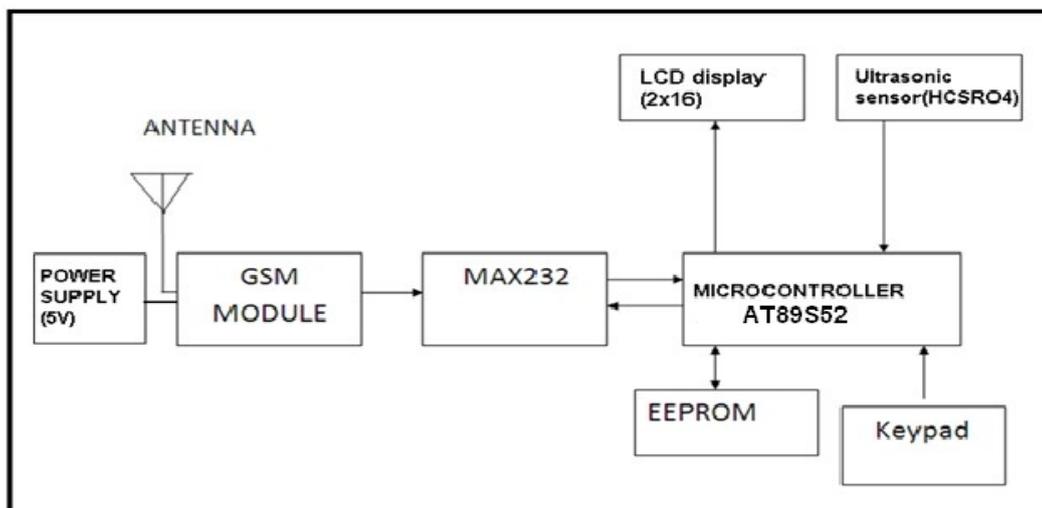


Figure 2. Block diagram

2.1: Block Diagram/Hardware Description

2.1.1. GSM Module (sim 900)

The GSM modem is a highly flexible plug and play quad band SIM900A GSM modem for direct and easy integration to RS232 applications. Supports features like Voice, SMS, Data/Fax, GPRS and integrated TCP/IP stack.

2.1.2. MAX 232

MAX232 is a very common IC basically required for interfacing controller to PC. MAX 232 IC basically converts RS232 voltage level into TTL voltage level i.e. $\pm 10V$ to $5V$. MAX 232 is used not just used for PC interfacing it is also used to interface different modules.

2.1.3. AT89S52 (MICROCONTROLLER)

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout.

2.1.4. EEPROM

Unlike bytes in most other kinds of non-volatile memory, individual bytes in a traditional EEPROM can be independently read, erased, and re-written. When larger amounts of static data are to be stored (such as in USB flash drives) a specific type of EEPROM such as flash 4 memory is more economical than traditional EEPROM devices. EEPROMs are organized as arrays of floating-gate transistors.

2.1.5. Ultrasonic sensors (HCSR04)

HC-SR04 is an ultrasonic ranging module that provides 2 cm to 400 cm non-contact measurement function. The ranging accuracy can reach to 3mm and effectual angle is $< 15^\circ$. It can be powered from a 5V power supply.

IV. CIRCUIT DIAGRAM

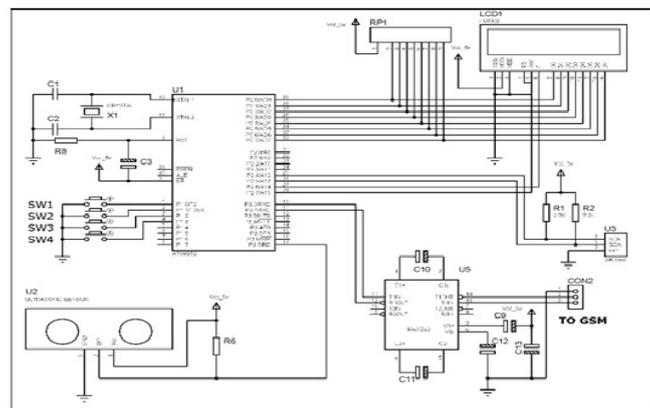


Figure 3. Circuit Diagram

V. CONCLUSION

This paper will help to measure the level of fuel in underground tanks without making physical contact with fuel. This paper will help in obtaining the higher degree of accuracy in fuel level measurement. So this system can be practically used in various level measurement system. As GSM is incorporated in it, the system is reliable for modern applications.

ACKNOWLEDGEMENT

We like to thanks our guide Prof. Mr. R.K. Nikhade for his guidance. Also, we like to thanks BPCL, Panewadi for giving us sponsorship. Also thanks to our friends, family for their support.

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