2nd National Conference on Recent Innovation in Engineering, Science, Humanities and Management
REVA University, Yelahanka, Bangalore, (India)
29th-30th March 2019 www.conferenceworld.in ISBN : 978-93-87793-79-8

LOW COST AND HIGH SECURITY SYSTEM FOR FUEL TANK

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ABSTRACT

Fuel theft is a very big concern for the police and rural communities. Fuel is stolen from vehicles and storage tanks using siphoning equipment that can vary from basic tubes to more sophisticated arrangements involving pumps and the cutting of fuel lines. In this proposed system we will implement Fuel Tank Guard which will have a sophisticated sensor fitted externally in a discrete location on the outside portion of the fuel tank. If thieves attempt to remove the locked cap of fuel tank or in any way try to attack the tank, then the tank guard alarm will be activated and give an alarm. The fuel tank guard will also send an immediate alert via text. A GSM unit works in conjunction with it to warn of immediate theft attempts and level of fuel will be send to owner at regular intervals. It also includes an anti-siphon product in conjunction with fuel theft alarm. The opportunist fuel thief thwarted by the anti-siphon at the filler neck and the alarm sounds a public warning.

Keywords- Arduino, GSM, LCD, Ultrasonic sensor, Anti-siphon, Vehicle

1. INTRODUCTION

Now-a-days fuel theft is a big issue. Generally fuel is transported by trucks and trains to long distances. The problems associated with these vehicles are to use this fuel effectively and ensure the safety, security and benefits of the users. Security is one of the key issues in modern society. With fleeting time crime rates is also increase in time beings. Furthermore, the fuel price over the past few years is increasing which may effect on the modern life. The vehicle may lose fuel in many ways such as leakage, cracking of fuel tank and fuel theft. It may hamper both safety of life and economic loss.

So, fuel theft from the vehicle is an important issue in many countries in the world. Although there are many alarming issues, in this work preference is given to the unanticipated issue of fuel theft from the transport vehicles. Most of the transport users are counting a loss of a lot of currencies because of this unusual fuel loss. This unexpected fuel loss has a great impact on the economy of a country. It is very alarming and undesirable issue for developing countries like Bangladesh, India and China etc. Petrol and diesel theft is an international problem. In the developing countries the fuel theft rate is incredibly high. So, the issue of fuel theft has become a major annoyance for the users which may one of the causes to derive of temperature and humidity.So here we proposing the system which provides safety and security for the fuel tank.

In this model, we will use keypad module and ultrasonic sensor as input. Arduino is used for controlling the signals and GSM, IR sensor, LCD, alarm works as output.

2.LITERATURE SURVEY

The proposed work contains Pyroelectric infrared sensor used for obstacle detection with small form factor and these devices are useful for triggering an alarm upon the presence of an obstacle. The analog output depends on sensitivity of the sensor and also on environmental conditions. Instead of security reasons these type of devices are used as obstacle detectors[6]. Ecodriving is a good way to reduce the environmental effects of a heavy duty vehicles. The work is done by analyzing 12 buses fuel consumption. Ecodriving reduced the fuel costs by 2-5% and the accident costs by 14-40%. The driver performance will be increased through this ecodriving incentive system[4]. The proposed system contains a sensor fusion technique that exploits a some set of wireless nodes equipped with PIR sensors for tracking people moving in that path. By using above technique 100% accuracy can be made for direction of movement and around 90% accuracy can be made for distance detection[7]. The system consists of RFID tags being attached to all the vehicles and used a PIC16F877A system on chip to detect the vehicles having those tags. If any vehicle is stolen and the system on chips which are placed at every traffic junction are used to detect the stolen vehicle to find the location exactly and if the system on chip detects ambulance then the traffic signals will be controlled and changed[5]. The work consists of using an alarm which is to be turned on when the sensor detects an irregular change in the distance or the movement of the object. Here they kept a minimum distance range around 8 feet and the alarm will be turned on if the distance of object increases[8].

3.PROPOSED SYSTEM

Our proposed model consists of two application; Fuel level monitoring and security to fuel tanks. First we will use a 4x4 keypad module at the outside portion of the fuel tank and the owner will give an individual passkey for each driver for his trucks. Whenever there is a need of filling the fuel the driver needs to open the door through the passkey. If the passkey is correct the anti-siphon product will open automatically. Instead of opening the door through keypad lock if someone opens forcefully the IR sensor will detect the change in distance and the Arduino will control the GSM unit and send the message to truck driver as well as to the owner. And the arduino unit will turn on an alarm along with the GSM. For Fuel level monitoring we will be using an ultrasonic sensor to detect the fuel level at regular intervalsand the fuel levels messages will be sent to the owner. The block diagram of our proposed work is shown in Fig 1. Complete component description is shown in Table 1.

ISBN : 978-93-87793-79-8

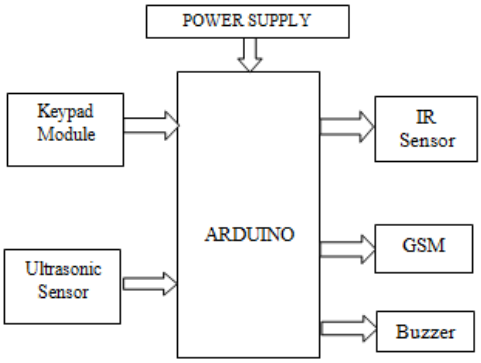
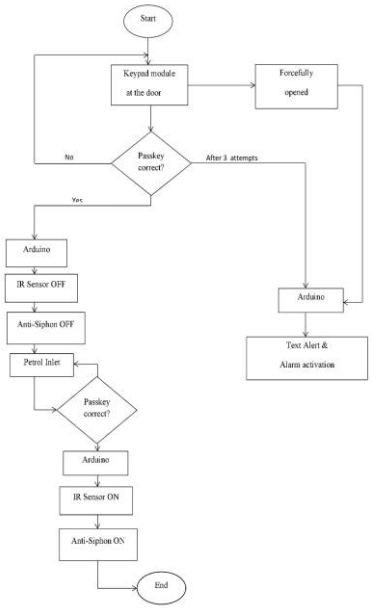


Fig 1: Block Diagram

3.1 ALGORITHM

1. Start the process.
2. Press the passkey of keypad module available at door.
3. If the pressed passkey is wrong, another two attempts will be allowed.
4. If the passkey entry attempts is exceeded or door is opened forcefully, the alarm will be activated and text will be send to the owner and driver.
5. If the passkey entered is correct, the IR sensor and the anti-siphon product will go to OFF condition.
6. After the door is opened, the petrol can be filled into the tank
7. After filling the petrol, again passkey should be enter to close the door
8. If the passkey entered is wrong, again Step 3 is repeated.
9. If the passkey entered is correct then the anti-siphon product will go to ON state and door will be locked.
10. End of the process.

3.2 FLOW CHART



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S.No	Component	Specification
1	KEYPAD MODULE	The 4*4 matrix keypad usually is used as input in a project. It has 16 keys in total, which means the same input values. 4*4 Matrix Keypad Module is a matrix non- encoded keypad consisting of 16 keys in parallel. The keys of each row and column are connected through the pins outside.
2	IR SENSOR	The IR sensor module consists mainly of the IR Transmitter and Receiver, Opamp, Variable Resistor (Trimmer pot), output LED in brief.
3	ULTRASONIC SENSOR	It use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.
4	ARDUINO	Arduino board is used to boot the program from ROM memory and it will wait for the sensor data. And it converts a analog data to the digital using ADC converter.
5	LCD	It is used to indicate the air and humidity in PPM and electrically modulated optical device that uses the light modulating properties of liquid crystal.
6	GSM	It is circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates on the mobile communication bands 900 MHz and 1800 MHz in most parts of the world. In the US, GSM operates in the bands 850 MHz and 1900 MHz.
7	BUZZER	Buzzer is an audio signaling device. It sounds warning form of continuous or intermittent buzzing or beeping sound.

Table 1: Components description

4.CONCLUSION

The system is used to provide better security and safety measures for the fuel tank. By sending the fuel level text alerts at regular intervals will be helpful for owners to monitor the fuel. The fuel level will be changed due to amient temperature if the tanks carrying more than 100L approx. This models is aimed for tanks carrying less than 50L. In future, by using advanced technology safety and security to the fuel tanks can be maximized.

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