

AUTOMATIC OIL TANK TRUCK ALARM SYSTEM FOR FUEL THEFT PREVENTION

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ABSTRACT

Fuel theft has become one of the major causes of concerns for gas station owners. This usually occurs due to irresponsible drivers when they transport the fuel from terminal to the gas stations. Many technologies have been already implemented by many fuel companies to prevent this case, but it has proved ineffectiveness until now. The safety of the vehicle is also important as the fuel should be transported safely without any accidents from the terminal to gas station. In this paper, we provide a digital locking mechanism which prevents the vehicle from being stolen. An SMS is sent to the owner if anyone tries to steal his vehicle. The SMS contains latitudinal and longitudinal position of the vehicle provided by GPS. To prevent collisions ultrasonic sensors are used. After reaching the destination the valve is opened only if the password entered by the owner and the password entered by the retailer match. Otherwise the valve remains closed. This system provides a better security system and prevents fuel theft. It also helps the gas station owners from financial losses.

Keywords: Fuel theft, GPS, Digital locking mechanism

1. INTRODUCTION

The discovery of automobile vehicles is a blessing to human beings from engineering and science. The uses of automobile are increasing day-by-day as a transport vehicle. The majority of transport vehicles are powered by traditional petroleum fuel such as gasoline, octane, diesel etc. The price of these transport vehicles are also increasing worldwide and the high oil price becomes a factor of concern for civilization. As a result advanced security system must be ensured for the fuel safety. Fuel companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Vehicle tracking systems have brought technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common sights on the roads of developed countries. All the existing technologies support tracking the vehicle, place and status. The GPS/GSM Based System is one of the most important systems, which integrate both GSM and GPS technologies. It is necessary due to the many of applications of both GSM and GPS systems and the wide usage of them by millions of people throughout the world. This system designed for users in land construction and transport business, provides real-time information such as location, speed and expected arrival time of the user. This system may also useful for communication process among the two points.

2. RELATED WORK

1 Numerical method for transit time measurement in ultrasonic sensor applications

G. Bucci and C. Landi, IEEE ,vol. 46, 6 Dec 1997

In this paper, the implementation of a novel algorithm for the measurement of the transit time is reported. It has been applied to implement a smart, ultrasonic sensor for the fluid level measurement on a tank by processing the detected signal.

2 Implementation of GPS for Location Tracking

Ahmad Ashraff Bin Ariffin, Noor Hafizah Abdul Aziz and Kama Azura Othman MARA 18 Aug ,2011.

In this paper stand alone global positioning system receivers are widely used nowadays to accurately locating one's position. By using stand alone GPS receivers the distance between two locations on earth can also be measured. This paper implemented a low cost Global Positioning System, The function of the GPS is to locate the position of user.

3 A Microcontroller-Based System for the Monitoring of a Fuel Cell Stack

Giovanni Bucci, Member, IEEE, Edoardo Fiorucci, Member, IEEE, Fabrizio Ciancetta and Francesco Vegliò 13 March 2006

This paper describes the development of a monitoring and managing system for a PEM fuel-cell (FC) stack. This is a stand-alone unit that embodies two microcontrollers, hardware and sensing circuits, an LCD and a numeric pad. The proposed system acquires the most important gas parameters: mass flow rate, pressure and temperature.

4 Interacting Multiple Model Filter-Based Sensor Fusion of GPS With In-Vehicle Sensors for Real-Time Vehicle Positioning

Kichun Jo, Student Member, IEEE, Keounyup Chu, Student Member, IEEE, and Myoungho Sunwoo, Member, IEEE IEEE vol. 13, no. 1, march 2012

In this paper vehicle position estimation for intelligent vehicles requires not only highly accurate position information but reliable and continuous information provision as well. A low-cost Global Positioning System (GPS) receiver has widely been used for conventional automotive applications,

3. EXISTING METHODOLOGY

The vehicle location is found out using GPS so that a constant monitoring of the truck can be done by the owner. GSM is used to send messages related to vehicle's safety that if it is trying to be stolen. In order to avoid collisions and accidents, ultrasonic sensors are used. These are the overall methodologies used in the existing system.

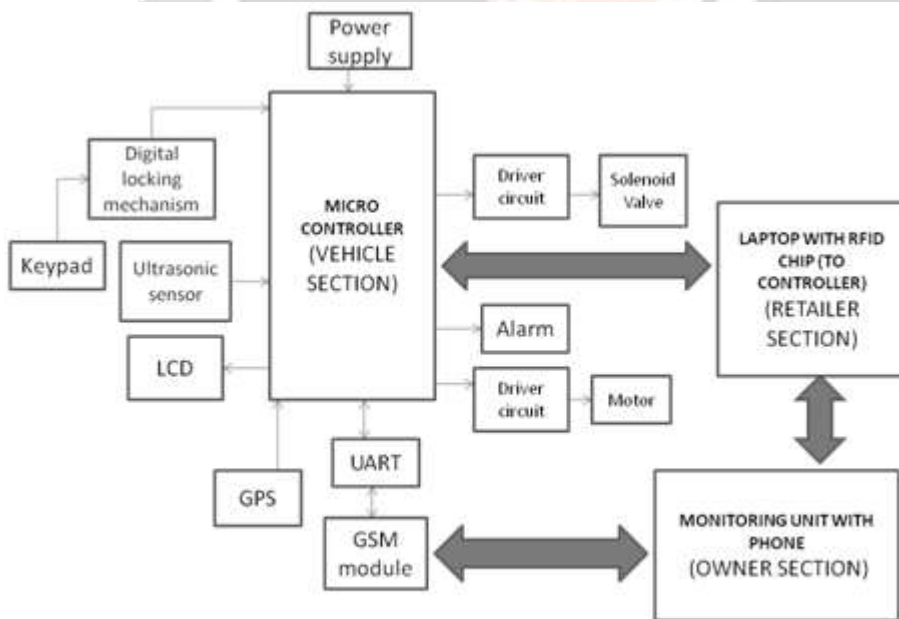
4. PROBLEMS IN THE EXISTING SYSTEM

This method is only able to track the vehicle’s position and send information that a theft happened or that the truck had undergone collisions or accidents. The theft cannot be fully avoided and the vehicle safety is not guaranteed.

5) PROPOSED WORK

In the proposed system for fuel theft prevention SMS alert system is used. In case anyone is trying to steal the vehicle information is given to the owner. Digital locking mechanism is used here. The driver is given a password for starting the vehicle. If the password is entered wrongly, an SMS is automatically sent to the owner. The SMS contains the latitudinal and longitudinal positions of the vehicle. By entering the values of the latitudinal and longitudinal positions in the map, the vehicle location is found out. The vehicle after reaching the destination another password is given for ignition off. Ultrasonic sensors are used to prevent collision of vehicles. The sensors can prevent the collision at a range of 20m. Advanced Security system is used here. The solenoid valve can be opened only if the password from the retailer and the password from the owner match together. If any mismatch occurs the valve remains closed. This security system prevents fuel theft.

5.1 BLOCK DIAGRAM



5.2 BLOCK DIAGRAM EXPLANATION

5.2.1 VEHICLE SECTION

In the vehicle section, a PIC microcontroller is used. A digital locking mechanism is implemented to avoid theft of the vehicle. A keypad is connected to enter the password by the driver for ignition on/off. GPS is connected to PIC for vehicle’s latitudinal and longitudinal position and this information is sent to owner using GSM module based system. The solenoid valve along with driver circuit opens and closes at required conditions set by the owner and costumer. Ultrasonic sensors are used in order to avoid collisions of vehicles.

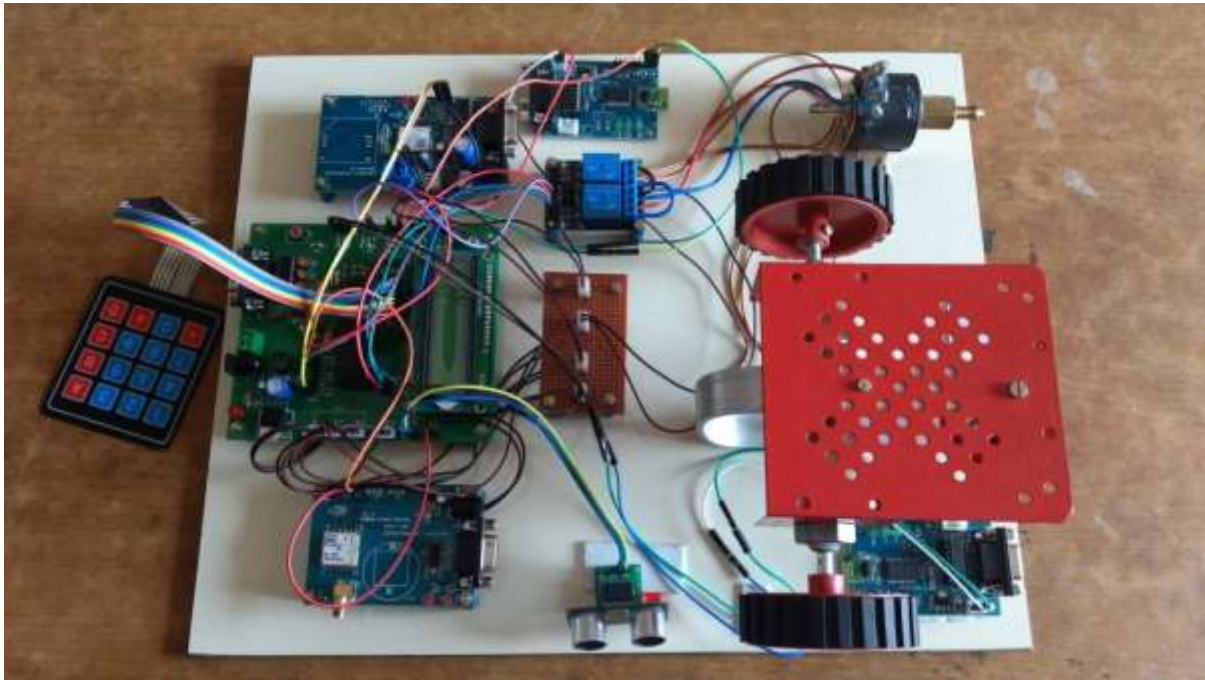
5.2.2 RETAILER SECTION

The retailer section consists of a laptop connected to an RFID chip. The solenoid valve is opened only if the password from retailer and password from owner match.

5.2.3 OWNER SECTION

The owner section consists of a mobile phone. An SMS is sent to the owner if anyone is trying to steal his vehicle.

6. RESULT:



HARDWARE KIT

LCD showing the various processes involved:



LCD showing Vehicle Tracking



LCD shows the password entered



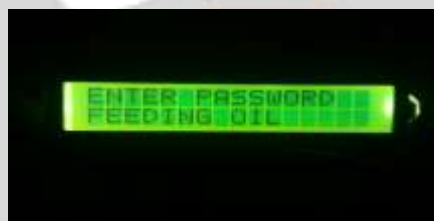
LCD shows the vehicle is on



LCD shows the distance



LCD shows vehicle is off



LCD showing feeding oil



LCD showing mismatch



Laptop connected to RFID chip – Retailer section

6. CONCLUSION

In this project, the system uses GPS receiver to retrieve coordinate of illegal fuel hoarding while the GSM module send that coordinate through warning SMS. The fuel is transported safely without any accidents on the way by the use of ultrasonic sensors which prevents collisions. Password protection is used for the valve. This system is expected to be much cheaper and effective than previous method, thus can prevent illegal fuel hoarding and potentially help gas station owner from financial losses.

7. FUTURE WORK

The next work for the development of this system is the use of camera that can automatically trigger itself when the bottom loader trunk is opened. It is useful as an evidence if illegal fuel hoarding occurs. Then the microcontroller that has double serial communication pins will be used, so that the gas station owner can request real time location of oil tank truck through SMS

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