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Automatic Fuel Tank Monitoring and Leakage Detection

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Abstract - This system is proposed for fuel loud road tankers which carry fuel from oil depots to end users such as petrol-stations. This system is based on hardware as well as software. The hardware part consists of fuel level circuits, on-board Arduino, GSM and GPS modules, Sensors. While the software part consists of LabView for Database purposes, Cloud Computing Machine learning for Average Calculation Algorithms. In the proposed system how much fuel was filled into the tank. Information on raising or lowering the fuel level in the fuel tank of vehicle comes from fuel level sensor which will be shown on android application. Vehicle Petrol theft is one of the main concerns of many bike user and car user. Many times people have already faced that petrol from their bike or cars has been stolen. In petrol theft detection system, a Level sensor to detect the petrol level in petrol tank. When the level goes below certain threshold level then this sensor gives a particular signal to the microcontroller. Then microcontroller turns on the buzzer and sends message to the car/bike user.

Key Words: (Size 10 & Bold) Key word1, Key word2, Key word3, etc (Minimum 5 to 8 key words)…

1. INTRODUCTION

GSM primarily based Vehicle Fuel felony Detection System with SMS indication has application in automobile, Bikes and every one alternative vehicles. This project encompasses a GSM electronic equipment that send sms to owner of auto once there's fuel felony occurring. Vehicle hydrocarbon felony is one in every of the most issues of the many bike homeowners and automobile owners. Many times we've got detected or a number of US have already baby-faced that hydrocarbon from their bike or cars has been taken. Main intention of this project is to avoid such scenario. In SMS primarily based hydrocarbon felony detection system, we've got used tier sensing element to observe the hydrocarbon level in hydrocarbon tank. If the extent goes below bound intensity then this sensing element offers a specific signal to the microcontroller. Then microcontroller activates the buzzer and sends SMS to the car/bike owner. Microcontroller may be a main heart or Central process Unit of the system. Bluetooth all the fuel related information is displayed in the android application via Percentage and Graphical representation. Based on Consumption of Fuel and Amount of Depletion occurred we can also calculate the Average of Any Vehicle. Distance traveled and speed can also be calculated based on the received values which can be helpful for parental control

1.1 Existing System.

- The Existing System consists of many flaws. Hence, can't be relied completely. The values obtained are Not 100% Accurate and are displayed in Pre-assumption Manner. There is also possibility that the Device gets damaged as it's Quite fragile which may affect the result, such Failures can bring Further Damage. Consider a pilot of an Aeroplane not knowing about the Fuel remaining in Tank, It might cost many lives. So 100% Accuracy is Necessary.

1.2 PROBLEM INGREDIENTS:

Actual record of fuel filled and fuel consumption in automobiles is not continued. It results in a financial loss. To avoid this loss, monitoring and tracking system is implemented by an IOT based Fuel Monitoring in vehicle. The proposed system. Tracks all the details of a vehicle fuel, fuel quantity, average get information on android phone.

1.3. Goals and Objectives

Goals:

- To get information about fuel level in fuel tank of vehicle.
- To get information about average of vehicle.
- To detect leakage of fuel
- If any person manually removes the petrol from vehicle at that time to find out the theft.

1.4. Motivation:

Now the organizations are facing a serious problem of handling the fuel transportation due to manual monitoring. This manual monitoring provides an inefficient way of calculating and analyzing the fuel ingestion and can lead to financial losses for the company. In the typical scenario used by most organizations there is no logging or auditing mechanism to check that the number of liters written on the receipt correspond to the actual amount of fuel in the tank. This scenario is affected by many possible flaws: the driver does not know whether the amount of fuel inserted in the fuel is the same as the amount declared on the receipt. Another flaw of the system is caused by misleading information created by the pump station manager. A third example would be the involvement of the staff from

company's management personnel which commit fraud by falsifying information regarding the amount of fuel inserted.

1.5 Additional Features:

In the Mobile Application we can Track nearby Petrol Pumps using prestored maps, so it becomes easier for refueling. For Driving companies or Transport Businesses it's Necessary for owner to keep track of all their vehicles which can be done via same Mobile Application.

1.6 Scope

Scope of our project is as follows:

Future work can comprise any enhancing by victimisation a lot of economical detector and adding a lot of sensors to live alternative surroundings parameters within the web site. Constructing a weather box or (Stevenson Screen) to protect the instruments of the system from weather variations is one of the future plan. Enriching the fuel management system with secure internet application to stop the system from unauthorized access is additionally open problems.

1.6 Algorithm

The haversine formula determines the great-circle distance between two points on a sphere given their longitudes and latitudes. Important in navigation, it is a special case of a more general formula in spherical trigonometry, the law of haversines, that relates the sides and angles of spherical triangles.

These names follow from the fact that they are customarily written in terms of the haversine function, given by haversin(θ) = sin2(θ/2). The formulas could equally be written in terms of any multiple of the haversine, such as the older versine function (twice the haversine). Prior to the advent of computers, the elimination of division and multiplication by factors of two proved convenient enough that tables of haversine values and logarithms were included in 19th and early 20th century navigation and trigonometric texts

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- Let the central angle Θ between any two points on a sphere be:
- {\displaystyle \Theta ={\frac {d}{r}}}where:
- *d* is the distance between the two points (along a great circle of the sphere; see spherical distance),
- *r* is the radius of the sphere.
- The *haversine formula* hav of Θ is given by:
- {\displaystyle \operatorname {hav} \left(\Theta \right)=\operatorname {hav} (\varphi _{2}-\varphi _{1})+\cos(\varphi _{1})\cos(\varphi _{2})\operatorname {hav} (\lambda _{2}-\lambda _{1})}where
- φ_1, φ_2: latitude of point 1 and latitude of point 2,
- λ_1, λ_2: longitude of point 1 and longitude of point 2.
- Finally, the haversine function (half a versine) of an angle θ (applied above to the differences in latitude and longitude) is:
- {\displaystyle \operatorname {hav} (\theta)=\sin ^{2}\left({\frac {\theta }{2}}\right)={\frac {1-\cos(\theta)}{2}}}To solve for the distance *d*, apply the inverse haversine hav^{-1} to the central angle Θ or use the arcsine (inverse sine) function:
- {\displaystyle d=r\operatorname {hav} ^{-1}(h)=2r\arcsin \left({\sqrt {h}}\right)}where *h*=hav(Θ), or more explicitly

2. LITERATURE REVIEW

1) **Paper Name: "Fuel Management System"**

Author: Areeg Abubakr Ibrahim Ahmed, Siddig Ali Elamin Mohammed(2017)

Description:

This paper describes about developed a fuel management system that measures tank's fuel level to be displayed through web based application and design of camera surveillance system for station. The system employs two different sensors: The ultrasonic sensor, and the chemical Etape. Although cheaper than the latter, the results produced by the ultrasonic sensor suffer from inaccuracies caused by the gasoline thick vapors. The chemical Etape, being more expensive, resolves this issue and possesses a higher resolution.

2) Paper Name: "Automatic fuel tank monitoring, tracking & theft detection system"

Author: Shoukat Ali Khuwaja1, Brohi Arif Ali (2018)

Description:

This system is proposed for fuel carrying road tankers which carry fuel from oil depots to end users such as petrol-stations. This system is based on hardware as well as software. The hardware part consists of fuel level circuits, on-board Arduino, GSM and GPS modules.The primary design goal is to devise a system capable of monitoring the fuel level in real time

Paper Name: "Intelligent Vehicle Technology and Combustion Fuel Alert Using IOT"

Author: M. Kavitha, D. Atchaya, S. Pavithra (2019)

Description:

Fuel is monitored using flow sensor to avoid fraud at petrol pumps. Day by day petrol rate is updated in the LCD display, to alert the user. Using this technology accident and fuel theft can detected. The movement of vehicle is continuously monitored with the help of GPS and the information is given to web server through IOT. To avoid the financial loss in terms of fuel consumption in vehicles by using fuel monitoring and tracking system.

4) Paper Name: "IOT Based Fuel Monitoring for Future Vehicles."

Author: Mrs.S.A.Chiwhane, Mrs. Deepa Mishra.(2017)

Description:

The fuel monitoring system is built on ESP8266 Wi-Fi chip. This system uses Hall Effect Sensor to calculate the information about tank's current fuel level and also the amount of currently inserted fuel. It delivers data to the ESP8266 Wi-Fi chip. ESP8266 chip is a hardware which connect flow sensor and server, then server send that data on users android app. IOT based fuel monitoring and tracking system has implemented for overcome Fraud at petrol-pumps

5) Paper Name: "Design of a Real-time Ship Fuel Consumption Monitoring System with Self-checking Function"

Author: Qizhi Yin, Zhuoran Ding(2017)

Description:

To develop the accuracy of ship fuel consumption monitoring system and avoid understatement, false alarm, and missing report, a real-time ship fuel consumption monitoring system with self-checking function is designed. The accurate measurement and error alarm of vessel oil consumption can be realized through the measured data and correlations of data. And the error alarm will be sent to ship management terminal and ship management departments by wired and wireless transmission equipment, which helps the supervision of ship fuel consumption and analyzing of ship energy efficiency.

2.1. SURVEY of PROPOSED SYSTEM

In proposed system for Monitoring Fuel Tank Level sensor is used to detect the level of fuel in the fuel tank, this information is sent to the controller. then by Bluetooth all the fuel related information is Displayed in the android application via Percentage and Graphical representation. Based on Consumption of Fuel and Amount of Depletion occurred we can also calculate the Average of Any Vehicle. Distance traveled and speed can also be calculated based on the received values which can be helpful for parental control In the Mobile Application we can Track Nearby Petrol Pumps using prestored maps, so it becomes easier for refueling. For Driving companies or Transport Businesses its Necessary for owner to keep track of all their vehicles which can be Done via same Mobile Application.

2.2 APLICATION OF PROPOSED SYSTEM:

- This system can be used in Car, Bikes and all Vehicles.
- This system can be used in various industries or companies which have bus or caps for their employees.
- This system can be fitted in this transportation buses to detect the petrol theft.

2.3 SYSTEM ARCHITECTURE

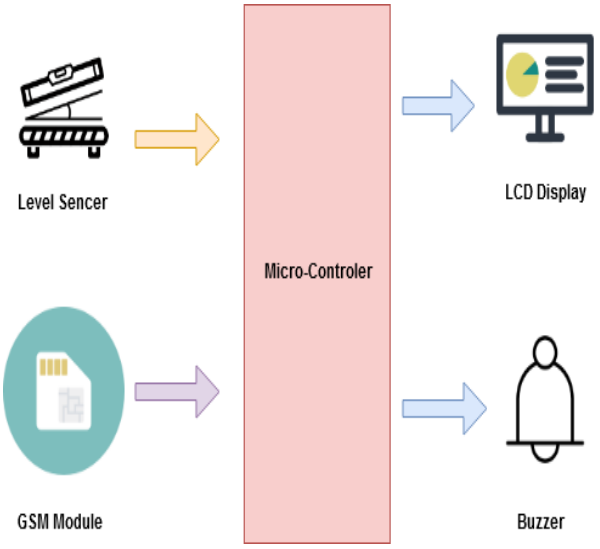

Fig -1: Name of the figure

Sample paragraph Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

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3. CONCLUSION

A proposed system that measures tank's fuel level to be displayed through android application. This system is additional economical, reliable and low-cost compare to existing System. It additionally provides a way for police investigation larceny or fraud incidents just in case of fuel larceny or fuel escape. This system allows for an automated analysis and monitoring of fuel level, having a reduced price thanks to reasonable and easy-to-acquire electronic elements.

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