SMART DIGITAL FUEL INDICATOR SYSTEM BY USING IOT

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*Abstract :*Today in this digitalized world, the fuel marker in the vehicles is also additionally made advanced so that it will know the correct measure of fuel available in the fuel tank. This project shows the measure of fuel in the tank in liters. The fuel quantity in liters will be in numerical digits. This task mostly thinks about the sign of fuel level in bike tanks. This task keeps away from a great deal of issues like fuel bunks at fuel stations, fuel burglary and keeps us from getting into circumstances where the individuals need to drive their vehicles because of suppositions of the level of fuel. These days the fuel pointer framework for the bikes are computerized however the fuel indicator don't show the definite measure of fuel which is available in the tank for example the fuel indicator demonstrate the measure of fuel in bars and not in numbers or digits like Liter or Milliliter. So this issue is contemplated for our work of building up the computerized (numeric) fuel pointer framework for bikes which demonstrates accurate measure of fuel in Litres(L) or Milliliters (ml).

IndexTerms **- GSM-Global System Mobile communication, SMS-Shot Message Service, Ardino.**

I. INTRODUCTION

Today in this digitalized world, the fuel marker in the vehicles is also additionally made advanced so that it will know the correct measure of fuel available in the fuel tank. This project shows the measure of fuel in the tank in liters. The fuel quantity in liters will be in numerical digits. This task mostly thinks about the sign of fuel level in bike tanks. This task keeps away from a great deal of issues like fuel bunks at fuel stations, fuel burglary and keeps us from getting into circumstances where the individuals need to drive their vehicles because of suppositions of the level of fuel. These days the fuel pointer framework for the bikes are computerized however the fuel indicator don't show the definite measure of fuel which is available in the tank for example the fuel indicator demonstrate the measure of fuel in bars and not in numbers or digits like Liter or Milliliter. So this issue is contemplated for our work of building up the computerized (numeric) fuel pointer framework for bikes which demonstrates accurate measure of fuel in Litres(L) or Milliliters (ml).

This project first reviewed the current fuel pointer frameworks and fuel tanks of various bicycles and bikes. Along with this overview, the state of the fuel tanks is in unpredictable design. In any case, because of unpredictable state of the tanks there were much complexity emerging for the establishment of hardware unit and level sensors which are utilized for adjustment of fuel amount. Thus, This system have mulled over every one of the requirements and arranged a task to address every one of the issues expressed above and found a suitable answer for it.

Authors in [1] suggests that, The present fuel exhibiting structure in vehicle uses basic and electronic visuals for showing status of fuel level, not showing the sum in numerical. This structure shows the fuel level in numerical by using LCD. In India, mileage issue has risen to be a major issue provoking customers slowing down out in obscure zone since they disregard to check the fuel level. This proposed setup can give a way to deal with stop this issue and control the excessive use of the fuel to the customer by exhibiting mileage. This proposed arrangement will be valuable to control the stream of the fuel in the vehicle, moreover steadily demonstrates the fuel left and the kilometers it can cover. This is done by controlling the fuel use with the help of units put in the fuel tank and when the fuel tank gets unfilled a sign is given for the driver that the fuel is void and the vehicle will kill.

The task is intended to know the GPS location of the user and the nearest fuel station, send through a SMS to the connected mobile. Authors in [2] suggests that, This framework incorporates a GPS modem which recovers the location of a vehicle in its longitude and scope. This information is sent to the microcontroller which is interfaced with a GSM modem. Microcontroller recovers the area from the GPS and sends it to the concerned specialist as a SMS over GSM modem on periodical terms set by the client. A LCD is interfaced to the microcontroller displays the information got before being sent over GSM .This innovation will be very helpful to transport organizations to track their vehicles. This project can be improved by making a course of action to stop the vehicle start by the proprietor remotely by sending a SMS in burglary circumstances.

A typical issue looked by everybody when the fuel level goes down and they need to scan for closest fuel station. Individuals can't gauge generally about how much distance they can go before their vehicle stops

totally. This system has an answer for this issue. This Project will recommend the closest fuel station that will assist driver with navigating to the chosen fuel station. Ultrasonic sensor to distinguish the level of fuel, Arduino board, Bluetooth module as equipment and programming parts, for example, Android Studio, WAMP server, and Google APIs.

II.AUTOMATION

Automation is the innovation by which a procedure or strategy is performed with least human help. Automation or programmed control is the utilization of different control systems for working hardware, for example, apparatus, forms in processing plants, boilers and warmth treating broilers, exchanging on phone systems, guiding and adjustment of boats, air ship and different applications and vehicles with insignificant or decreased human mediation. A few procedures have been totally robotized. Automation covers applications ranging from a household thermostat controlling a boiler to a vast modern control system with a huge number of input estimations and output control signals. In control complexity it can extend from simple on-off control to multi-variable high level algorithms. In the simplest type of an automatic control loop, a controller compares a measured value of a process with a desired set value and processes the resulting error signal to change some input to the process, in such a way that the process stays at its set point despite disturbances. This closed-loop control is an application of negative feedback to a system. The mathematical basis of control theory was begun in the 18th century, and advanced rapidly in the 20th.

Automation has been accomplished by different methods including mechanical, pressure driven, pneumatic, electrical, electronics and PCs, generally in combinations. Complicated systems, such as present day industrial facilities, planes and ships ordinarily utilize all these consolidated systems. The benefit of Automation incorporates work investment funds, savings in power costs, investment funds in material expenses, and enhancements to quality, exactness and accuracy. The World Bank's World Development Report 2019 proved that the new ventures and employments in the mechanical segment exceed the monetary impacts of laborers being uprooted via Automation. The term Automation, roused by the prior word programmed, was not generally utilized before 1947, when Ford set up a computerization department. It was amid this time industry was quickly embracing input controllers, which were presented during the 1930s.

III. IOT TECHNOLOGY

The definition of the Internet of things has developed because of combination of various advances, constant examination, machine learning, item sensors, and installed systems. Customary fields of implanted systems, remote sensor systems, control systems, computerization, and others all add to empower the Internet of things.

The idea of a system of brilliant electronics was talked about as right on time as 1982, with a changed Coke candy machine at Carnegie Mellon University turning into the principal Internet-associated apparatus, ready to report its stock and whether recently stacked drinks were cold. Imprint Weise's 1991 paper [3] on pervasive figuring, "The Computer of the 21st Century", just as scholarly scenes, for example, Ubicomps and PerCom created the contemporary vision of IOT. In 1994, Reza Raji [4] portrayed the idea in IEEE Spectrum as " moving small packets of data to a large set of nodes, so as to integrate and automate everything from home appliances to entire factories ". Somewhere in the range of 1993 and 1997, a few organizations proposed solutions like Microsoft's at Work or Novell's NEST. The term "Internet of things" was likely coined by Kevin Ashton of Procter & Gamble, [5] later MIT's Auto-ID Center, in 1999, though he prefers the phrase "Internet for things". At that point, he viewed Radio-frequency identification (RFID) as essential to the Internet of things, which would allow computers to manage all individual things.

A research article referencing the Internet of Things was submitted to the gathering for Nordic Researchers in Norway, in June 2002,[6] which was gone before by an article distributed in Finnish in January 2002. The usage portrayed there was created by Kary Framing and his group at Helsinki University of Technology and all the more intently coordinates the cutting edge one, for example a data system foundation for executing savvy, associated items. Characterizing the Internet of things as "essentially the point in time when more 'things or items' were associated with the Internet than individuals", Cisco Systems evaluated that IOT was "born" somewhere in the range of 2008 and 2009, with the things/individuals proportion developing from 0.08 in 2003 to 1.84 in 2010.

IV.EXISTING METHOD

ANALOG DIGITAL METER

With the expansion of vehicle utilization over the world, fuel necessary has turned into a tremendous problem. Plan and usage of load cell based fuel measurement estimates the exact level of fuel including while fuel filling process. There is a large variety of techniques for estimating fuel level, extending from those utilizing mechanical floats and capacitive and optical sensors to ultrasound strategies. These days all fuel bunks having kinds of computerized displays unit so as to show the estimation of fuel adding to the vehicle. Yet, the inconvenience of utilizing load cell is that it can't be utilized for estimation of very responsive material, for example, petrol. So we chose to utilize ultrasonic strategy for petroleum level measurement as it is a non – contact type estimation technique. In everywhere throughout the world all the vehicle are having a simple fuel meter. This meter shows three conditions of fuel level which are vacant, half and Full. The Analog Fuel Meter is shown in the figure 1.

Fig.1:Analog Fuel Meter

Authors in [7] suggests that, Existing method can't pass judgment on the genuine fuel present in the fuel tank. Figure1 show simple meter, which demonstrates the fuel level by utilizing needle. In any case, Existing system don't get appropriate thought regarding fuel level present in fuel tank. Due to improper knowledge of fuel present in the tank undergoes in an unfortunate situation because of low fuel. As considering past simple framework goes to execute improved framework. In our framework advanced fuel meter is using which is used for theft detection. This computerized fuel meter demonstrating the measure of fuel in the tank in liters. The fuel quantity in liters will be in numerical digits.

As utilized in vehicles, the measure comprises of two sections:

- The sending unit - in the tank
- The marker - on the dashboard

The sending unit usually utilizes a float associated with a potentiometer, regularly printed ink design in a modern automobile. As the tank empties, the float drops and slides a moving contact along the resistor, increasing its resistance. In addition, when the resistance is at a certain point, it will also turn on a "low fuel" light on a few vehicles.

In the mean time, the pointer unit (generally mounted on the dashboard) is estimating and showing the measure of electric charge flowing through the sending unit. At the point when the tank level is high and maximum current is flowing, the needle focuses to "F" demonstrating a full tank. At the point when the tank is unfilled and the least current is running, the needle focuses to "E" showing a vacant tank.

The system can be fail-safe. If an electrical fault occurs, the electrical circuit makes the pointer demonstrate the tank as being vacant (hypothetically inciting the driver to refill the tank) as opposed to full (which would enable the driver to come up short on fuel with no earlier notice). Corrosion or wear of the potentiometer will give wrong readings of fuel level. However, this framework has a potential hazard related with it. An electric current is sent through the variable resistor to which a float is connected, so that the value of resistance depends on the fuel level. In most automobile fuel gauges such resistors are on the internal side of the measure, i.e., inside the fuel tank. Sending current through such a resistor has a fire hazard and a explosion risk related with it. These resistance sensors are also showing increased failure rate with the internal conditions of liquor in automotive gasoline fuel. Liquor increases the corrosion rate at the potentiometer, as it is fit for carrying current like water. Potentiometer applications for liquor fuel utilize a pulse and hold system, with a periodical signal being sent to decide fuel level decreasing the corrosion potential. Accordingly, demand for another safer, non-contact method for fuel level is desired.

V.PROPOSED METHOD

In this proposed system, the ATmega328 series microcontroller is used. This controller is extremely helpful to utilize. The coding or programming of this controller is additionally simpler. ATmega328 finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and in many industrial instruments.

The sensor that is used is Ultrasonic sensor. The ultrasonic sensor is installed in the tank to sense the level of the fuel. The working of the system is, the ultrasonic sensor which is installed in the tank senses the level of fuel and send it to the controller, the controller will show that level in digital (numeric) form like on the 16*02 LCD display. According to that, the LCD which is connected to the controller shows the fuel level and estimated distance is displayed on the LCD. The additional SIM808 GPS GSM module circuitry is used to provide location of user and the nearest fuel station location, by using latitude and longitude of corresponding area of user. SIM808 GPS GSM Module fetching the latitude and longitude value of the user location and the nearest fuel station location and send a SMS to the mobile connected. The Connection diagram for Smart Digital Fuel Indicator System using IOT is shown in the figure 2.

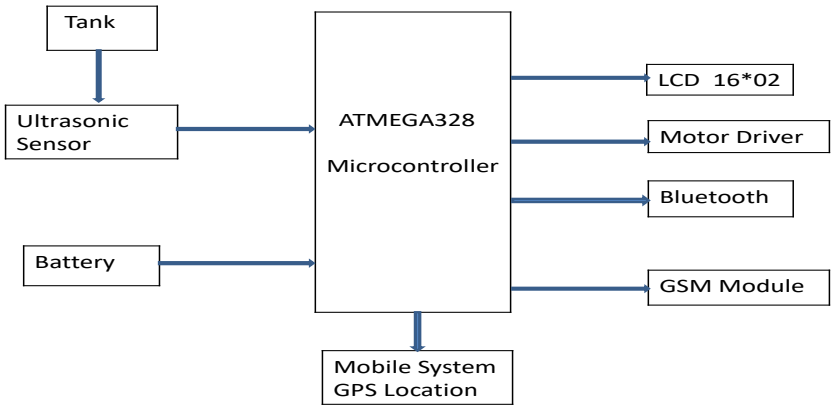

Fig.2:Connection diagram for Smart Digital Fuel Indicator System by using IOT

L293D is a Motor Driver IC which permits DC engine to drive on either direction. L293D is a 16-pin IC which can control a set of two DC engines at the same time in any direction. It implies that you can control two DC engine with one L293D IC. It uses the idea of H-Bridge. H-Bridge is a circuit which enables the voltage to be flown in either direction. As you probably are aware voltage need to alter its direction to almost certainly turn the engine in clockwise or anticlockwise direction, Hence H-Bridge IC is perfect for driving a DC motor. In one L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc engine independently. Due to its size it is especially utilized in mechanical application for controlling DC engines.

Arduino is an open-source electronics platform dependent on simple to-utilize equipment and programming. Arduino sheets can peruse inputs - light on a sensor, a finger on a catch, or a Twitter message - and transform it into a output - enacting an engine, turning on a LED, distributing something on the internet. You can guide your board by sending a lot of principles to the microcontroller on the board. To do as such you utilize the Arduino programming language (in view of Wiring), and the Arduino Software (IDE), in light of Processing. Throughout the years Arduino has been the cerebrum of thousands of activities, from regular articles to complex logical instruments. An overall network of creators - understudies, specialists, craftsmen, software engineers, and experts - has assembled around this open-source platform, their commitments have meant an unfathomable measure of available impetration that can be of incredible help to learners and specialists alike.

The HC-SR04 ultrasonic sensor utilizes SONAR to measure the distance of an object simply like the bats do. It offers brilliant non-contact run recognition with high exactness and stable readings in a simple to-utilize package from 2 cm to 400 cm or 1" to 13 feet. The activity isn't influenced by daylight or dark material, delicate materials like fabric can be hard to identify. It comes total with ultrasonic transmitter and beneficiary module. HC-05 module is a simple to utilize Bluetooth SPP (Serial Port Protocol) module, intended for transparent wireless sequential association setup. Serial port Bluetooth module is completely qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio handset and baseband. It uses CSR Blue core 04-External single chip Bluetooth framework with CMOS innovation and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as little as 12.7mmx27mm. Expectation it will sort out your general plan/advancement cycle. LCD draws its definition from its name itself. It is mix of two conditions of issue, the strong and the fluid. LCD utilizes a fluid precious stone to create an unmistakable picture. Fluid precious stone presentations are super-meager innovation show screen that are commonly utilized in PC phone, TVs, mobile phones and compact computer games. LCD's advancements permit displays to be a lot more slender when contrasted with cathode beam tube (CRT) innovation .

VI.COMPONENTS REQUIRED

The components required for this project are categorized into two parts. The first one is the hardware requirement and the next is the software requirement.

HARDWARE REQUIREMENT

- ✓ ARDUINO UNO
- ✓ SIM808 GPS GSM MODULE
- ✓ ULTRASONIC SENSOR
- ✓ LCD(16*02)
- ✓ L293D MOTOR DRIVER IC
- ✓ BLUETOOTH MODULE

SOFTWARE REQUIREMENT

- ✓ ARDUINO IDE SOFTWARE

VII.HARDWARE REQUIREMENT

ARDUINO UNO

The Arduino UNO is an open-source microcontroller board focus on the Microchip ATmega328P microcontroller and made by Arduino. The board is furnished with sets of digital and analog(I/O) pins that may be interfaced to various expansion sheets (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the ArduinoIDE(Integrated Development Environment) by methods for a sort B USB interface It can be powered by a USB connect or by an external 9 volt battery, anyway it recognizes voltages some place in the scope of 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The equipment reference configuration is dispersed under a Creative Commons Attribution Share-Alike 2.5 permit and is accessible on the Arduino site. Format and generation records for a few variants of the equipment are also accessible. "Uno" signifies one in Italian and was picked to check the arrival of Arduino Software (IDE) 1.0. The Uno board and form 1.0 of Arduino Software (IDE) were the reference adaptations of Arduino, presently advanced to fresher releases.The Uno board is the first in a series of USB Arduino sheets, and the reference model for the Arduino platform. The ATmega328 on the Arduino Uno comes preprogrammed with a bootloader that enables transferring new code to it without the utilization of an outside equipment software engineer. It conveys utilizing the first STK500 protocol.The UNO additionally contrasts from every single going before board in that it doesn't utilize the FTDI USB-to-series driver chip. Rather, it utilizes the Atmega16U2 (Atmega8U2 up to rendition R2) modified as a USB-to-series converter.

The Arduino project began at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy. Around then, the understudies utilized a BASIC Stamp microcontroller at an expense of $100, an extensive cost for some understudies. In 2003 Hernando Barragán made the improvement stage Wiring as a Master's theory project at IDII, under the supervision of Massimo Banzi and Casey Reas, who are known for work on the Processing language. The project objective was to make straightforward, minimal effort instruments for making computerized activities by non-engineers. The Wiring stage comprised of a Printed Circuit Board (PCB) with an ATmega168 microcontroller, an IDE dependent on Processing and library capacities to effectively program the microcontroller. In 2003, MassmoBanzi, with David Mellis another IDII understudy, and David Cuartielles, included help for the less expensive ATmega8 microcontroller to Wiring. Be that as it may, rather than proceeding with the work on Wiring, they forked the task and renamed it Arduino. Early arduino sheets utilized the FTDI USB-to-sequential driver chip and an ATmega168. The Uno varied from every previous board by highlighting the ATmega328P microcontroller and an ATmega16U2 (Atmega8U2 up to adaptation R2) customized as a USB-to-sequential converter.

VIII.RESULTS AND DISCUSSION

This System shows the following values:

1.Fuel in Litres 2.Estimated Distance in Kilometres

The Fig.3 presents prototype of Smart Digital Fuel Indicator System

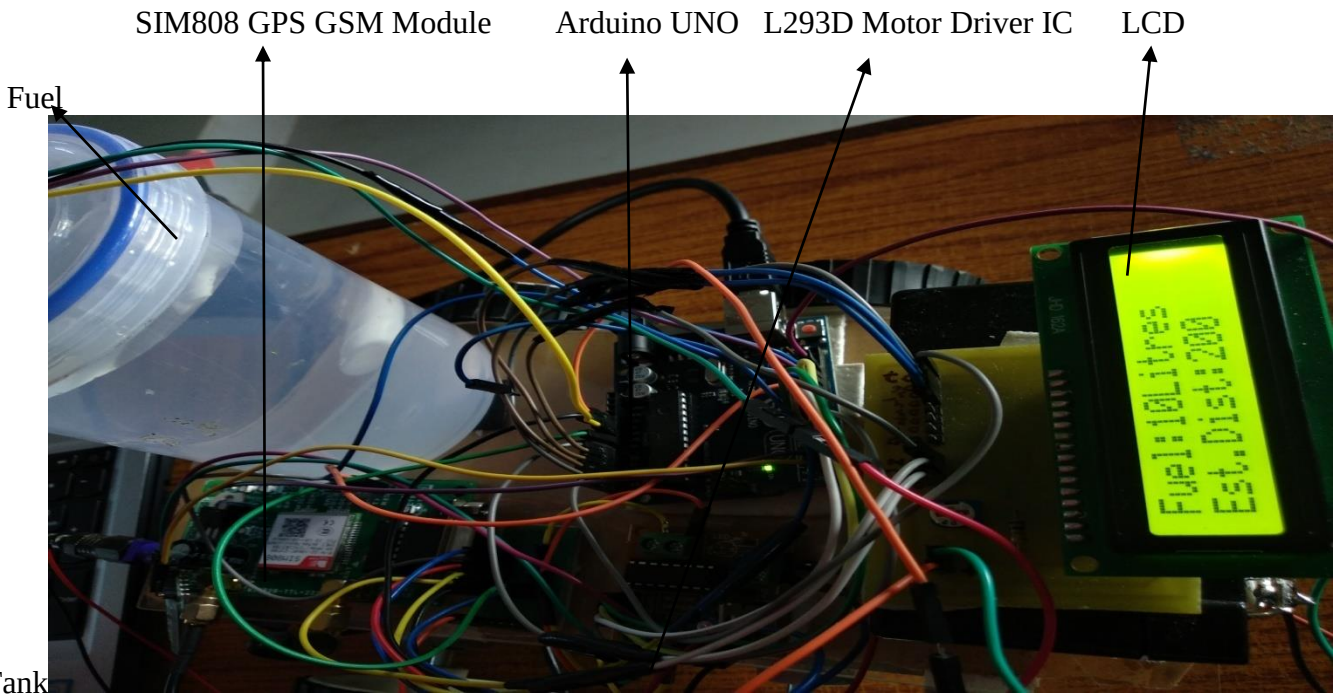

Fig.3:**Digital Fuel Indicator System With Parameter Indication**

In the Fig.3, LCD displays the quantity of Fuel in the tank in liters and the Estimated Distance it can cover in kilometers.

Here, With the remaining fuel in the fuel tank how much distance we can travel will show by assuming mileage as 20 kmpl.If fuel tank contains less than five liters of fuel, then SIM808 GPS GSM Module send an SMS in the form of Latitude and Longitude Value to the mobile number which is already connected.In this Project, We used the Arduino Bluetooth Controller Application for the purpose of sending signals to the Bluetooth Module. So that, Bluetooth Module which is connected to the

ATmega328 microcontroller checks that signals and send to the L293D Motor Driver IC drives the DC motors which are attached to the wheels. The output with less than five liters is shown in the Fig.4.

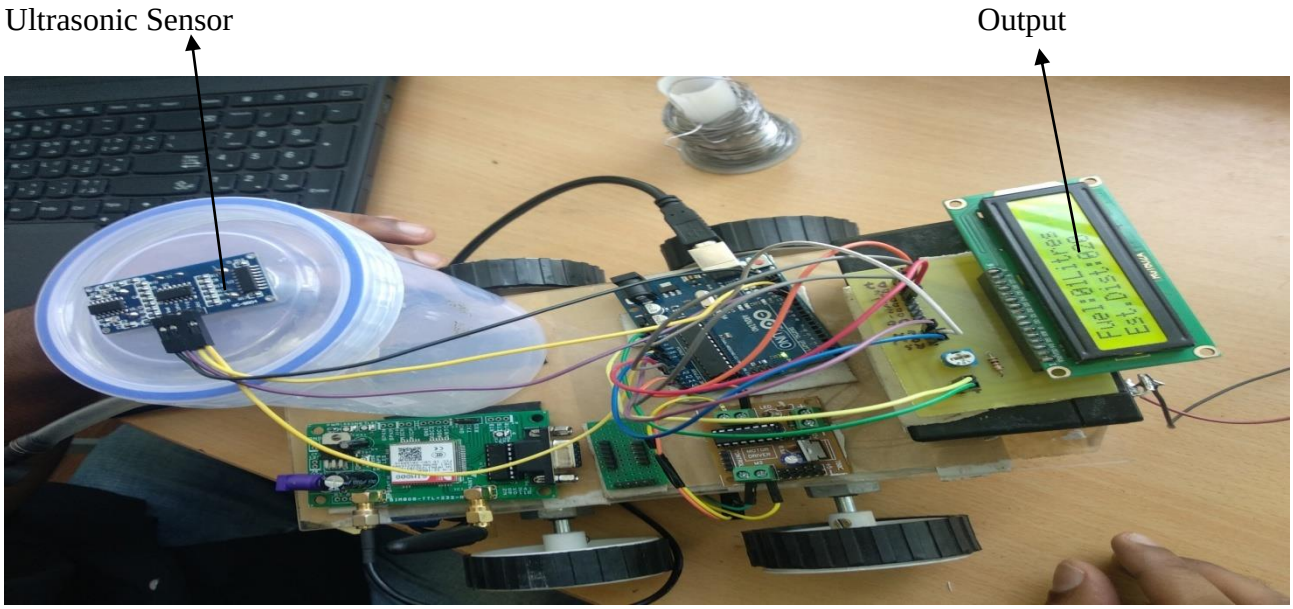

Fig.4..Output of Smart Digital Fuel Indicator System

The Fig.5 and Fig.6 show the GPS Location of the user as well as the nearest fuel station when the fuel in the fuel tank is less than five liters in the Google Maps by using Latitude and Longitude values.

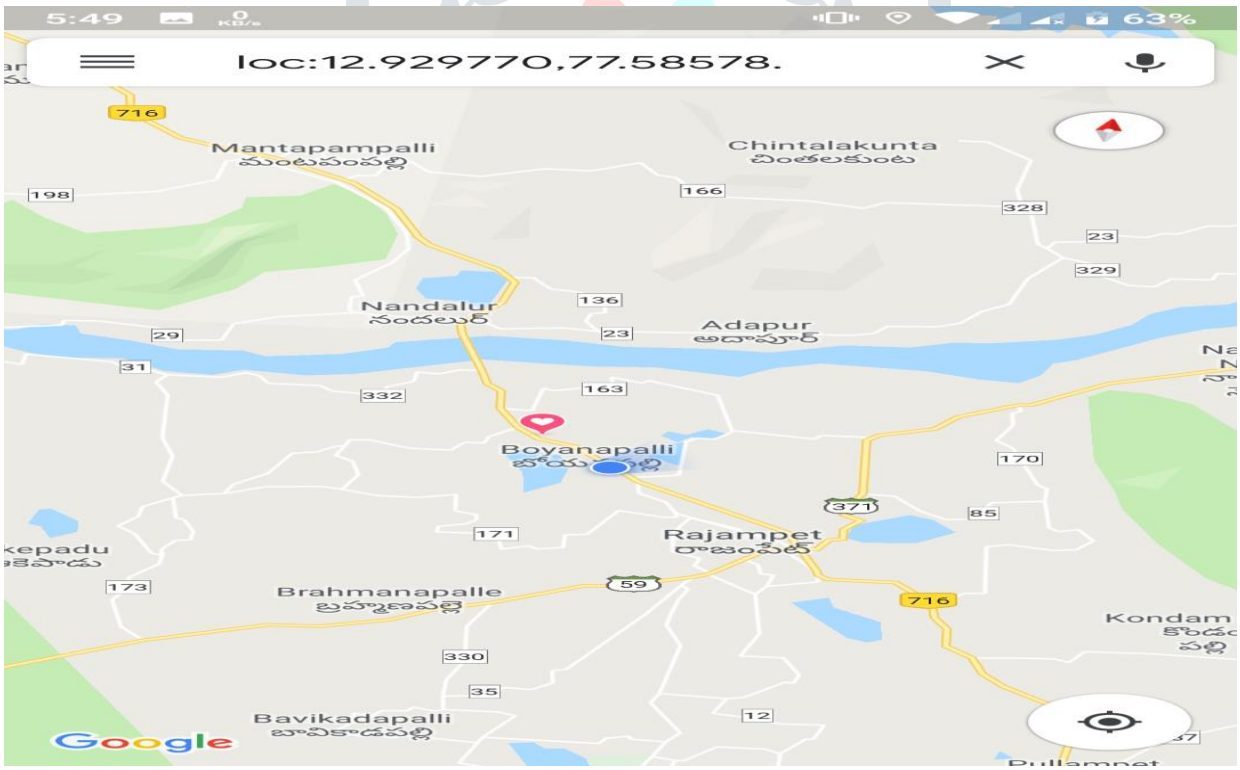

Fig.5 :GPS Location of the user

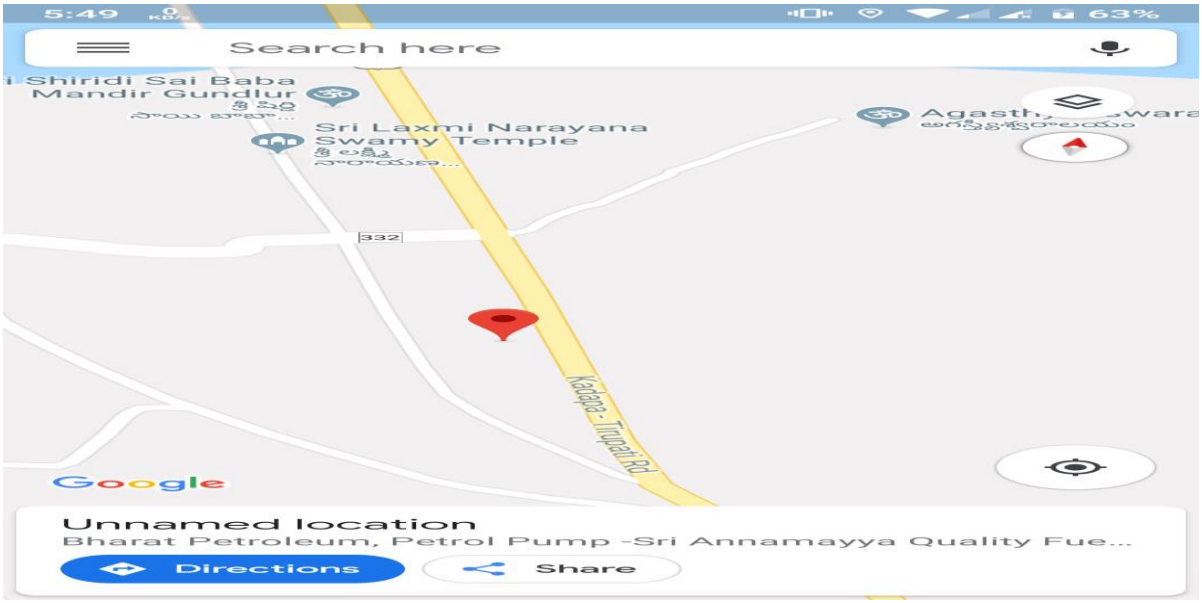

Fig.6:**GPS Location of the nearest fuel Station**

V. CONCLUSION

The smart digital fuel indicator is very advanced type of indicating system. The main advantage of this system is that it can gives accurate value of remaining fuel as well as the vehicle running capacity in km. The operation time is very less. All the equipment's have long life, quality material and are durable. This project is able to show that simple available hardware and technology can be used to construct a robust fuel level monitoring system. It also shows the location of vehicle to the user by using the latitude and longitude value. The system designed and tested in this project to presented the low construction cost of the system. Involving mechatronics in such design applications can eventually solve many practical problems with ease, reliability and at low cost. Even though the quality of material used and components used are of good quality, the cost of the project is not so costly and it can be used and implemented in all vehicles without much increment of cost of the vehicle. This smart fuel indicator is best in its field and will be most widely used and advance system.

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