

Fuel Management and Accident Detection System

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Abstract :

In today's world, actual record of fuel filled and fuel consumption in vehicles is not maintained. It results in making the fuel tanks empty. To avoid this we are implementing a microcontroller based fuel monitoring system. A microcontroller has been used for the system. Also we have used the GPS technology to track the vehicle. Also if petrol is about to finish in the tank of the vehicle, it will alert the driver and the LCD screen will show some nearby petrol pumps to the user and also give directions to the nearest petrol pump.

Traffic accidents are one of the leading causes of decease of life in most of the countries. As number of vehicle increases mean while the accident also increases. The government has taken number of actions and so many awareness program also contacted even though the accident increases as population increases. The accident alert system is designed using IOT and an android app. It is primarily developed to save lives of people in critical situations (or) in case of road accidents. The app is interconnected with sensors, which are connected in user's vehicle and responsible for detection of a fall down or accident event, and after they sends this information to the application which is pre-installed in the user's mobile. The application will send alert SMS or voice message regarding accident and its location to emergency contacts (Family members) and Emergency Medical Services automatically. The user needs to register his details while installing it and can add his desired contacts, to which the information needs to be passed. It may take 2-3 min of time to send this message. The message would also contain the location along with time. This would help save precious time in situations where an immediate action for the event has to take place in saving the life of dear ones.

Keywords: Accident detection, Arduino, ultrasonic sensor.

I. INTRODUCTION

Fuel management system will work on the basis of the availability of fuel in tank of the vehicle. The threshold value is set if vehicle remaining less amount of fuel which will take the vehicle 5 km ahead, it will alert the driver that the fuel might get empty soon. Hence the driver will get the details about the nearby petrol pumps and the LCD screen will also give directions towards the petrol pumps. This will help the drivers to avoid situations like getting stuck at the middle of the road because of empty fuel tank.

Now a days there are many decease of life because of the Road Accidents. As it was proven by previous researches. The consequences of traffic accidents regarding the injuries of those affected is strongly depending on the response time of the emergency services. The time that take place between the occurrence of the accident and the arrival of services to the site, and also on the level of informed status of the emergency regarding the number and condition of the injured person. In Accident saving of the person is very important. But lack of services it cannot be possible. For providing that services

to the person i.e. Family members and Hospital, Mobile phones have been present in our lives for over 20 years during which they have become indispensable due to the hardware and software

Characteristics of the smartphone, these devices are suitable to work as terminals for accident reporting system implement the Accidental System Application. Proposed system presents an IOT device connected with an application, a lightweight, flexible and power-efficient smartphone based vehicle to infrastructure communication system for improving road safety and enhancing the driving experience. This system uses the GPS to notify motor vehicle drivers about events that may be encountered while driving, this application will alert users if there is any accident happen on road. If the Accident happen then Emergency service will be available to the accident place but if there is no accident then user can decline the notification message. Using accelerometer sensor, vibration sensor, velocity and speed of that particular vehicle will be calculated.

II. LITERATURE REVIEW

This inventors Nitesh.K.A, Lohith.B.N.”Arduino Based Digital Fuel Gauge and Vehicle Monitoring System”,Proceeding of second ASAR International Conference, came out with the design and implementation of digital fuel gauge which measures the level of fuel adding, by fixing the pressure sensor below the Fuel tank, at any point of time it will continuously measures the level of fuel with the help of processor and displays the value in the digital numeric form in the display unit. Hence, the measured values and location of fuel added is sent to the owner mobile through GPS and GSM and vehicle owner is aware of the fuel consumption through SMS services. In addition we have come up with the solution for displaying values or level of the fuel in vehicle with the help of LED screen and give the direction to the nearest fuel station.

Yen-Jen Chen et.,al developed a fuel consumption monitoring using FMS[1], which has front end Vehicle Tracking System (VTS) and the back end Management Server (MS). VTS was established and installed into the vehicles, based on several well-known technologies, such as Mobile Telecommunications Technology of GPRS or 3G, Global Positioning System (GPS), and On-Board Diagnostics II (OBD-II). In addition, VTS was also connected with the Vehicle Electronic Control Unit (VECU) through the OBD-II inter-face.

The previous inventors works on the similar system. The “Automatic Road Accident Detection Techniques” was done by Usmar Khalil and Tariq Javid in 2017 they used sensors that have many aims like detect the objects and check the driver health conditions such as (heart rate, drunk, & illness). In this project we are using ultrasonic sensor to detect the impact and send the location using GPS and GSM. The main goal of this system was to save thousands of life and this system play a big role in safety technology for the vehicles. Using all these tools and technologies they made one system to avoid the accident as much as possible and send the useful report for drivers family or the police if any cause happen with driver.

III. PROPOSED SYSTEM

The proposed system is a based on the consumption and availability of fuel in nearby fuel stations. This system can be used using an android application which is designed using Android studio (Version 3.5.0.0) and the programming is done by using java.

The Android application consist of three user types- The admin, manager and the application user.

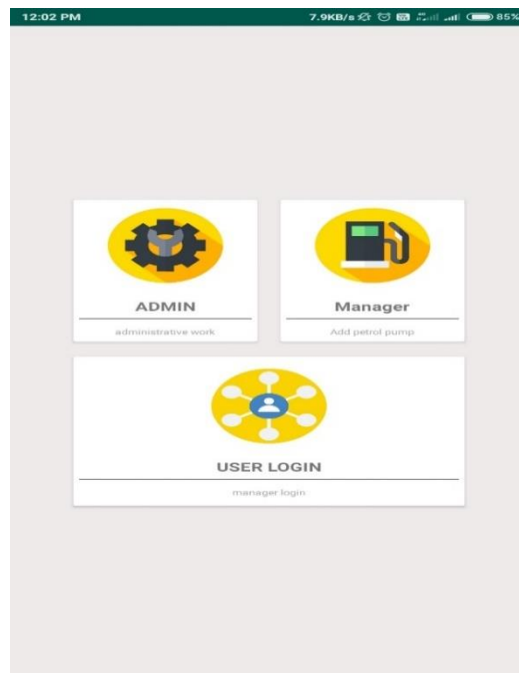


Fig 3.1: Login page for different users

The admin have all user and manager capabilities. Admin can edit and delete users they haven't created, even their own account and they can grant permissions to the petrol pump manager to add their fuel station to the android app. The major handler of this application is the admin. The manager will perform the role to update the data in the android application about the availability of fuel in stations.

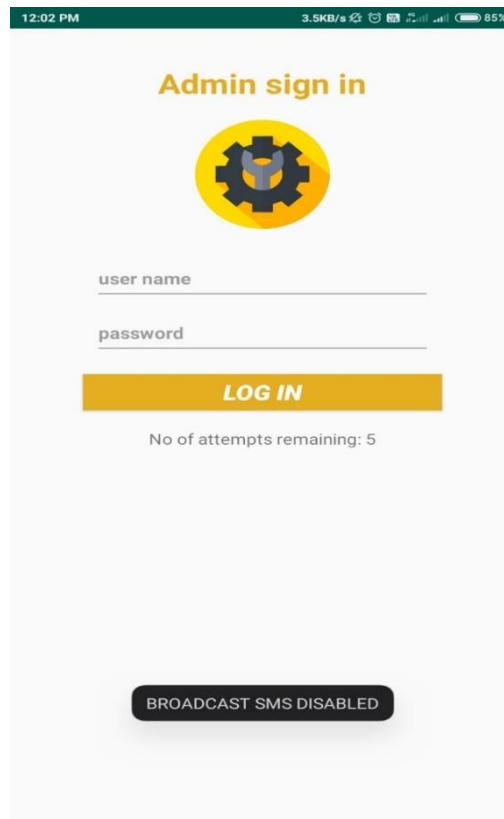
A screenshot of a mobile application's admin login page. The page has a white background with a light gray border. At the top, there is a status bar with the time '12:02 PM', signal strength, and battery level '85%'. Below the status bar, the title 'Admin sign in' is displayed in a bold, orange font. Underneath the title is a circular icon with a yellow background and a black gear-like border, containing a stylized human figure. Below the icon are two input fields: 'user name' and 'password', both with gray placeholder text. A prominent orange button with the text 'LOG IN' in white capital letters is positioned below the input fields. Underneath the button, the text 'No of attempts remaining: 5' is displayed in a small, gray font. At the bottom of the page, there is a dark gray button with the text 'BROADCAST SMS DISABLED' in white capital letters.

Fig 3.2: Admin login page

The user will only have to install the application and login using credentials given by the admin. The user when needed will check the application and click on “user login” then it would redirect the user on the map to show nearby fuel station’s location.

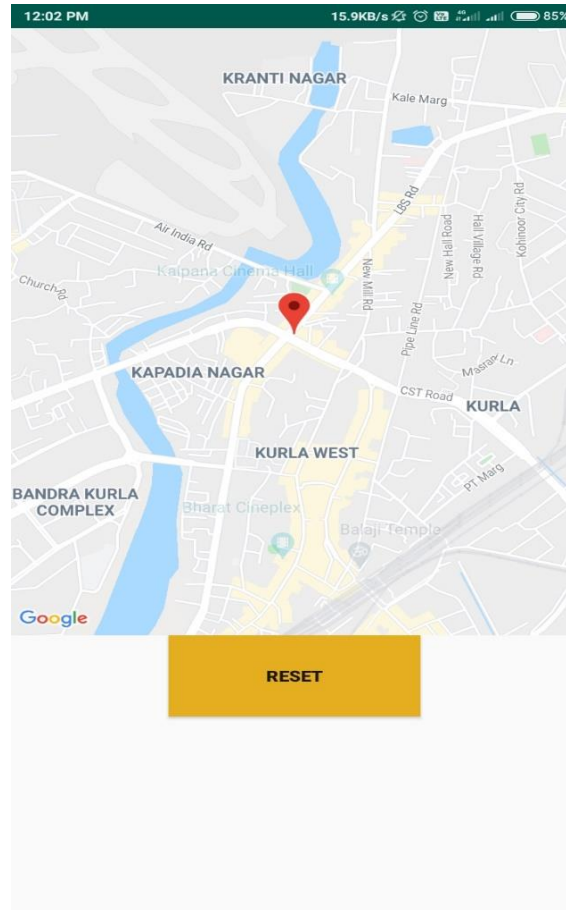


Fig 3.3: Map discovery for user

The system will efficiently work by following the above procedure. The detailed explanation of fuel management system is shown in the figure below.

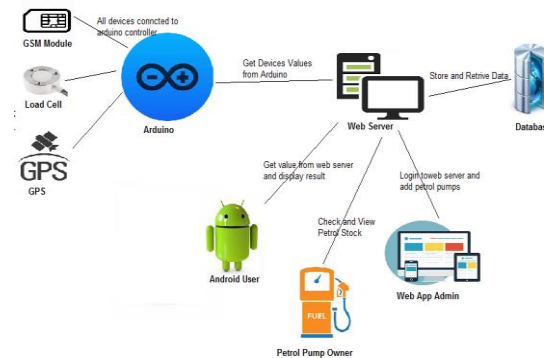


Fig: 3.4: Block Diagram petrol pump management system

The accident detection system proposes a method using ultrasonic sensor technology that will detect the accident of vehicles that approaches on front side of the vehicle where the sensor is attached. The ultrasonic sensor is placed at the front side of the vehicle. When the ultrasonic sensor detect the collision, it will use the hardware design of Arduino UNO which is programmed by using Arduino 1.8.1 IDE tool which is open source software. Programming is done by using embedded C.

The main advantage of ultrasonic sensor is that it provides highest reliability in getting proximity and has lesser absorption than Radio and Infrared frequencies. The main aim of this system to avoid loss of life, this system play a big role in safety technology for the vehicle.

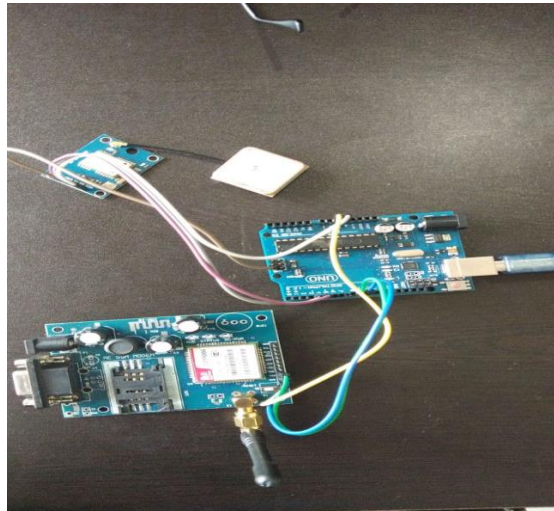


Fig 3.5: Hardware connected device

IV. OBSERVATION

The fuel management system works on updation of fuel availability in nearby petrol pumps. Due to unavailability of fuel, people find it difficult to fill their fuel tanks in different areas. The fuel management system will be useful as it alerts the driver if the fuel is running out and also show nearby petrol pumps. The accident detection module is basically developed for the safety of the driver as it sends an SMS on collision to the emergency contacts. After using various sensors such as pressure sensor were not giving accurate reading hence we included ultrasonic sensor.

V. CONCLUSION

The outcome of this proposed system describes various approaches of fuel management system and automatic SMS system in case of emergency. This invention is much more useful for the accident occurred in desired places and those occurring at night time which manually goes unattended. The biggest advantage is, this device locate the accident spot accurately, realizing the automation of accident detection and messaging system. Also Fuel management helps the vehicle driver to locate nearby petrol pumps with the help of GPS system and it gives directions to the nearest petrol pumps on the LCD screen. This will be beneficial for the driver to avoid empty fuel tank.

REFERENCES

- [1] Nitesh.K.A, Lohith.B.N.”Arduino Based Digital Fuel Guage and Vehicle Monitoring System”,Proceeding of second ASAR International Conference, ISBN:978-93-85465-06-2.
- [2] Yen-Jen Chen, Chai-Hung Chien.”Fuel Consumption System”, Journal of Computer and Communication, page no: 153-158

[3] The “Automatic Road Accident Detection Techniques” was done by Usmar Khalil and Tariq Javid in 2017