



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

IoT Based Smart Petrol Pump Finder

Akarsh Goyal

Student, School of Computer Science and Engineering, VIT University, Vellore, Tamil Nadu, India

ABSTRACT: Many a times while travelling, people get stuck in the middle of nowhere due to an empty fuel tank. Our project aims at eliminating this problem by searching and showing the nearest petrol pump to the user. We have developed an android app which, based on the fuel level, will suggest the nearest Petrol Pumps using Google Maps and Google Distance Matrix API, and will help the user to navigate to the selected petrol pump. An Ultrasonic sensor is used to detect the level of petrol pump and a Bluetooth module is used to communicate the level of petrol pump to the android app. A user can also look at the current month's petrol pumps he visited and the last time when his fuel tank level went low. All the values such as his current location, location of petrol pump he visited, petrol level, date and time are stored in the database for user's reference and for future inferences. This will help users to reach a petrol pump on time even in an unknown location or when they are stuck with no help around. The application is light weight and doesn't require much space and gives accurate output.

KEYWORDS: Android, Petrol Pump, Google Maps, Bluetooth Module

I. INTRODUCTION

We have developed our project on this idea of IoT (Internet of Things) which is an amalgam of electronics, sensors, software and network. It's a common problem faced by everyone when the petrol level goes down and they have to search for nearest petrol pump. People can't estimate roughly as to how much distance they can travel before their car breaks down completely and they become helpless.

We have formulated a solution for this problem. Our 'smart petrol level indicator app' will suggest the nearest petrol pumps that will help user to navigate to the selected petrol pump, and the history of petrol pumps he visited. We used reliable technologies such as ultrasonic sensor to detect the level of liquid, Arduino board, Bluetooth module as hardware and software components such as Android Studio, WAMP server, and Google APIs.

This app[1][2] can be the next big revolution in the current tech bubble as most people rely on their android apps for maps and other products. They will definitely like searching for nearest petrol pumps based on their petrol level and will definitely increase their productivity.

II. RELATED WORK

Many apps have been made that find the petrol pumps in the vicinity of a neighbourhood. Some of them are -

- Petrol Station Finder
- Gas Station Finder
- Petrol Pump Locator
- WhatGas Petrol Prices

Also many other apps are there that track car expenses, auto service, your fill-ups, fuel consumption such as -

- Fuelio: Gas Log and Costs
- FillUp: Gas Mileage Log
- Drivvo: Car management
- Fuel Manager(Consumption)

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

III. BLOCK DIAGRAM

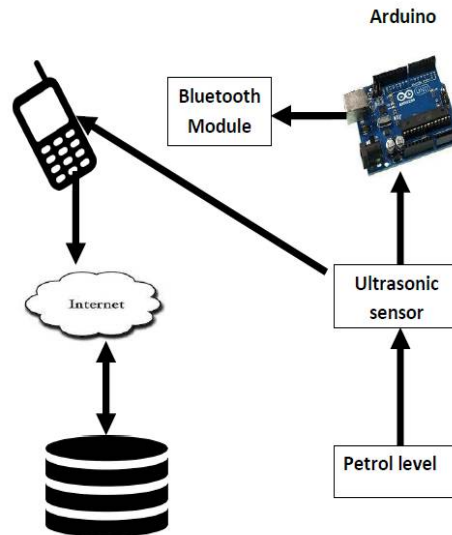


Fig.1. Block diagram

First, the petrol level is sensed by the ultrasonic sensor which is placed in the petrol tank. This is attached to an arduino which communicates the information to the mobile device of the owner using a Bluetooth module. This is analysed by the mobile and used to find the petrol pumps in the vicinity of the car[5-7]. This all is done by using Google Maps and Google Distance Matrix API. The search history and also the petrol pumps visited earlier are saved in the database for future reference.

IV. SYSTEM DESIGN

The implementation of the model can be divided into two parts –

- Hardware
- Software

Hardware

Components used

1. Arduino UNO[8]
2. Bluetooth module
3. Ultrasonic sensor

We used an “Ultrasonic Sensor” [4][9] to detect the level of the liquid. Water was used to test the model. The value obtained from the sensor was passed to “Bluetooth Module” which was in turn passed to the android app using Bluetooth. Android app used this value to indicate the petrol level and resulted in various inferences thereafter such as the maximum distance that can be travelled and the nearest petrol pumps.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

Circuit Diagram

- 1) Ultrasonic sensor to Arduino

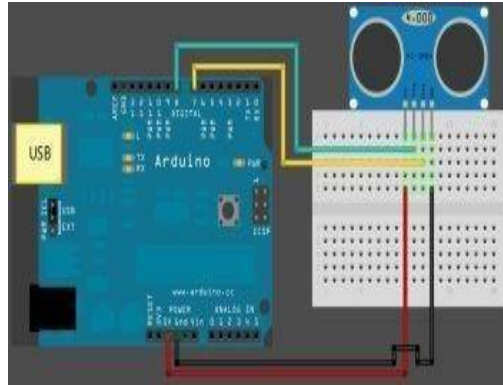


Fig.2. Ultrasonic sensor to Arduino

- 2) Arduino to Bluetooth module

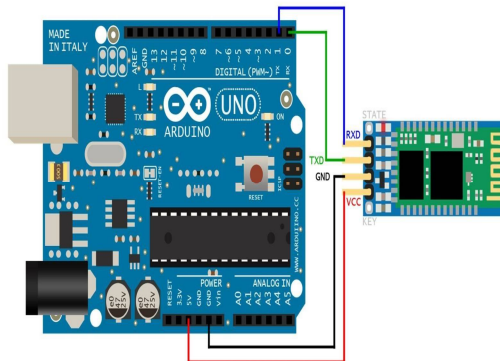


Fig.3. Arduino to Bluetooth Module

Software

Components used:

- 1) Android Studio
- 2) WAMP server
- 3) Arduino IDE

The app was created using Android Studio and Google Maps API including Google's Distance Matrix[3] API to calculate the shortest path. The backend was fully loaded with PHP and MYSQL and database tool used was PhpMyadmin.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

V. ACTIVITY DIAGRAMS

View/Search Petrol Pump

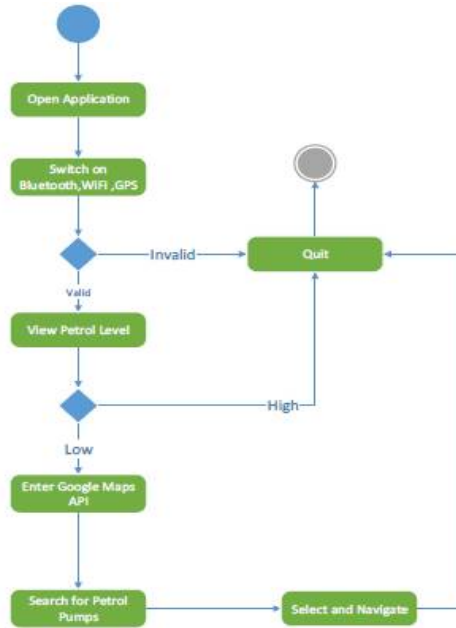


Fig.4. View/Search Petrol Pump

View History

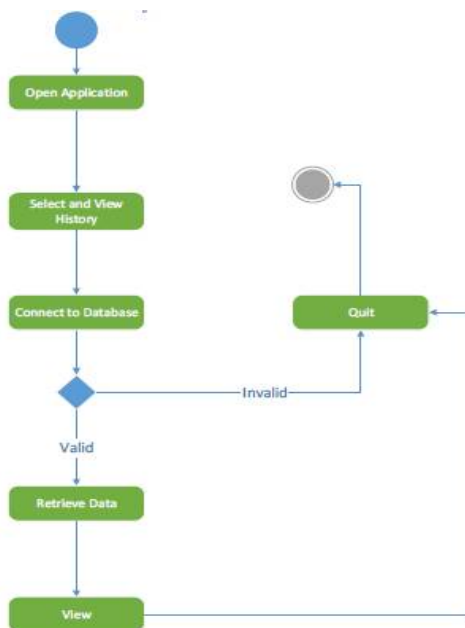


Fig.5. View History

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

Rate Petrol Pump

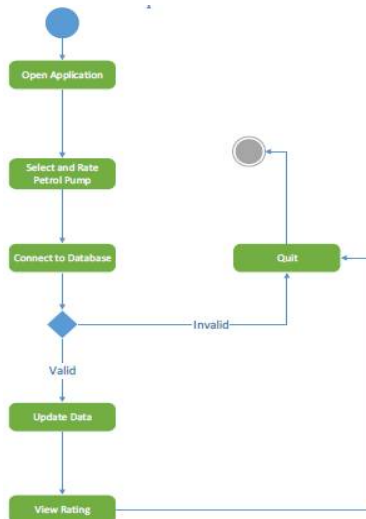


Fig.6. Rate Petrol Pump

VI. RESULTS AND DISCUSSIONS

We were able to implement a model which could take the readings of the level indicator and feed into our android app. The app searched for nearest petrol pumps, helped user navigate to the selected petrol pump and provided various other facilities. This will be a great productive app for people as they will no more be stuck at an unknown location finding petrol pumps. This app addresses a real life problem faced by all of us and will be quite beneficial. The app could further be improvised for real time use. The level indicator can be clubbed with the petrol level indicator already provided in cars and a system could be developed to fetch that value into our app. This would prove to be a great boon for many.

A rating system for petrol pumps can also be provided. A separate section to add reviews and rating for a particular petrol pump can be added and several Machine Learning algorithms such as sentimental analysis could be used to get the accurate rating. This would be the next big thing in our Tech market as such apps like “Zomato” exist which provide rating and reviews for various restaurants but there is no such thing for petrol pumps that exists. The app would not just serve the purpose of finding petrol pumps for you, but it will also suggest you the petrol pump you should prefer based on he reviews and rating which will prove very helpful to the customers.

Various Screenshots of the implementation –

- 1) Database Screenshots

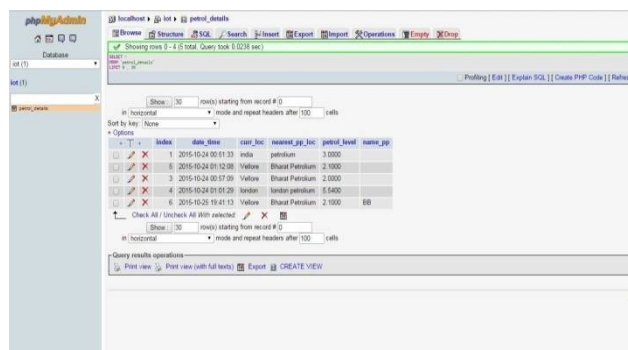


Fig.7. PHP MyAdmin Database

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

2) App screenshots

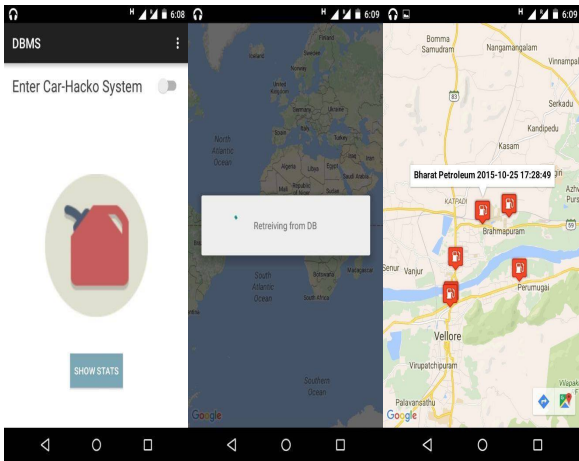


Fig.8.Retrieving data from database

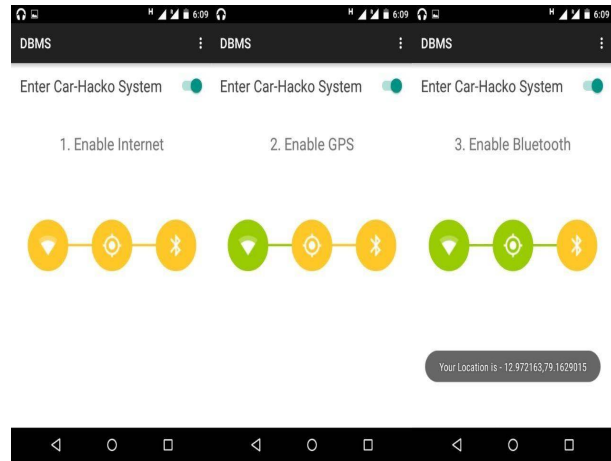


Fig.9.Starting the Car-Hacko System

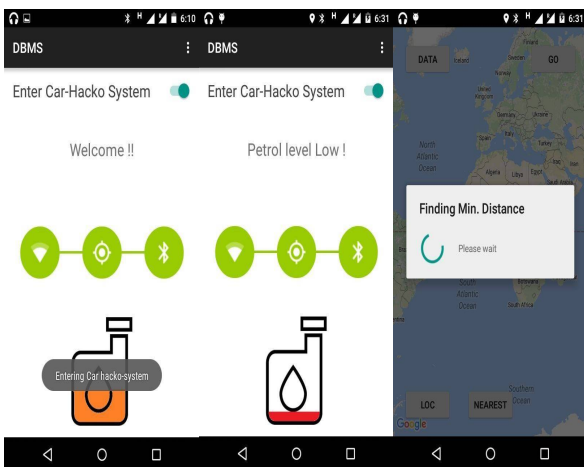


Fig.10. Petrol level is low and find nearest petrol pump

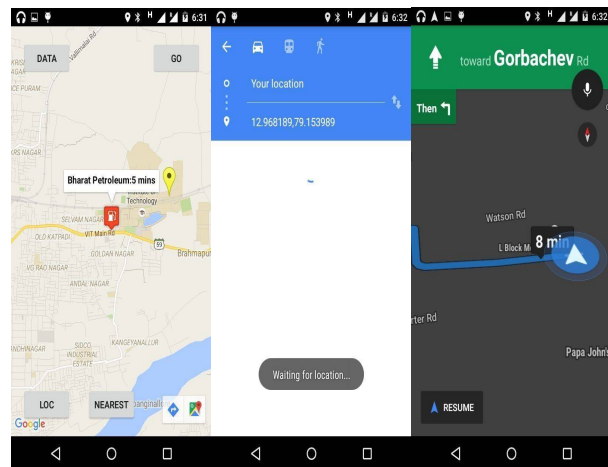


Fig.11.Show nearest Petrol Pump using Google Maps

VII. CONCLUSION

Once all the functionalities are added and the app is made real time, it could prove very helpful to the users. It will suggest petrol pumps that they could visit and also help users to choose which petrol pump to visit and to trust. It will not only increase competition among petrol pumps but will also motivate them to provide better services to users. There are a number of cases we hear where petrol pumps cheat on customers by charging more money than required or those of poor services. Such problems will diminish and it will help provide a better way of living.

VIII. FUTURE WORK

Future work includes rating and review section in the Android Application and calculating the maximum distance the vehicle can travel before fuels runs out completely. The rating and review section will be based on Participatory Sensing. This is an approach where information collected through user's mobile phone help to improve quality of service. This will be a kind of recommendation system to the other users where users will avoid going to the petrol pumps with a bad quality of service.

We also intend to include a feature where the user can know the maximum distance his vehicle can travel before the fuel runs out. This will be of great help to the driver, and will be user customised. The application will be completely



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 6, June 2016

automatic, in the sense that user need not touch the mobile phone. The Text-to-Speech and Speech-to-Text will be accurate and efficient.

REFERENCES

1. L. Ma, L. Gu, J. Wang, "Research and Development of Mobile Application for Android Platform," International Journal of Multimedia and Ubiquitous Engineering, vol. 9, pp. 187–198, 2014.
2. S. Holla, MM Katti, "Android Based Mobile Application Development and its Security," International Journal of Computer Trends and Technology, vol. 3, issue 3, 2012.
3. L. Priyanka, A. Priyanka, K. Monali, M. Sandhya, "Smart Shopping: Location Based An Android Application," Imperial Journal of Interdisciplinary Research, vol. 2, issue 1, 2016.
4. S.V. Devika, S.K. Khamuruddeen, S.K. Khamurunnisa, Jayanth Thota, Khalesha Shaik, "Arduino Based Automatic Plant Watering System," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 4, issue 10, 2014.
5. Y. Chittoria, Neha Aggarwal, "My Tour- Navigation Based Application," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 4, issue 2, 2014.
6. Dr. O Ibrahim, K. Mohsen, "Design and Implementation an Online Location based Services Using Google Maps for Android Mobile," International Journal of Computer Networks and Communications Security, vol. 2, issue 3, 2014.
7. P. Verma, K. Bhatia, "Design and Development of GPS-GSM Based Tracking System with Google Map Based Monitoring," International Journal of Computer Science, Engineering and Applications, vol. 3, issue 3, 2013.
8. Araujo, D. Portugal, M. Couceiro, R. Rocha, "Integrating Arduino-Based Educational Mobile Robots in ROS," Proceedings Of the 13th International Conference on Mobile Robots and Competitions, April 24th, 2014.
9. A. Shrivastava, A. Verma, S.P. Singh, "Distance Measurement of an Object or Obstacle by Ultrasound Sensors using P89C51RD2," International Journal of Computer Theory and Engineering, vol. 2, issue 1, 2010.

BIOGRAPHY



Akarsh Goyal, Student, School Of Computer Science and Engineering, VIT University, Vellore. He has published a few scientific papers. His areas of interest are data mining, machine learning, IoT, and Android based applications.