

Digital Fuel Meter and Bike Usage Analyser

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ABSTRACT

In this paper we propose to build an android app along with hardware to collect various data from bike's usage and display it effectively in the app. We intend to make the app as user-friendly as possible. Our main focus is on displaying the amount of fuel in bike's tank in liter's i.e. in digital format.

1. INTRODUCTION

This document is a proposed idea of making a complete tracker of bike usage. The directive of this project is to make a device that can give as accurate result as possible to prevent petrol thieves at petrol pump, as some article proves that there are lot of incidence where customers are not provided by the amount of petrol they have paid for by using inappropriate devices fitted in petrol filler. Prevention of such cases is primary motive of this project. Along with it we also intend to develop an app that displays all other information and not just amount of fuel. It also contains feature to keep track of insurance and puc expiry dates. Also location of bike will be transmitted in order to jot down maps of trip. This information can be very helpful for frequent bike riders and also majorly for user's that have bike renting business to keep track of there rented bikes info. There are many other uses of this application as well. This application can be used to analyze one's riding pattern and behavior.

2. EXISTING SYSTEM

There are similar apps that give usage analysis based on android phone's inbuilt gps. It is limited to calculation of distance along with time constraints. Its accuracy depends on Phone's gps. None of app show fuel usage or current quantity of fuel on tank.

2.1. Disadvantages of existing system

For its data collection user must have his/her mobile phone along with them at all time. It will not be able to store data of usage if rider does not carry phone along as it collects data based on phones gps alone which is not accurate. There is no feature of measuring fuel as it requires hardware to collect data. As a result it is highly inconvenient and user cannot rely on data collected from it.

3. OVERVIEW

As both hardware and software are required to function correctly in this project. The main motivation of this project is communication between the two modules. This communication is established by server-client module via gprs. It consists of different modules for each functions. Basic aim of the project is data collection from hardware and successful transmission to server. Later this data will be synced with user's phone. Therefore this project is divided into two parts, first consist of hardware and data transfer to server and second comprises of analysis and display various results based on collected data.

4. METHODOLOGY

Here are few of functions along with hardware requirements used for its execution:

a.) Fuel measurement

We plan to use arduino together with the necessary sensors. Because the fundamental role of this project is to calculate precise fuel, a sensor that can give precise values must be implemented. In addition to sensors, there are many methods to measure volume but as the tank of a bike is not uniform, we need a sensor that can solve this problem. Until now, we believe that an ultrasonic sensor is better suited for fuel measurement according to our studies. The only disadvantage is that while the bike is in motion, it cannot measure correct value.

b.) Distance measurement

The distance measurement is the second significant characteristic. We need distance covered by a bicycle for analysis purposes. We plan to use a hall sensor or a Gps sensor for this function. The exactness of respected

sensors depends on that. Both of them have their disadvantages, e.g. hall-sensor relies upon the pneumatic circumference, meaning that each bicycle has distinct range values if it is static. In contrast, gps can return distinct co-ordinates that lead to distance calculation errors, as we use co-ordinates to evaluate distance between the two points and to repeat until the motorcycle moves. In order to enhance the distance calculation, both sensors may be used better. Gps for getting coordinates and hall sensor to acquire speed. Use this coordinates to calculate distance. And then validating that it is possible to travel such distance with acquired speed. We need an algorithm to verify the two sensor values to function correctly.

c.) Speed measurement

We also need bike speed at periodic time intervals along with range. Using both the hall sensor and the gps sensor, this can also be collected. But gps sensor will be more suitable and preferable because there are less chances of wear and tear as it will be with other hardware inside bike rather than hall effect sensor that has to be implemented on tyre of bike.

d.) Data transfer

Following a good raw information compilation, all information on the server must be transferred to the second portion of the project. To that end, we propose to use the gsm module to upload data from a 2 g simcard on server. Data will be transmitted with the assistance of gprs as http get request. After which hardware side of project execution is completed and control is transferred to server as well as software side of the project.

e.) Server execution

Once http request of the gsm module is executed, server which is live on web will collect the data with the help of php script and save it in mysql database. For backup purpose every entry is saved in two tables one for further transfer and other for data backup. Server is programmed to enter each entries date and time automatically.

f.) Software requirements

We propose an android application in this project, which shows usage assessment because it is easier for users to access information using an android app rather than a website. Coding language that will be used is java along with android studio software as compiler. To synchronize with equipment, users must have internet access. Data will automatically sync every time user starts the app. Also there will be manual button in app for syncing. Data is collected in app with http request and stored in json array and then transferred in sqlite database by using pointer function.

g.) In-app functions

There will be three main fragment pages in app which will contain group of similar function. Main loading fragment will consist of all queries related to the present day, live fuel amount in tank and other small information. Second fragment will contain Information related to entire week. Third fragment will comprise of all analysis of entire month. Each fragment will represent data in different format for eg. First fragment will contain detail information about the entire day like petrol used, distance covered, time driven, and average speed. It will also contain detail information filtered by time when bike was started and stopped i.e information of each trip like distance, petrol used etc. Second fragment and third fragment contains graphs and summary of usage according to the criteria mentioned. User can also get information of a particular date or set of days that they may wish to select. This option will be available in menu tab along with setting and other options. There will be other small functions like keeping track of puc expiry date and insurance expiry date and alerting user beforehand about it and separate division in app for countdown of both expires date in terms of days. This app will also show live petrol prices for reference of user. Also by computing coordinates of location we can map down the whole trip of user.

5. CONCLUSION

This project creates new ways to connect to our modern technologies and makes way to more detailed analysis. This data is very useful for organizations as it can be used to conclude various traffic areas with relation to time and in turn can be used for various business planning like mechanic garage, food corners, petrol pumps etc. This app will prevent unnecessary expenses caused due to forgetting the renew date.

6. FUTURE SCOPE

The main difficulty with this project has is that while the bike is moving it won't be able to get accurate reading of petrol data, results will be accurate only when bike is still. To overcome we must use some other type of sensor that will be able to collect accurate data even while bike is in motion. Also gps used should be checked with accuracy as cheap and inaccurate gps's data will fluctuate when climate is not clear.

7. REFERENCE

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