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Distance Estimation in Vehicle Using IOT

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ABSTRACT

This paper describes a system to estimate the distance covered with the available quantity of fuel. More specifically, on a long journey, the driver may forget to pay attention on the quantity of the fuel present in the fuel tank. In such a situation, the user is unaware of the distance that can be covered by the vehicle running on fumes. A smart device provides the driver with five modes to estimate the distance that can be covered by the vehicle.

Keywords: Distance Estimation, Internet of Things, Fuel, Five modes, Hybrid Mode, Highway Mode, Uphill Mode, City Mode, Traffic Mode

1. INTRODUCTION

The present invention relates to the field of Internet of things (IOT) in Vehicle Distance Estimation.

The goal of this research is to develop a smart device for estimating the distance of the vehicle and that allows them to estimate the distance that can be covered with the remaining quantity of fuel.

The recent advancements in the area of IoT has provided solutions to measure the distance and actual estimation of kilometers a vehicle can cover with the quantity of fuel present in the fuel tank. The system also enables fuel consumption in an effective and efficient manner.

Our research team has developed a smart system that challenges the current system and provides the following advantages for estimating the distance a vehicle can travel with the available fuel in the tank.

1. Device having four buttons/options one for each mode and a display screen
2. Device having a fifth button for a hybrid mode
3. Ultrasonic level sensor for measuring the quantity of fuel present inside the tank
4. Graduated fuel cylinder

The implementation and description of smart system for distance estimation in a vehicle would be discussed in the preceding sections of this paper.

2. DESCRIPTION

The paper discusses in detail on a smartsystem to estimate the distance that can be covered by the driver before the fuel tank dries up.

The present invention includes a display system that has four different modes. During the testing stage of new vehicle, the vehicle manufacturers specify the mileage of the vehicle after performing a number of tests. The present invention introduces four modes which are installed inside the vehicle. These four modes are represented by four buttons available on the device below the display screen.

All the four modes and their combinations are predefined during the designing phase of the vehicle manufacturer. The testing of the vehicle can be carried out under these four driving modes. The four modes which are accessed

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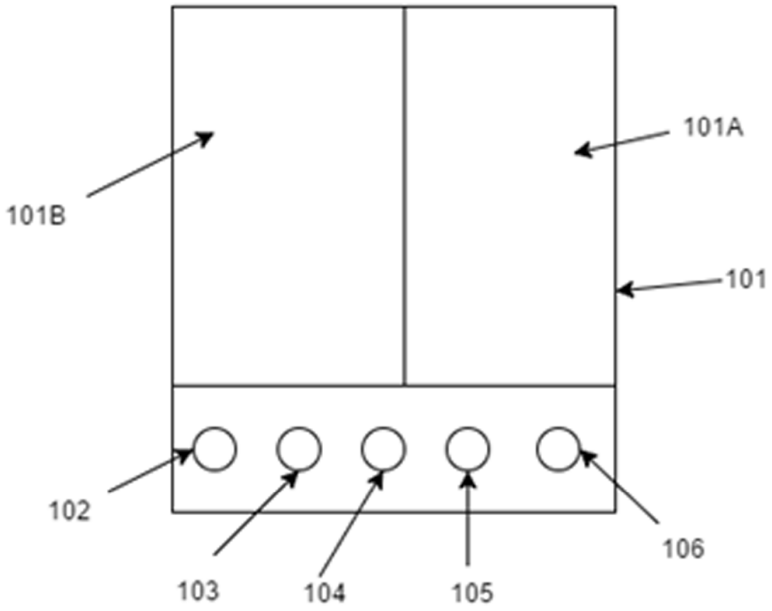

Figure 1: Smart Device having Four Buttons and the Display Screen

through the buttons are highway, uphill, city and traffic mode. Further, the device has a fifth button which provides a hybrid option. The smart device having four buttons one for each mode and the display screen is shown in fig.1.

The modes described above have the following specifications, the highway mode 102 is used in the places such as national highways, state highways, intercity roads where the vehicle accelerates ahead without any hindrance for atleast 5 km. The mileage for such a mode is calculated after driving at a speed close to 60 km/hr which is the usual speed while driving on highways. The mileage calculation is different for different vehicles.

The uphill mode 103 as the term suggests will be selected when the terrain or road has considerable amount of inclination. For city mode 104, the condition is decided by considering driving in the regions where light amount of traffic is present and the vehicle travel at considerable amount of speed.

In the traffic mode 105, where the high density is present which do not allow the easy manoeuvre of the vehicle past other obstacles. In other case, the same traffic mode can be used in the areas where the quality of the road is not good, the roads such as village roads, and roads in the outskirts of the city.

As mentioned above, there is a fifth button called a hybrid mode 106, here the user is allowed to choose more than one mode to estimate the distance with the available fuel. On selecting/activating the fifth button 106, the display 101 asks the user to choose the required modes. The user at this point of time can select the required set of modes using the four buttons 102 to 105 to form a combination.

For the above detailed mode, the mileage of the particular vehicle is calculated by performing repeated tests under the above mentioned mode conditions. After a series of such tests the device consisting of the display 101 and the four buttons is placed on the vehicle preferably on the dashboard. This device shows the different values for different modes in different and in the same vehicle. The mileage calculation are performed by considering 1 litre of fuel and the values indicated are approximate only.

The options to choose the mode is decided by the driver based on the live traffic data. Live traffic data can be obtained from any available applications such as Google Maps, Waze or similar other applicationswhich can provide live updates.

Since this device is projected on the vehicle during the manufacturing/assembly, the user has to calibrate the device after every year to set the updated mileage values avoid any false estimation. The user at any point of time can calibrate the system, in case they are going out on a long drive.

As mentioned above, the four modes are installed inside the device, and placed inside the vehicle. The system further has a fuel level measurement system that provides the quantity of the fuel present in the system in numerical digits. The fuel tank has an ultrasonic level sensor present on the upper surface. The tank has graduated markings on it. The timing of the signal from the ultrasonic sensor to the fuel surface and back to the receiver is clocked for different quantities of fuel in the tank. This value is stored in a memory. As and when it is required to display the quantity of fuel on the display screen, the timing of the signals from the sensor back to the receiver is clocked. The obtained value is compared with the reference value inside the memory. This value is displayed on the display screen either in numerical or graphically indicating the quantity of the fuel present in the fuel tank.

As mentioned in fig. 1, the display screen 101 is divided into two sections where the first section 101A displaying the live traffic update to the driver and the second section 101B to display the quantity of fuel and the estimated distance. Further, the display unit displays the mode that is selected by the driver. The user uses the value of the quantity of the fuel and the device calculates the distance after the driver chooses the appropriate mode. As mentioned the device comprises of five buttons and a display unit, the entire system can also be implemented on a touchscreen device with the user selecting the options provided on the display screen.

Further modification can be included in the present invention without changing the scope of the invention as known by the person skilled in the art.

3. IMPLEMENTATION

The present invention and its advantages can be implemented as described below. In the present disclosure, a vehicle distance estimation based on few modes of the vehicle is presented. In many cases, it happens that the user forgets to keep an eye on the fuel indicator and reaches a place where there is no fuel station in the vicinity when he runs short of fuel. In such case, the user wishes to atleast cover distance to reach the nearest fuel station.

The driver is provided with a device which can estimate the distance the vehicle can cover on four different modes with the button for each mode and a fifth button termed as a hybrid mode. The system further has an ability to measure the quantity of fuel and display it numerically on the display screen.

4. APPLICATIONS

The invention as described in the drawing finds applications in taxi, cab, cars, trucks, buses and heavy vehicles

5. CONCLUSION

The present invention provides a solution to travellers and drivers by enabling them to estimate the distance that can be covered based on the quantity of the fuel present in the vehicle.

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