A Review on Different Mileage Indication Techniques for Two-Wheeler

Umesh P.Hade *1, Prof.A.R.Suryawanshi’2

*1(Student of E&TC department,PCCOE,Pune,India)
*2 (Asst. Professor of E&TC department,PCCOE,Pune,India)

Abstract – There are different mileage indication techniques used in automobile sector of vehicle. Mileage of vehicle depends upon the fuel consumed by the vehicle for travelling particular distance. It also depends upon the driving style of driver as well as road condition. Fuel consumption for travelling a particular distance is more while travelling vehicle in traffic, bad road condition and load on vehicle, so this indicates that the vehicle mileage also depends upon traffic condition and load on vehicle. Our paper shows the comparative study of different techniques to indicate mileage of the vehicle in real time. From current mileage and available fuel in the tank probable distance the vehicle will travel can be predicted.

Keywords – Mileage, Sensors, Flow meter, Two-wheeler, Microcontroller.

I. INTRODUCTION

Fuel mileage in vehicles refers to the relationship between the distances travelled by an automobile to the amount of fuel consumed [1]. In the current scenario, use of automobile and petrol price increasing with higher rates, so it is necessary to use fuel economically as well as to avoid the wastage of fuel. In conventional mileage calculation techniques, human have to calculate the mileage of the vehicle manually by travelling vehicle until it get empty. The drawback of this process is that there is no real time mileage calculation and also it is time consuming. Thus demand grows to indicate fuel consumption as well as mileage in real time.

II. LITERATURE SURVEY

In this section existing mileage indication techniques are discussed.

A. B.Naresh Kumar Reddy.[8] et.al. In this proposed method, proximity sensor, fuel level sensor, LCD display and microcontroller are used to indicate distance, speed, fuel and mileage of the vehicle.

1. Proximity Sensor

The Proximity sensor used detects the presence of nearby metallic objects without any physical contact. In this method, proximity sensor fixed in wheel and when wheel is rotating the proximity sensor gives the pulse to the microcontroller and inside the counter will count that pulse from this author has calculated the revolutions per minute(RPM).

2. Float Sensor

Fuel level sensor DUT-E is designed for the precision fuel level measurement in all kinds of vehicles tanks, also tanks of fixed installations. DUT-E is used for standard fuel level measurement as well as to determine fuel consumption.

3. Microcontroller

Microcontroller is used to calculate RPM, Distance and Fuel consumption

3.1. To calculate mileage

A proximity sensor is fixed either in front or rear wheel. Wheel rotates as per the speed of the vehicle. In accordance with the wheel rotation the proximity sensor gives the series of pulses to the microcontroller. Whenever the beam coming from the proximity sensor is interrupted. It can be treated as logic 1 during the flow of beam and its absence of reception can be assumed as digital logic of 0. Thus, a clock pulse is generated every time when the beam is interrupted by the
beam whose frequency is proportional to the rate of rotation of wheel [9].

The counter embedded in the microcontroller used to count the pulses. It is then followed by frequency to voltage convertor circuit and later by digital to analog convertor. Mathematically this information is adequate for calculating the revolution per minute (RPM).

3.2. To calculate Distance

Circumference of the rear wheel is measured, so that the rotation per minute is converted to the kilometer per hour by means of programmed microcontroller.

3.3. To calculate fuel consumption

Firstly fuel sensor measures the fuel level in tank and second reading of fuel is taken when vehicle travels a particular distance. By subtracting second reading from first reading of fuel, fuel consumption for particular distance is calculated.

4. LCD Display

The LCD is used for displaying the amount of fuel, mileage and speed of vehicle.

In this mileage calculation techniques the experiment is done at the different conditions such as Highway with traffic, Highway without traffic, Traffic in city, No traffic in city.

Advantage of this technique is, it could provide necessary information to the bike rider about the fuel quantity and mileage details well under the constraint that the user has to manually switch among the modes like highway with traffic, city mode etc.

Disadvantage of this technique is rider should have pre-knowledge of the current situation such as highway with traffic, highway without traffic etc and the accuracy of the results primarily depends on the modes he chosen.

B. Jaimon Chacko Varghese.[2] et.al. In this proposed method, flow meter, level sensor, speed/distance sensor, solenoid driver, Electronic Fluid Valve, LCD display and microcontroller are used to indicate distance, speed, fuel and mileage of the vehicle.

1. Flow meter

A flow meter is an instrument used to measure nonlinear, linear, volumetric or mass flow rate of a gas or liquid. From flow rate and area of flow meter amount of fuel pass through flow meter is calculated.

2. Electronic Fluid Valve

Electronic fluid valve is electronically controlled to obtain open and closed position of the valve.

3. Microcontroller

A Microcontroller has all of the essential blocks to read, write information to the display, control and store data. In addition to simple ON/OFF inputs and outputs, many microcontrollers have abilities such as measuring analog signals, performing pulse-width modulated output, counting input pulses, and many more.

4. Solenoid Driver

Solenoid driver is a circuit which is used to drive the fuel solenoid from the battery with the control signal from the microcontroller.

5. Level Sensors

Level sensors detect the level of fuel in the tank.

6. Speed Sensors/Distance Sensor

Speed sensors provide information to the microcontrollers about the speed of a component and the change in speed of a component. Vehicle speed sensor is used to determine the speed of a vehicle [12].

6. LCD Display

The LCD is used for displaying the amount of fuel, mileage and speed of vehicle.

In this mileage calculation techniques the experiment is done at the different conditions such as single person load and two person load.
Advantage of this technique is the device was working normally under the standard test condition and displayed different values of the mileage under different condition. Disadvantage of this technique is rider should have pre-knowledge of the current situation such as highway with traffic, highway without traffic etc and the accuracy of the results primarily depends on the modes he chosen.

C. C.S. Suresh Babu. [6] et.al. In this proposed method, basically the work is divided into two phases. In the first phase of the work, the desired parameter to be monitored is the mileage of a vehicle, which is not an independent variable. The second phase of the work forecast the distance that can be traveled by the vehicle based on the fuel available in the tank. Component used in this method, T-tube with optical sensor, Proximity sensor, solenoid valve, LCD display, Float sensor and microcontroller are used to indicate distance, speed, fuel, mileage of the vehicle and Predict the distance.

1. Solenoid value
To determine fuel consumption, it is necessary to intermittent the continuous flow of fuel for that purpose T-tube and solenoid value. When T-tube empty solenoid value act as open switch and when T-tube full solenoid value act as close switch. In this way known volume of fuel transfer to engine.

2. T-Tube with Optical sensor
To send know volume of fuel to engine of vehicle solenoid value and T-Tube with optical sensor arrangement is used. When tube is full optical sensor send high signal to controller and depending upon signal reception controller close the solenoid value. When tube is empty optical sensor send low signal to controller and depending upon signal reception controller open the solenoid value.

3. Proximity sensor
The Proximity sensor used detects the presence metal without any physical contact. In this method, proximity sensor fixed in the wheel, when the wheel is rotating the proximity sensor gives the pulse to the microcontroller and inside the counter will count that pulse from this author has calculated the revolutions per minute (RPM).

4. Float sensor
To measure the quantity of fuel available in the tank float sensor is used. Out put of float sensor connected to microcontroller for level measuring.

5. Microcontroller
It is used to control solenoid switching and calculate RPM by using pulses of proximity sensor. RPM value is multiplied with circumference of wheel to get distance travel for known volume of fuel consumed. From this distance and fuel consumption mileage of vehicle is calculated. Available fuel in the tank is multiplied with current mileage, predicted the distance that can be traveled by the vehicle which depends upon the fuel available in the tank.

6. LCD Display
The LCD is used for displaying the amount of fuel, mileage, speed of vehicle and predicts the distance.

In these mileage calculation techniques the mileage is estimated at different condition such as Tuned Engine mode, Clogged Filter mode, Rich mixture mode and the designed system is successfully tested on a two wheeler for various constant speeds under different conditions of the vehicle given above.
Advantage of this technique is the designed system performance evaluated at three different modes such as engine tuned mode, clogged filter and rich mixture.

D.A. Avinashkumar. [13] et.al. In this proposed method different component is used as followed

1. Fuel gauge
It is generally used in two-wheelers. It is a device which shows the amount of petrol in the petrol tank. Output signal of fuel gauge provided as input for microcontroller (Empty and Full).

2. Petrol Tank with Float
It is used to find the petrol in the tank of vehicle. Float sensor consists of potentiometer and depending upon its resistance change output signal of float sensor changes and in accordance with that fuel level is measured.

3. A/D Converter
It is used to convert analog quantity to digital value.

4. LCD Display
In this method LCD display is used to indicate fuel available in the tank of vehicle, mileage and distance predicted.

5. Battery
It is device which provides the supply to the microcontroller and all sensors.

In this technique the main component is microcontroller unit, fuel level sensor and LCD display. The fuel level sensor is used to detect the level of fuel in the tank. In this method sensors are placed at particular location in the tank to find out the fuel level and this output signal of fuel level sensor is sent to the microcontroller unit for further processing purpose. This process signal sent by microcontroller to LCD Display to indicate fuel level. The LCD connected to dashboard of vehicle which shows the present fuel level in liters. The fuel sensor is used to calculate consumption of fuel for travelling particular distance and from fuel consumption reading and distance mileage of vehicle is calculated with the help of microcontroller. Again the fuel level is measure and by multiplying it with current mileage of vehicle the distance traveled by vehicle is predicted.

Advantage of this method is it can display exact fuel level available in vehicle and predict the distance vehicle can travel. This technique can be improved by using buzzer or LED to indicate the vehicle rider about the abnormal conditions like low fuel level and low mileage level.

In this method a float type sensor is used within the fuel tank the variation of the fuel level can change resistance of float sensor which is connected with the float. Variable resistance from the fuel tank is connected with the analog to digital converter unit to show the exact quantity of fuel in the fuel tank. The arrangement can show the exact value of fuel in the tank.

Disadvantage of this method is A/D converter cannot show correct fuel in the tank when the fuel in the fuel tank is less than 1 litre. The accuracy level is up to 95 – 98% as fuel in the fuel tank was measured on the basis of float level in the tank. In this proposed technique by placing fuel cells at different places of fuel tank exact fuel levels can be measured and from correct fuel level exact distance to zero can be calculated.

III. CONCLUSION

In this paper, different techniques for mileage calculation of the vehicle are explained. Mileage calculation by using flow meter, electronic fluid value and high resolution fuel sensor can find the mileage accurately. These techniques can be used in automobile industry in future and can provide correct information about fuel consumption and mileage of the vehicle. These techniques also help to use fuel economically and avoid the wastage of the fuel.

IV. REFERENCES


