An Integrated Digital Dashboard For Automobile System

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Abstract— The design of "An Integrated Digital Dashboard For Automobile System"is intended to develop an integrated dashboard in automobile for smart city application. In today's world when we look out for any vehicle's dashboard the parameters are represented in analog form or in the form of bar for e.g. speed, fuel indication, battery level indication, etc. This dosen't provide exact idea about the magnitude of parameters like fuel remaining in the tank, speed of the vehicle, battery life, etc. Hence it is very much necessary to support the user by providing the parametric values in the form of digits. This project is concerned about the digitization of dashboard along with the indication of various features like battery level indicator, oil level indicator, distance to empty location of the vehicle by using GPS and GSM networks. These values are displayed on LCD.

Keywords— dashboard, pollution, real time monitoring, sensors, GPS,GSM.

I. INTRODUCTION

The dashboard of automobiles is used to represent the values of parameters such as fuel level, speed , distance travelled, etc. The present technology used for the indication of the parametric values on dashboard of automobile is easily implementable but at the same time it compromises accuracy and sudden changes. That means the technology used today is trade-off between accuracy and easy implementation. Thus approach of the project try to indicate the parameters with relatively higher accuracy and better readability for the user. Hence digitization is required to know the exact amount of fuel remaining. This parameter alone can't give us the idea about how long the fuel will last. Thus one more parameter i.e, distance that can be travelled in the remaining fuel' which would give an exact idea about how far the vehicle can travel. So that to locate the nearest fuel station interfacing of GPS and GSM module is used. In today's automobile industry , oil is primarily used as coolant and lubricant in the engines of the automobile. So we can also facilitate the user with an additional parameter that can indicate the oil level as well as oil condition. Similarly, the battery level can be shown on the dashboard so that user knows the exact level of charge in the battery in the terms of percentage as commonly shown in cell phones. Thus, in this project we would try to implement the useful parameter indicators with increased accuracy and in a cost effective manner.

II. LITERATURE REVIEW

After the extensive survey of the leading automobiles, such as Vespa, CBR, Bullet, Activa, BMW, Maruti Suzuki Swift etc., we had the following observations. In the dashboards of Bullet, Activa, BMW, Maruti Suzuki Swift speed is shown on analog meter and fuel is shown in form of bars. Whereas in Vespa and CBR dashboards additional things like time and distance travelled is shown in digital forms.

The dashboard fig., for the above listed vehicles are given below:

Figure **1**. Dashboard of Bullet

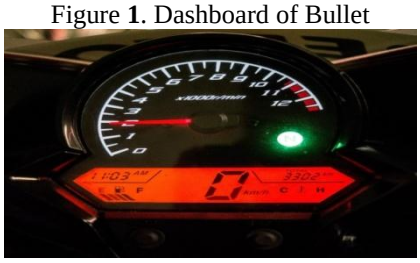

Figure **2**. Dashboard of CBR.

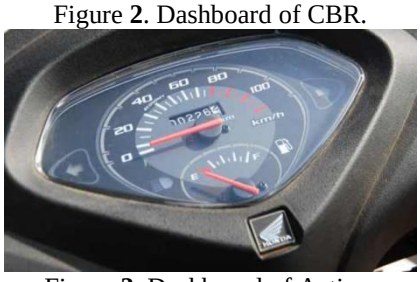

Figure **3**. Dashboard of Activa.

Figure **4**. Dashboard of Vespa

Figure 5. Dashboard of Maruti Swift

Figure 6. Dashboard of BMW.

We have surveyed various research papers and journals are as follows:

The paper presented by **Pankaj Verma , J.S.Bhatia describes the GPS-GSM based tracking system with google map based monitoring[1]**. This tracking system can inform you the location and route travelled by vehicle , and that information can be observed from any other location. It includes the hardware part which comprises of GPS, GSM , ATMEGA microcontroller max232 , 16x2 LCD and software part is used for interfacing all the required modules and a web application is also developed at the client side.

Jaimon Chacko Varghese , Binesh Ellupurayil Balachandran describes the real time fuel mileage indicator for motor bikes[2]. They have developed a low cost device that can actively display the fuel mileage of a motor bike and display it in real time onto a display. The system comprises of a flowmeter, a control unit and a display unit . Flowmeter of minor size is made to fix in between the fuel tank and the engine. The control unit comprises a travelled distance interpreter , a consumed fuel amount calculator which is based on the flowmeter and fuel mileage calculator ; for calculating fuel mileage. The fuel mileage display will display the mileage of the motorbike in real time.

Mr. Vasim K. Ustad, Prof. A.S. Mali and Mr. Suhas S. Kilbile describes the wireless air pollution monitoring system[3]. This paper contain brief introduction about air pollution. To monitor this pollution wireless sensor network(WSN) system is proposed. The proposed system consists of a Mobile Data Aquisition Unit(Mobile DAQ) and a fixed internet enabled pollution monitoring server. The mobile DAQ unit gathers air pollutants levels (CO, NO2 and SO2), and packs them in a frame with the GPS physical location, time and date. The frame is transmitted to the Pollution Sever via xigbee module.

Jia-Sheng Hu and Chien-Chu Yeh described the smart dashboard for electric vehicles[4]. They have described about developing a smart dashboard system based on a hands-on electric vehicles. Many platforms were considered such as Android , iOS and Window for implementing graphical dashboard.It displays vehicles status such as speed , temperature , mileage also shows the current safety evaluations of steering.

III. RELATED WORK

Block Diagram:-

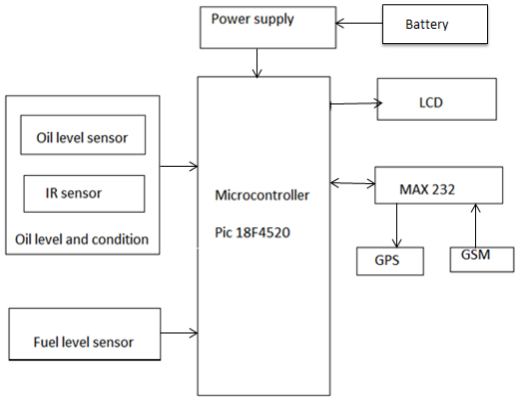

Figure shows the block diagram of overall system. PIC18F4520 can be used as a platform. Vehicle battery is 12V dc. Thus power supply is designed to bring the level down to 5V. Resistive divider network is used to bring the battery level down from 12V dc to 5V dc. Various parameters like oil level with conditioning, fuel level, battery level, distance to travel are shown on a dashboard in digital format. Resistive float sensor is used to measure the fuel level. Magnetic float sensor is used to check the oil level, it gives two outputs either 1 or 0 i.e. it shows whether oil is low or high. An IR sensor is used to indicate whether the oil is expired or not. If oil is red in color then an indication can be made that the oil is not expired. GPS obtains the latitude and longitude coordinates of the vehicle. GSM is used to send the message to the registered mobile number. MAX 232 is the level converter IC. It converts the GPS and GSM logic level to the microcontroller compatible logic levels.

IV. SIMULATION RESULT

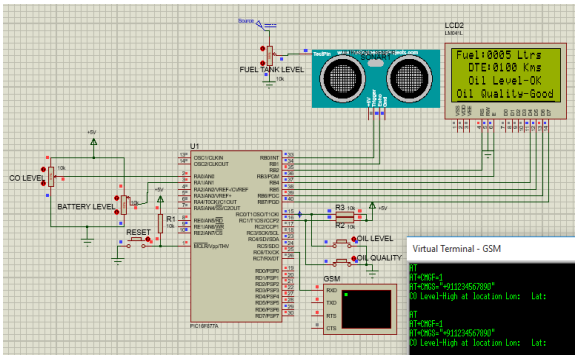

Figure 7. Simulation with good quality oil

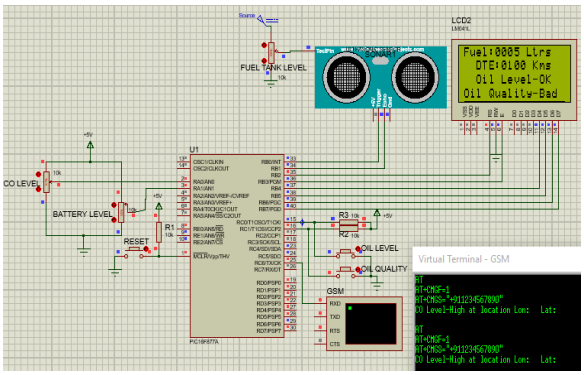

Figure 8. Simulation with bad quality oil

V. CONCLUSION

The real time monitoring system design for modify the existing dashboard. Over all, this project covers all important parameters such as pollution factor, oil level, oil condition, battery level and the vehicle location in one dashboard. This project provides all the parameters in a single dashboard and that too at a cost effective solution. The next objective of the project is the oil level sensor and oil condition sensor. The oil level sensor is IR sensor which indicates the oil condition. We had also interfaced GSM and GPS module with our project to get vehicle location at user request.

VI. ACKNOWLEDGMENT

It gives an immense pleasure to us to submit the project review paper on BE project

"An Integrated Digital Dashboard For Automobile System."

We would like to express our thanks to our guide **Prof. Ganesh Rahate** for his whole hearted co-operation and valuable suggestions, technical guidance throughout the project work.

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