Iot Based Vehicle Health Monitoring System

Yogesh Kr. Mallick, Anamika Talukdar, Debleena Bhattacharjee, Sandipan Roy
Final Year Students (2018)ofRegionalInstituteofScience&Technology,Meghalaya

Mr. Abdul Kayum Ali
Assistant Professor of Regional Institute of Science & Technology, Meghalaya:
Corresponding Author; Yogesh Kr. Mallick

ABSTRACT
This paper deals with design and development of an IoT based embedded system for detecting the vehicle health condition by monitoring various parameters of a vehicle based on some threshold value. In this project, an integrated system is being developed which is a proper blending of hardware (electronics) and the software to monitor various parameter of a vehicle and transmit it to a web server to store that information along with aunique identification number, different parameters along with date and time.This helps in increasing life span of the engine as well as the vehicle. It also helps in avoiding sudden malfunctioning of the engine which may result in some accident.
Keywords– Engine Oil Quality, Internet of Things, Microcontroller-SST89E516RD2 (8051/52), Vibration Sensor, Temperature Sensor, Vehicle Health

I. INTRODUCTION

Monitoring a vehicle regularly increase the lifetime of the engine as well as can prevent from sudden malfunctioning of the machine.

In this busy world everyone uses vehicle for transportation but due to busy schedule people cannot spare time for its proper maintenance.Many people periodically visit the service centre for servicing and maintenance of the vehicle but many people are not concerned about this issue due to many constraints, it may be lack of time or work overload etc. If the manufacturing company service provider can monitor the health of the vehicle remotely it would be a beneficial servicefor both the owners of the vehicle as well as the concerned company.

Hardware part consists of microprocessor which is responsible for collecting and processing data based on various parameters from the vehicle using sensors and send to the server over a unique IP address whereas the software part which consists of a web application, is responsible for receiving the data and store it in the database which can be retrieved later to create health report of the vehicle. Web application makes use of PHP, HTML, and MySQL for receiving and storing the data. WAMP server is used to create dummy server for hosting the application. The health report can be accessed from a centralized location and by multiuser environment using PC, mobile phone, etc.

Vehicle Health Monitoring
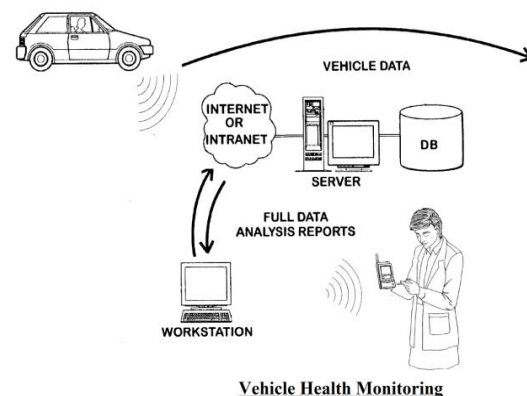
II. REQUIREMENTS

Hardware:
- Microcontroller- SST89E516RD2
- LCD
- Temperature Sensor- DS18B20
- Vibration Sensor module
- IR/Laser Sensor
- Wi-Fi Module
- Hub

Software:
- Keil μVision 3
- Minipro Programmer
- WAMP

Programming Languages Used:
- Embedded C
- PHP/ HTML/ Java Script/ CSS

III. METHODOLOGY

Working of Hardware

- Here microcontroller is main component used for the hardware part.
- Signal from the microcontroller will be sent to sensors for sending the data and different sensors sends the data to the microcontroller.
- Received data is analysed for threshold limit and is sent to the web server using Wi-Fi module, if found more than the limit.

Working of Software:

- Request is handled by the web server and it will be handed over to specific PHP file.
- The PHP file is responsible for collecting the data and processing it as well as storing it in MySQL database.
- Multiple PHP files is responsible for handling different requests from client or user and retrieve the data according to request.
- The data is represented with HTML based API to authenticated user.

Fig: Block Diagram
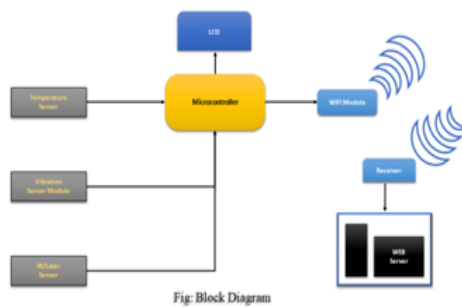
IV. IMPLEMENTATION

Hardware:

Temperature is measured using temperature sensor.Vibration is measured using ball type vibration sensor.

Oil Quality is measured by passing IR through the engine oil. One side IR emitter is placed and on the other side IR receiver is placed. As we know that oil is clearer when it is new so it allows more IR to pass but as time passes it gets used and more dust particles are added so it does not allow more IR to pass. This principle was used to determine oil quality.

Software:

V. CONCLUSION

In this paper a prototype of simple vehicle health monitoring system has been designed and implemented to analyse the health condition of a vehicle on the basisof its physical parameters of its engine which is connected to the IoT for datacollection. This system requires few sensors for collecting data and a microprocessor which processes them and sends to database. The main motive of designing this system was to provide extra features in a vehicle at cost effective rates, so that middle class of the society who use economic class vehicles get benefited. This system will add few thousand rupees to the vehicle cost but it would increase the life span and enhance performance of the vehicle.

The designed system collected data from vibration sensor, temperature sensor and IR sensor and those were stored in MySQL database of the vehicle manufacturer. On the basis of collected data, a health report was generated which was accessed using a web interface or application designed using HTML and PHP, which might further be utilized for optimization and maintenance of vehicle.

By implementing this system, the lack in maintenance of vehicle due to busy schedule of the owner, can be reduced as the vehicle manufacturer gets information of health condition and can inform vehicle owner about it time to time with exact faults.

If more work is done in future more parameters can be added e.g. Tyre pressure, fuel level, emission level, body vibration, etc.

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