

Tyre Pressure, Fuel and Engine Temperature Monitoring System for Vehicle using Raspberry Pi: A Review

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Abstract—As day by day technological innovations are increases, users are prefer to automatic system than the manual operated system. The number of accidents are increasing due to increase in number of vehicles and different faults occurring inside the vehicle such as decrease in tyre pressure, decrease in fuel level, and increase in engine temperature. But by using recent technologies we can minimize these accidents. Raspberry Pi based embedded system for tyre pressure, engine temperature, fuel level monitoring uses computer device to monitor and control these faults occurs in the vehicle. The entire monitoring is done by different sensors and activities of sensor are controlled by Raspberry Pi.

Keywords-)Tyre pressure, Engine Temperature, Fuel Level.

I. INTRODUCTION

In today's world Internet of Things (IoT) plays an important role. Also vehicle monitoring plays an important role. If parameter in the vehicle are not detected or monitored can cause serious problems during running of vehicle. One wants to monitor and control the different physical objects in vehicle and interact with it, as the number of accidents are increases due to different faults in the vehicle. The main purpose of this project is to minimize the faults occurs inside the vehicle such as decrease in tyre pressure, decrease in fuel level, and increase in engine temperature by using different sensors with the help of wireless technology. As there is increase in the number of internet users around the world, monitoring different parameter of vehicle over the internet has many advantages over other technology. The main object of this project is to minimize accidents occurs in vehicle due to decrease in tyre pressure, decreases in fuel level and increase in engine temperature.

II. LITERATURE REVIEW

Literature review is carried out to gain knowledge and skills essential for this project. The main sources of this project is the previous projects and their related thesis and also the journals and articles obtained from the internet. It is very important to improve and develop the project. Information about research paper and few implemented project are used as a reference for this project.

Vehicle accident becomes a social real time problem now a days, hence it becomes necessary to monitor the different parameter of the vehicle in order to overcome the severe issues. In this project the tyre pressure monitoring, fuel level and engine temperature monitoring system using the Raspberry Pi technology has to be developed, which is helpful in monitoring the pressure in the tyre and provides a better solution for the tire maintenance. Also the fuel level of the fuel tank in the vehicle is monitored using the

ultrasonic sensor and also engine temperature is monitored using the temperature sensor. The system transmits the monitoring data to the cloud server via the mobile Internet, and digs out the tire pressure and temperature and fuel level varying pattern, then give feedbacks to the users.

IOT BASED VEHICLE MONITORING SYSTEM by Jaideep J. Joshi , Poonam N. Kakade , Shraddha P. Kale, Dr. D.G. Bhalke. In this paper they have proposed a Vehicle monitoring system which is an electronic system that monitors the air pressure, engine temperature, fuel leakage, fuel level of vehicle in real time and alerts the driver as well as server by display and IOT respectively .There are several parameters in vehicle such as drop in tire pressure, unexpected Tire bursting ,unexpected tyre puncture, more fuel consumption, sudden fall in fuel level and degradation in engine performance which results in several drawbacks. This paper presents a vehicle monitoring system that reduces number of accidents, improve mileage, braking efficiency, tire inflation, helps in proper handling and maintenance of vehicle. This system is controlled by a microcontroller that is loaded with an intelligent embedded C program. All parameters are displayed on the physical interface i.e. LCD Screen and remote interface using IOT. [1]

INTERNET OF THINGS BASED VEHICLE MONITORING SYSTEM by Mayuresh Desai, Arati Phadke. In this paper they have proposed a Advances in technologies and availability of economical open source hardware systems are setting a new trend in system designing. Use of technologies like Internet of Things (IoT) can ease the process of data collection and analysis. The main objective of the paper is to describe a system which can monitor or track the location and vehicle parameters of different test vehicles from a centralized place for research and development purposes and to store data of testing

parameters of those vehicles on the server for further analysis and records. System design will be generalized for monitoring different parameters like Location, Vehicle speed, Engine compartment temperature, Fuel consumption and many more. [2]

RASPBERRY PI BASED EMBEDDED SYSTEM FOR VEHICLE AUTOMATION OVER INTERNET by Nagalaskhmi T S, Nirmala L, Akash Soragaon, in this paper they have said that with the emerging technological innovations, users are looking for automotive system than the manually operated system. As the number of vehicle users increased, the number of accidents and thefts are increasing. Due to a convergence of multiple technologies usage of Internet evolved in the field of networking, which helps objects to be sensed and controlled remotely. Pi based Embedded System for Vehicle Monitoring, tracking and controlling over internet uses mobile or computer device to monitor, track, and control the vehicle. This project is also aimed to monitor the driver activity through the internet from anywhere around the world by the owner of the vehicle. The owner can monitor the different sensors in the vehicle and can also keep track of the vehicle using GPS in the system and can store these data in the cloud. In case anything goes wrong in the system the owner can get the update and will be able to stop the vehicle by sending a command. This command turns of the motor. Until an authentication command is sent by the owner the vehicle cannot restart. The entire activities of the sensors are controlled by the Raspberry Pi which acts as a master controller and Arduino acts as a slave controller. [3]

REAL TIME VEHICLE MONITORING AND TRACKING SYSTEM USING RASPBERRY PI AND WEB PAGE by T. santhi vandana, M. srikanth reddy. In this paper a prototype model of real time vehicle tracking and monitoring using raspberry pi is designed and implemented. A vehicle tracking system combines the use of automatic vehicle location in individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations. The real time vehicle tracking and monitoring system tracks the vehicle and displays the current location of the vehicle both in Raspberry Pi and in the remote server using Google maps. It has the ability to communicate over the remote areas where user needs the current location of vehicle. It can provide tele-monitoring system for inter-cities transportation vehicles such as taxis and buses. This system is integrated with GPS and GSM to provide features like Location information and Real time tracking using SMS and also we can monitor the live streaming using camera this system can also be controlled using web page. [4]

“THE THINGS IN THE INTERNET OF THINGS”, INTERNET OF THINGS CONFERENCE TOKYO, JAPAN. 2010. by Stephan Haller. This paper has presented

all the different definitions of the term “Internet of Things” “have in common that it is related to the integration of the physical world with the virtual world of the Internet. There are physical objects one wants to be able to track, to monitor and to interact with. Examples include inanimate objects like pallets, boxes containing consumer goods, cars, machines, fridges –and maybe even the infamous carton of milk or cup of yoghurt– as well as animate objects like animals and humans. These are the things of the Internet of Things – or to use a clear term, the entities of interest.[5]

THE RESEARCH ON INTELLIGENT MONITORING SYSTEM OF KEY TIRE PARAMETERS FOR AUTOMOTIVE DRIVING SAFETY BASED ON VEHICULAR NETWORKING”. By Huaguang Yang, Lin Xi, Qingquan He, Fengfeng Liu, Ming Yang, Hua Yan, Weiminyang.

In the paper, the intelligent TPMS based on vehicular networking technology was developed which is a full tire life-cycle tracking service system and provides a new solution for the tire maintenance. The system transmits the monitoring data to the cloud server via the mobile Internet, and digs out the tire pressure and temperature varying pattern, then feedbacks to the users. [6]

“FUEL MONITORING AND VEHICLE TRACKING” by Sachin S. Aher, Kokate R. D.

In this paper they have proposed a system for fuel monitoring and vehicle tracking by using microcontroller, GPS, fuel level sensor and USB. The microcontroller MSP430F149 is used as CPU and along with that GPS, Fuel level sensor and RS232 is used for tracking vehicle, fuel level and communication respectively.[7]

“TIRE PRESSURE MONITORING SYSTEM AND FUEL LEAK DETECTION. By Loya Chandreshkumar, Joshi Pranav, Chaudhari Hemraj, Prof. Gayatri Bokade .This article presents a kind of scheme of direct TPMS, introduces the principle of the system. The communication can greatly improved through carefully choosing the RF module. The transmission module has the low power property. The wireless signal transmission is solved by adopting FSK, Manchester coding and CRC checkout. The testing results indicate that the system meets the needs of the real application well. Researches show TPMS has a bright prospect. [8]

III. IMPLEMENTATION

The block diagram of the overall project can be seen in Fig 1. This embedded system mainly consists of Raspberry - Pi and Analog to digital converter, instead of analog to digital converter we can used the Arduino. The embedded system also consist of tyre pressure sensor, fuel level sensor, temperature sensor, and screen monitor, Buzzer, Relay, and engine ignition .Tyre pressure sensor is used to sense the pressure in the tyre whether it is decrease or not, Fuel level

sensor is used to monitor the fuel level of the fuel tank. Temperature sensor is used to sense the temperature of the engine, it will alert when the engine is overheating. The data of the sensors are continuously sending to the raspberry pi through serial communication. If there is decrease in tyre pressure, decrease in fuel level and increase in engine temperature is detected the buzzer will get automatically ON.

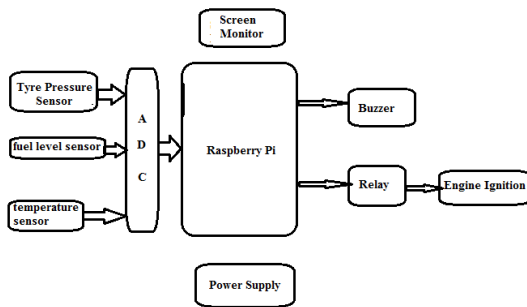


FIG. 1

IV. CONCLUSION

By referring all these different research papers we came to know that monitoring different parameters of the vehicles such as decrease in tyre pressure, decrease in fuel level and increase in engine temperature by using raspberry pi is very essential and helpful in preventing the vehicle accidents. And also safety of human being. We are working towards an idea which can contribute some part towards a developing India to become secure & safe. Where the driver of the vehicle should be aware about the different parameter of the vehicle in order to prevent his and passengers life.

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