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On Board Diagnostics (OBD): A Review On Monitoring Vehicle Operations

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Abstract: Internet of Things (IoT) refers to the network, the micro-sensor generated by the information to be collected, processed and used, and then the construction of intelligent families, smart city and wisdom of medical and other living environment. Vehicles can be considered as a specialized form of Cyber Physical Systems with sensors, ECU's and actuators working together to produce a coherent behavior. The system aims to measure speed, distance and fuel consumption of vehicles for tracking and analysis purposes. An OBD II reader is designed to measure speed and mass air flow, from which distance and fuel consumption are also computed. This data is then transmitted via Wi-Fi to a remote server. The system also implements GPS tracking to determine the location of the vehicle. A database management system is implemented at the remote server for the storage and management of transmitted data and a graphical user interface (GUI) is developed for analyzing the transmitted data . Various qualification tests are conducted to verify the functionality of the system. The results demonstrate that the system is capable of reading the various parameters, and can successfully process, transmit and display the readings. OBD (On Board Diagnostics) is one of critical tool used for the emission control in today's automobiles. OBD generates fault codes when any system/component non-compliance is detected. Commercially available tools fetch fault codes from OBD and are providing only limited information/access of basic data to engineers. These tools are black box type of tools which provide very limited flexibility. Also the data storage capacity of these diagnostic tools is very limited. This paper informs about new indigenously developed OBD scanning tool which provides complete access to engineers, good flexibility and large storage capacity with added features like time and cost saving. Study of DTC will provide easy diagnostics of vehicle by which mechanic's efforts will reduce.

Keywords: OBD: On Board Diagnostics DTC: Diagnostic Trouble Code ECU: Engine Control Unit, SAE: Society of Automotive Engineers MIL: Malfunction Indicator Lamp PID: Parameter Identification, DLC: Data Link Connector,

1. Introduction

In introduction to on board diagnostics it is a growing technique to diagnose the vehicles moving around us. All vehicle manufacturers are now a days using this technology to detect any error if vehicle having. It is much important that to ease the work to human beings; yes now a days it is very easy to do any task without involving any human. For example now a days IOT is taking place to ease of work; in present time all most appliances works on IOT like turn on/off the appliances or else operate the device remotely possible with this growing technology. Most of the companies are working on this technology; only to convenience of people they trying to make work easier and easier. But one should think on this automation because if everything will be automated then this may cause unemployment. No doubt automation and technology enhancement is the very important pillar of any developing country.

2. Development of On Board Diagnostics (OBD) scan tool for Emission Control System

Release control and regulations are the most critical part of modern cars. The introduction of robust extraction processes involves the heavy use of electronics. It also adds to the problems for the manufacturer, OEs (Original Equipment Manufacturers) and pre-service. OBD (On Board Diagnostics) is one of the most important tools used for pollution control in modern vehicles. The OBD generates error codes in the event of any system / non-compliance. Available commercial tools download error codes to OBD and provide limited access to basic developer data. These tools are a kind of black box tools that provide very limited flexibility. And the data storage capacity of these diagnostic tools is very limited. This paper introduces a new custom-made photography tool that enables complete engine access, great flexibility and great storage capabilities with additional features such as time and cost savings.

For any developed technology cost and time always matters because technologies are developed only to facilitate people with more secure way.

3. Design and Implementation of a Wireless OBD II Fleet Management System

This paper describes the work that has been done in the development and development of the OBD II wireless navigation system. The plan aims to measure the speed, distance and fuel consumption of vehicles for tracking and analysis purposes. The OBD II reader is designed to measure high speed and wind speed, from which distance and fuel consumption are also calculated. This data is then transmitted over Wi-Fi to a remote server. The system also uses GPS tracking to determine the location of the vehicle. The data management system is used on a remote data storage and control server and the user's graphical interface

(GUI) is designed to analyze transferred data. Various qualification tests are performed to ensure the effectiveness of the program. The results show that the system can read a variety of parameters, and can be effective, transfer and demonstrate learning.

4. Automotive OBDII Simulator

The simulator built into this project is around the Atmel ATmega168 AVR microcontroller. This microcontroller is an 8bit general microcontroller with 16kB of codec memory, 8-bit general purpose I / O ports, a 10bit resolution analog to digital converter (ADC), an standard serial peripheral interface (SPI), and 14MHz clock speed.

The ATmega168 was chosen for ease of use, low cost, robust community, and the availability of pre-configured chips with a boot loader eliminating the need for an expensive hardware system during development.

The simulator is compiled by the Hitachi HD44780U based LCD and Greyhill 4x4 matrix keypad. The LCD and keypad provide ease of use, and ease of use of the project while the microcontroller handles "everything under the hood." This project has succeeded in meeting many of the stated goals including building a simulator tool and an easy-to-use interface.

Unfortunately, working with real automotive systems has become a huge demand for a one-student project and the CAN interface could not be eliminated. In addition, the availability of information regarding the OBD-II standard diagnostic field has been found to be limited, at least in terms of freely available data, which has hampered the integration of some of the project objectives. In the end, much of the work with hardware and software of such a simulator has been successfully accomplished in what has led to a good learning opportunity, with many new skills learned and many old trains.

5. OBD Secure Alert: An Anomaly Detection System for Vehicles

Cars can be considered as a specialized way of Cyber Physical Systems with sensors, ECUs and actuators working together to produce a consistent character.

With the advent of external connections, a major attack center has opened up that affects not only the occupants of the cars, but also the people around them. One of the major causes of this growing attack is due to advanced systems built on conventional old and unprotected bus structures that lack basic means of verification.

To make such systems safer, we view this problem as a data analysis problem that can detect adverse conditions. To that end we collected data flowing between various objects from real cars and used the Hidden Markov Model, detected dangerous behavior and issued warnings, while the vehicle was operating.

Our experiments using one parameter and two parameters together provide sufficient evidence that such techniques can be used effectively to detect irregularities in vehicles. In addition, our method can be used on new and old cars

6. Using OBD-II Data to Explore Driving Behavior Model

The Internet of Things (IoT) refers to a network, a micro-sensor that is generated by data that will be collected, processed and used, and built by intelligent families, a wise city and the wisdom of medical and other environments.

The content of the study paper is to analyze driving behavior information with pre-loading vehicles, to analyze safety issues, and to establish a compliance model. In addition to the flexible driving behavior that has a significant impact on the car accident situation with the model, and analyze the magnitude of its impact.

7. Estimation of Fuel Consumption using In-Vehicle Parameters:

This paper proposed a method of measuring consumption from motor vehicle knowledge with OBD-II. Assuming RPM, TPS was related to fuel consumption. We found the product as fuel consumption from RPM vehicle, TPS as input using polynomial statistics. We have had models such as quadric performance and ground performance with OBD-II data and fuel consumption data supported by the automotive company actually. To ensure the operation of the proposed road, a 5 km road was constructed. The fuel results showed that the proposed method could accurately measure fuel consumption from a wide range of vehicle specifications. It was noted that the proposed models using RPM engine, TPS and (RPM, TPS) could estimate fuel consumption with a proportional determination were 76%, 88% and 71% respectively.

A method was also developed to measure fuel consumption based on the RPM recording engine and TPS of OBD-II data for the vehicle. This information is used to determine the fuel consumption of the fuel. Fuel consumption varies significantly with the RPM and TPS model variables. We have been modeling as a quadric operation with OBD-II data and fuel injection data. The results showed that the proposed approach could measure fuel consumption.

With petrol use, there is a great deal of data from the long-term follow-up of fuel consumption in vehicles. Analysis of this data will provide a better number of real-world eco-driving results in fuel consumption.

8. A Study on Development of Engine Fault Diagnostic System

The study used a mobile screening system that provides user-focused connectors for accurate measurement and testing of engine conditions by contacting the ECU that have only improved the use of industrial CRDI engines. In the existing system, a new protocol was developed and implemented based on the OBD-II standard to obtain improved ECU engine data values.

The built-in protocol has a data request message transfer from smartphone to ECU and ECU response message structure to send data to smartphone. Transfers 31 pieces of engine status information simultaneously and sends a diagnostic code. Because the diagnostic system enables real-time communication with modules, engine status information can be viewed at any time. Therefore, because when problems occur in the engine, users can check them immediately, faster response and resolution may be possible, and stable system management can be expected.

In this study, through the OBD-II protocol, a smart engine

test system was developed using Bluetooth communication. In this study, instead of managing the data that can only be controlled by the manufacturing companies, it was enabled to select only the required data and control itself.

9. Diagnostics vehicle's condition using obd-ii and raspberry pi technology: study literature

We The level of travel accidents remains a major challenge in many countries. There are many factors that can contribute to the risk of travel, especially in the case of an internal car system. To overcome this problem, OBD-II technology is designed for the vehicle's diagnostic condition. The OBD-II scanner is connected to the OBD-II port or commonly known as the Data Link Connector (DLC), and then sends the diagnosis to Raspberry Pi. Compared to another microcontroller, Arduino, the Raspberry Pi is preferred because it supports the app to get real-time diagnoses, process diagnoses and send commands to cars simultaneously, rather than Arduino having to wait for another completed process to perform another procedure. The result of this application is to enable the car user to diagnose their vehicles. If something unusual or problem is found, the app can tell the user a problem, so they know what to fix before using their car safely. Car diagnostics have received a lot of attention from industry and investigators in recent years. The diversity and diversity of vehicle diagnostic implementation has been a major factor in its popularity. This paper outlines the diagnostic process of vehicle diagnostics linked to OBDII and analyzes diagnostic data using the Raspberry Pi. People can also send a command to their car using this app. While the process is only possible for the delivery of car diagnostic data on a user's smartphone, the Raspberry Pi is well suited for viewing the potential Raspberry Pi which can be multi-tasking. In a future study related to the OBD-II scanner, its recommended to use OBD-II scanner with Bluetooth rather than Wi-Fi, because it's more energy saving, easier to use and more stable

10. Vehicle Diagnostic and Tracking System using Smartphone and GPS

The plan has proposed the creation of a truly low cost vehicle testing and tracking unit using Smartphone and GPS. The system monitors the activity of the vehicle and tracks the location by communicating the information obtained from the mobile device using Bluetooth. After that the results can be viewed by the user to check the fuel consumption and other important parameters of the electromechanical vehicle. Details can also be sent to the car repair department which is useful for finding and guessing faults in the car. This is done by compiling live reading of the engine control engine (ECU) using a built-in system diagnostic board (OBD). An electronic component is built that enables the connection between the car's OBD system and the Bluetooth module, in part communicating with the Smartphone. Smartphone is able to transfer information to the server using mobile internet connection.

The proposed program aims to create a vehicle tracking and tracking system that combines hardware modules and software that will help us provide low cost adjustment and vehicle tracking using the Android Smartphone. Used and used GPS used to find the current location of the car. The mobile app provides a friendly GUI where the user can easily understand and monitor information about various vehicle parameters.

11 Conclusion

Today OBD systems are installed in most cars and light trucks. What began in the '70s and early 1980's as a tool to meet EPA emission standards has come a long way now to where manufacturers use electronic means to control engine functions and diagnose engine problems.

Through the years these systems have become more sophisticated. OBD-II, a new standard, though introduced in the mid-'90s, has come to developing countries only in the last few years.

With the development of the electronic control features in vehicles, data, including the driving status, are recently being collected via electronic-control devices and sensors, to ensure more efficient driving conditions. In this study, a wireless protocol converter as a system of reading and processing the data in the ECU, which transmits and receives the data from the ECU, and a vehicle diagnosis program, which is linked with the navigation system, were presented so that the driver can easily check the relevant data, including the vehicle conditions, and can diagnose different kinds of malfunction and supplies. Thus, the abnormalities in a vehicle are detected via personal diagnosis and the real-time vehicle diagnosis features, and the resulting precision vehicle diagnosis and management service can prevent vehicular accidents and can enable systematic vehicle management. As the OBD-II standard is becoming mandatory not only in the U.S. and EU countries but in many other countries as well, especially in Asia, the vehicle self-diagnosis system is expected to have much greater marketability in the future. The applicability of the vehicle self-diagnosis system will have to be improved in the future, however, to satisfy more diverse environments, by developing App Store applications for all smart phones and by promoting the mobile-contents market.

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