



Online Monitoring For On-Board Diagnostics Parameter (Software Module)

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1. ABSTRACT

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.

Keywords: *Automobiles, Emission control, Good flexibility, Large storage capacity, OBD scanner*

2. INTRODUCTION

Computer programs and embedded systems have been part of the cars from long time. Most of the car owners are not aware the price of the second-hand car is decided based on the information available on these computers using wired and wireless technology for car users has become very easy. This information available in cars can be seen by the owner with the help of their smartphone and cloud technologies. As per the recent changes in the automobile industry paradigm, automobiles are mandatory to develop on eco-friendliness, safety etc...As many additional services and safe and convenient automatic internal control system have been introduced to provide more comfort and safety of the customers. The benefits of OBD are encourages design of durable and robust emission control systems and helps keep emissions low by identifying emission controls in need of repairs. The most one of the OBD is works for life of the vehicle.

3. METHODOLOGES

3.1 ON-BOARD DIAGNOSTIC (OBD)

On Board Diagnostic is a comprehensive electronic system, which detects exhaust emission related failures in passenger vehicles, light duty trucks and heavy duty vehicles, which run on combustion engines. These types of engines produce toxic exhaust emissions like HC, CO, and soot. The amount of these emissions is regulated by law in many countries (see emissions regulation map). To fulfill these legal requirements, complex exhaust emission control and cleaning systems are installed by OEMs. These systems and the related components have

to be monitored by a so called On Board Diagnostic system. The OBD laws require that all components and subsystems which have an emission impact and which are connected to an Engine Control Unit (ECU) need to be monitored and diagnosed. The components can be divided into:

Sensors: O2 sensor, temperature sensors, pressure sensors, etc.

Actuators: Fuel injectors, ignition coils, throttle blades, EGR valve, etc.

On the system side, several subsystems have to be monitored such as a malfunction of a complete subsystem which leads to a certain emission increase. Such subsystems are:

- ✓ Fuel Injection System
- ✓ Ignition system
- ✓ Exhaust gas cleaning system

The law requires only diagnostics on components which lead to an increase of exhaust emissions. However, failures of components which lead to a degradation of the OBD diagnostic system have also to be detected.

3.2 AZURE IOT CLOUD

IoT Hub is a managed service hosted in the cloud that acts as a central message hub for communication between an IoT application and its attached devices. You can connect millions of devices and their backend solutions reliably and securely. Almost any device can be connected to an IoT Hub.

3.3 MQTT INTEGRATE

MQTT is a publish/subscribe protocol that allows edge-of-network devices to publish to a broker. Clients connect to this broker, which then mediates communication between the two devices. When another client publishes a message on a subscribed topic, the broker forwards the message to any client that has subscribed.



4. SOFTWARE DESIGN

4.1 ANGULAR

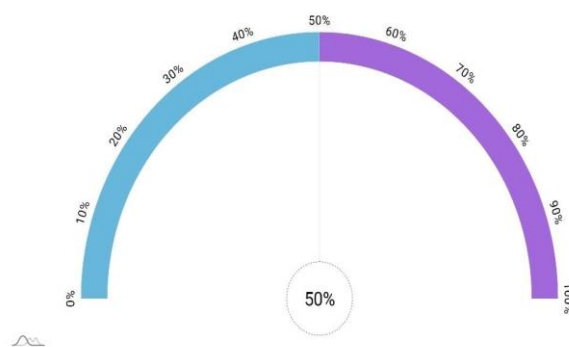
Angular is an application design framework and development platform for creating efficient and sophisticated single-page apps. Angular is a development platform, built on TypeScript. As a platform, Angular includes:

- ✓ A component-based framework for building scalable web applications.
- ✓ A collection of well-integrated libraries that cover a wide variety of features, including routing, forms management, client-server communication, and more.
- ✓ A suite of developer tools to help you develop, build, test, and update your code.



4.2 AM CHARTS

AM charts is an open-source tool, build on top of our JavaScript Maps and JavaScript Charts products.



Animated gauge

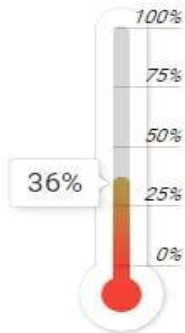


Vehicle Speed



30%

Battery

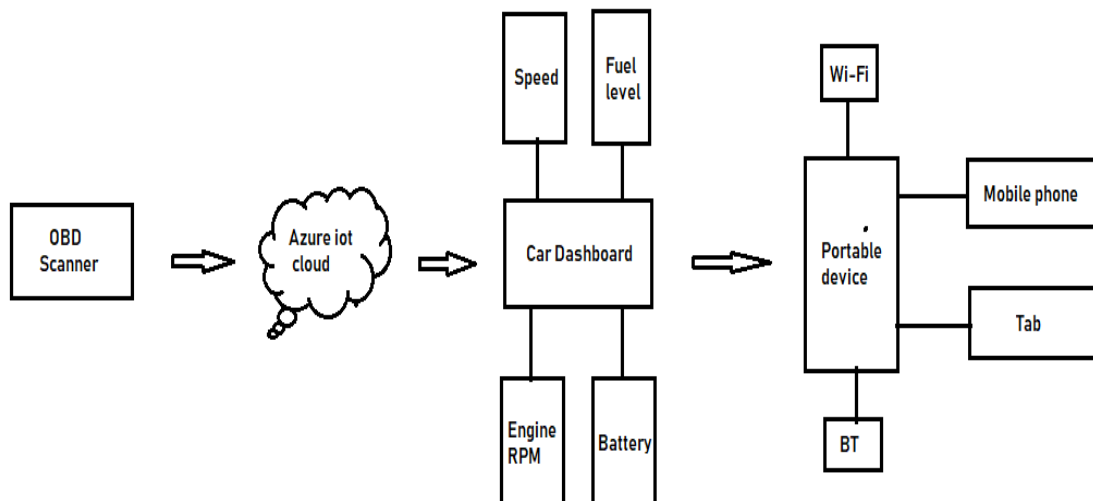


Thermometer



Engine RPM

5. BLOCK DIAGRAM



Block diagram of the On-Board Diagnostics

6. CONCLUSION

The OBD port still remains important to vehicle health, safety and sustainability. Although the number and variety of connected devices for vehicles increases, not all devices report and track the same information.



Vehicle's diagnostic get much attention from industry and researchers in recent years. The variety and heterogeneity of vehicle diagnostics implementation has been the major reason which makes it interested. This paper presents a technique to analyse diagnostics from vehicle that connected to OBD and process the diagnostics data using Raspberry Pi. People can also send a command to their own vehicle by using this application. Although the process occurs only the delivery of vehicle diagnostic data to user's smartphone, Raspberry Pi is more suitable viewing the ability of Raspberry Pi that can be multitasking. In the future research that related to OBD scanner, its recommended to use OBD scanner with Bluetooth rather than Wi-Fi, because it's more energy saving, easier to use and more stable.

REFERENCE

- [1] Basic Information | On-Board Diagnostics (OBD) US EPA. 16 March 2015. Retrieved 24 June 2011.
- [2] Antoni Jankowski and Marcin Slezak, "Some aspects of on board diagnostics systems (OBD) in Poland", *Journal of KONES*, vol. 18, pp. 191-196, 2011.
- [3] Alex Xandra Albert Sim and Benhard Sitohang, "OBD-II Standard Car Engine Diagnostic Software Development", *IEEE Trans*, 2014.