Online Networking Dashboard for Monitoring Vehicles

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ABSTRACT

The automotive industry is facing new and pressing challenges. The automotive industry is a major industrial and economic force worldwide. Safety is important concern too, keeping your car in good condition. A connected vehicle can send information and also connect to the emergency services in case of an accident. A constellation computer chips and sensors placed throughout a connected car collect a performance data, which is processed in the cloud to predict when a part might require maintenance. Automotive electronic system that provides vehicle self-diagnosis and reporting capabilities. Computer system inside of a vehicle that tracks and regulates of a vehicle that tracks and regulates a car's performance. Computer system collects information from network of sensors inside the vehicle, which the system can then use to regulate car or alert the user to problems. The rising trend of Autonomous Things is largely driven by the move towards the Autonomous car, that both addresses the main existing safety issues and creates new issues. The autonomous car is expected to be safer than existing vehicles, by eliminating the single most dangerous element - the driver. The parameters monitoring modules grant a way to automatically updating of the vehicle's condition to the user through which the user can be never bothered about the health of the vehicle. It reduces the stress of the users about the vehicle and ensures protection of the vehicle.

*Keywords***:** *Automotive, Cloud, Connected cars, Multiple devices, Parameters.*

1. INTRODUCTION

The tangible devices connect and interact with each other over a wireless network. Connected objects (or things) share data with each other and operate without any intervention by humans. The possibilities that technologies bring for the automobile industry are really immense. Connected cars facilitate fast transmission of data and increase drivers' response time through enhanced vehicle communication. The sensors embedded in different components of a car collect data and share it to a platform. This data is then processed by an algorithm that can analyze the future outcomes of the component based on its performance. It also helps a person to take necessary steps to prevent its car parts from sudden breakdown. Just like dashboard indicators of a vehicle, this system alerts the driver about probable malfunctions. By using these technologies, a person can confirm the performance of its vehicle and repair its car parts before they break. Using OBD scanner to collect the sensed data and these data will sent to the cloud for analyze the performance. Using MQTT integration, we can analyze

multiple devices data and shared to the service room and the owner of the car. Connected cars are generating car data attributes that specify location, engine status, speed, and much.

2. BLOCK DIAGRAM
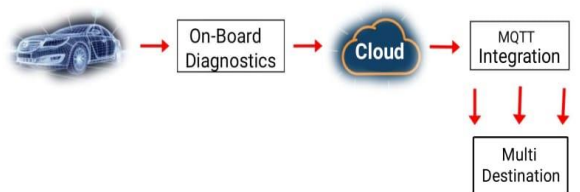
3. METHODOLOGIES

3.1 On-Board Diagnostics

A system in the engine's on-board computer that monitors the performance of almost every emission-related component for malfunctions. When a malfunction is detected, information about the malfunctioning component is stored. Technicians can download the information with a "scan tool" to help fix vehicle. A basic OBD system consists of a Raspberry Pi, which uses input from various sensors (e.g., oxygen sensors) to control the actuators to get the desired performance. The "Check Engine" light, also known as the MIL (Malfunction Indicator Light), provides an early warning of malfunctions to the vehicle owner. A modern vehicle can support hundreds of parameters, which can be accessed via the DLC (Diagnostic Link Connector) using a device called a scan tool. A mechanic who wanted to access diagnostic information typically had to buy a tool for every different vehicle make. OBD-I scan tools that support multiple protocols are supplied with an array of different adapter cables. It is a computer-based system originally designed to reduce emissions by monitoring the performance of major engine components.
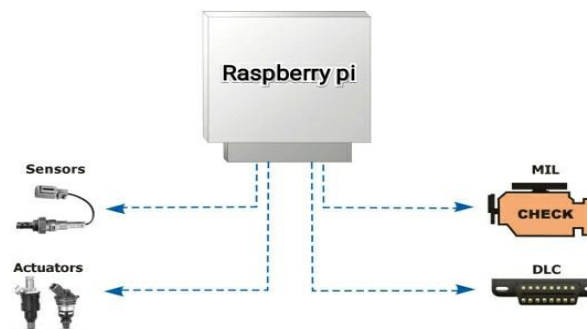
3.2 Raspberry Pi Simulator

Raspberry Pi simulator that allows users to write code to control emulated hardware, and that currently lets users interact with an LED and collect data from a sensor. The simulator shows a graphic of a Pi wired to a combined humidity, temperature, pressure sensor and a red LED via a breadboard, a plug board that allows circuits to be wired together rapidly. Users can type in a side panel to enter Node.js JavaScript code, which can be used to control the LED and collect dummy data from the simulated sensor. That code can be executed using a command line at the base of the panel.
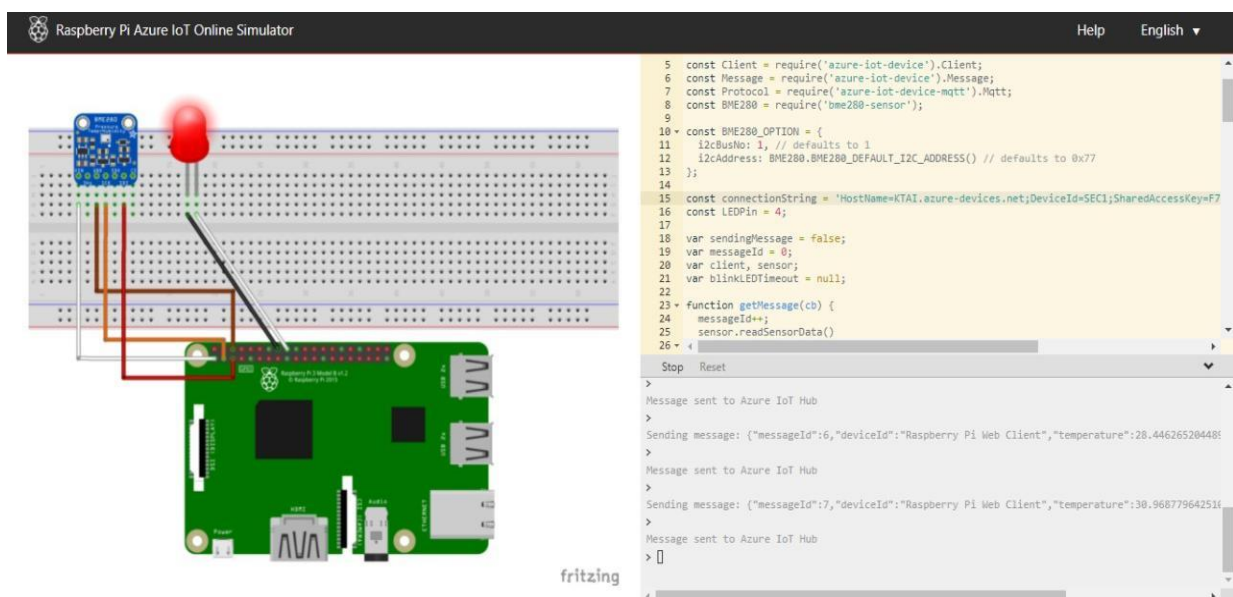

3.3 Azure IOT Cloud

Azure IoT Hub provides a cloud-hosted solution back end to connect virtually any device. Extend your solution from the cloud to the edge with per-device authentication, built-in device management and scaled provisioning. In cloud-to-device messages, reliably send commands and notifications to your connected devices and track message delivery with acknowledgment receipts. Automatically resend device messages as needed to accommodate intermittent connectivity. Azure IoT Hub is a Platform-as-a-Services (PaaS) managed service, hosted in the cloud, that acts as a central message hub for bi-directional communication between an IoT application and the devices it manages. Azure IoT. Connect devices, analyze data, and automate processes with secure, scalable, and open edge-to-cloud solutions. Help safeguard physical work environments with scalable IoT solutions designed for rapid deployment. IoT security. Strengthen your security posture with end-to-end security for your IoT solutions.

3.4 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. Components are the building blocks that compose an application. A component includes a TypeScript class with a @Component() decorator, an HTML template, and styles. Every component has an HTML template that declares how that component renders. You define this template either inline by file path. Angular extends HTML with additional syntax that lets you insert dynamic values from your component. The Angular CLI is the fastest, straightforward, and recommended way to develop Angular applications. As an application framework, Angular includes a collection of well-integrated libraries that cover a wide variety of features. The Angular libraries include routing, forms management, client-server communication.
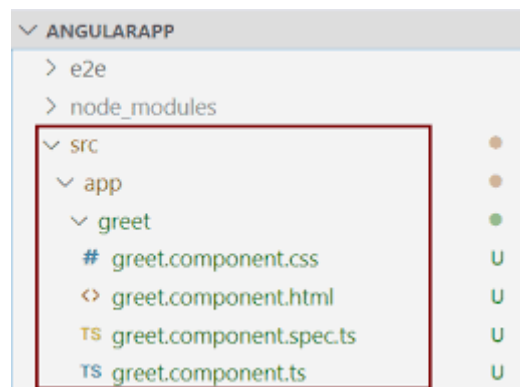
3.5 MQTT Integration

MQTT is an OASIS standard messaging protocol for the Internet of Things (IoT). It is designed as an extremely lightweight publish/subscribe messaging transport that is ideal for connecting remote devices with a small code footprint and minimal network bandwidth. MQTT clients are very small, require minimal resources so can be used on small microcontrollers. MQTT message headers are small to optimize network bandwidth. MQTT allows for messaging between device to cloud and cloud to device. This makes for easy broadcasting messages to groups of things. MQTT can scale to connect with millions of IoT devices. Reliability of message delivery is important for many IoT use cases. This is why MQTT has 3 defined quality of service levels: 0 - at most once, 1- at least once, 2 - exactly once. Many IoT devices connect over unreliable cellular networks. MQTT's support for persistent sessions reduces the time to reconnect the client with the broker. MQTT makes it easy to encrypt messages using TLS and authenticate clients using modern authentication protocols.

4. RESULTS
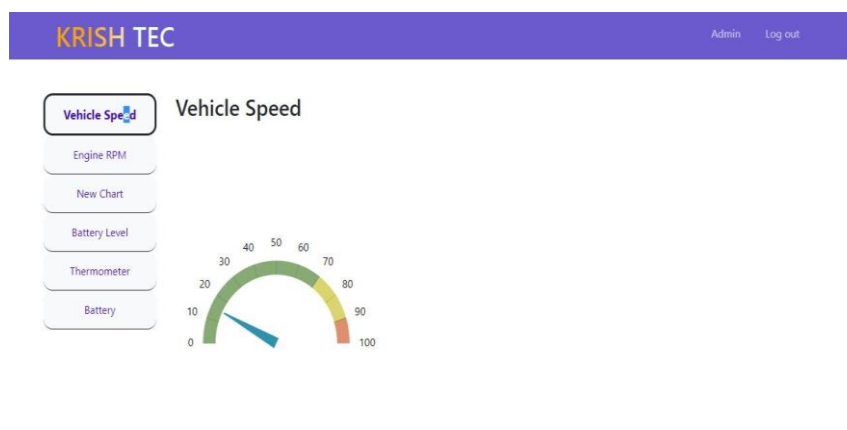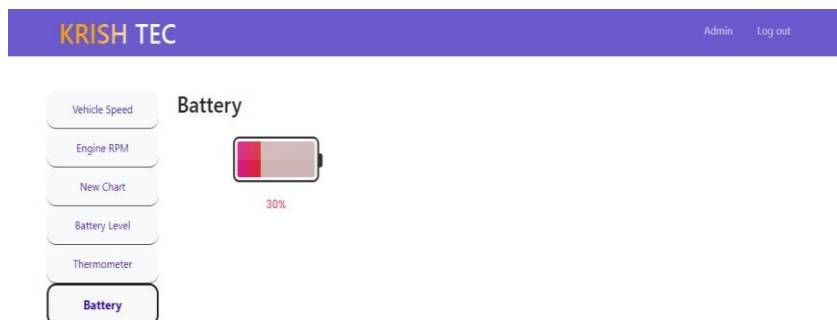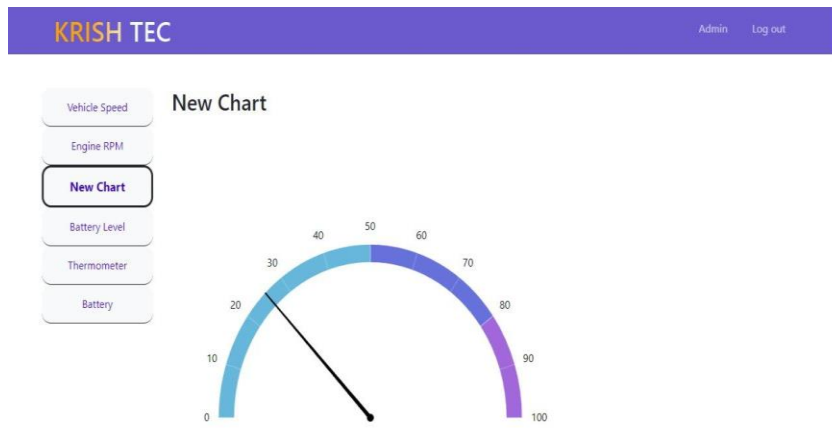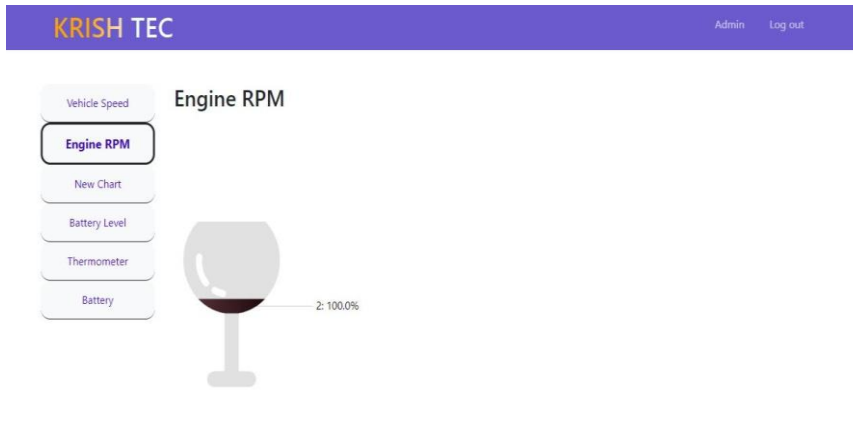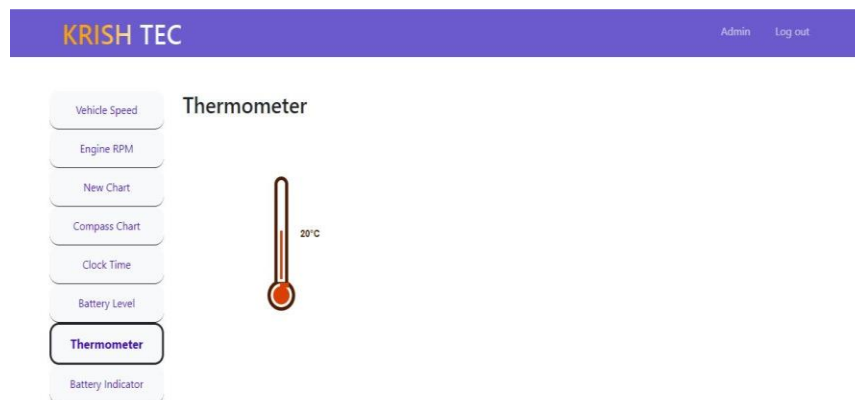
5. CONCLUSIONS

As newer innovations automotive vehicles achieve economies of scale and customer acceptance, the nature of business is likely to keep changing. The inclusion and participation of analytics software vendors, applications service providers, and infrastructure stakeholders will play a greater role in the system and lead to a redistribution of roles in the industry. Automakers will be faced with a number of challenges in this transformation and need to take a number of steps to reinforce their core value propositions as the ecosystem of connected cars evolves. Evolution in this field has brought in the emergence of trailblazing development in automobiles in terms of connected and automated cars. Its usage has revamped car inspection and maintenance capabilities and presented new mediums of entertainment. IoT applications in the automotive industry are increasing day by day. With the enhancement in the technology of Internet of Things, more refined automobile use cases will pop up that will completely change the way in which we interact with our vehicles.

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