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Real Time Vehicle Monitoring System

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Abstract: -- **The purpose of the paper to design a real time vehicle monitoring system based on the internet of things (IOT). The vehicle is the most common function of everyday life, but most of the people applying for the commercial purpose they depend on their vehicle for their cost of living example taxis, goods carriers, then it requires more attention than before. Then we design the scheme to accept concern of vehicle like living things in our smart world. We too demonstrate how pervasive computing technology is encroaching upon our vehicle. They are presenting the engineering solution to automate and improve the management of the vehicle. Internet of things (IOT) was prepared for connecting a billion of devices into an internet. A vast measure of information is transported between the electronic devices. It is a novel path to interact between device and people. This shows that how the embedded wireless system has been for future vision in the monitoring arrangement. Internet of things (IOT) will take on a major role in day to day life in the hereafter.**

Keywords:-- iot, cc3200, sensor nodes, mqtt server, private web server

I. INTRODUCTION

Real time vehicle monitoring system is otherwise sent for as intelligent monitoring and reporting system for the vehicle. At present days people using their vehicles for extending to next nearest shops, they won`t hold their vehicle condition until the any damage happened to the vehicle they won't comment. To keep off the extreme level damage to vehicle and also fast on the spot services to the damaged vehicle. We developed intelligent monitoring and describing system for vehicle using internet of things. Because it offers a novel method for accessing the data. A vehicle has a multivariate interactive system due to the more complex machines. Most of the vehicle service sector in the state is facing the poor inspection and repairs. Thus many researchers have been focusing on the automated wireless embedded intelligent monitoring system for vehicles. This report presents the experimental wireless embedded intelligent monitoring system for vehicle which will improve vehicle operation, cuts cost and workforce. If monitoring has been carried out using the wired networks, the cables related to the devices need to be rearranged for every different type of vehicle, so it is a dissipation of money and manpower, and then it necessitates to be supplanted by the internet of things (IOT) because it offers a novel method for accessing the vehicle data. It extends the communication between the devices and the people by sensing a physical universe using a sensing technology that information has been sworn out by the intelligent embedded wireless system utilizing this methodology to accomplish the real time monitoring of the physical universe to generate a date using that data to prepare conclusions for what action to arrive at. The data gathered by the embedded wireless node has been transported to the server through "message queuing telemetry transport" (MQTT) broker, a host which is a standalone private network server. The server will manage the sensor data using MySQL, it stashes away the data every five second time stamps. Engagement and Time, trip in kilometers, engine oil level in percentage, gear oil level in percentage, radiator coolant level in percentage and battery level in percentage data have been stored in the database. Utilizing the web languages like PHP and HTML the sensor data have been displayed in the graph for better reason. This demonstrates how the internet of things (IOT) has made revolution for the future communication and computing. It's just not only extension of internet or communication. It owns the features for both the internet and communication. It possesses its own characteristics of three layer architecture, which is not enough so, the five layers were put in. A first IOT has been used by Kevin Ashton in a demonstration in 1998. The primary use of IOT is for replacing info. IOT will serve as the backbone for computing and networking of embedded systems.

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II. INTERNET OF THINGS ARCHITECTURE

It has three layer architecture and five layer architecture in this paper has using three layer architecture the figure shown in below

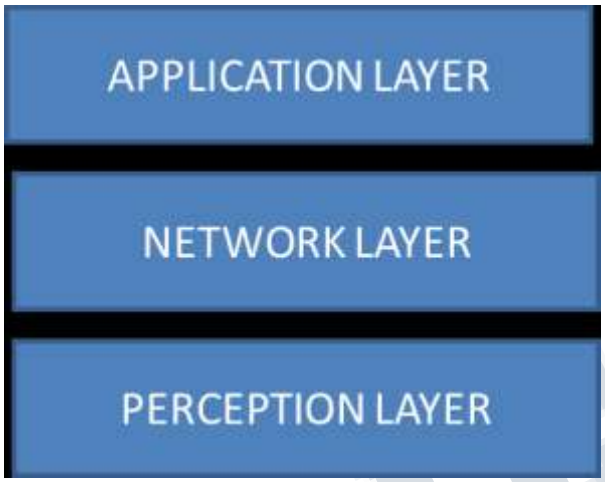

Figure: 2.1 three layer architecture

2.2 Perception Layer

It is the lower most layer of IOT it is mainly used for identifying objects and collecting information. It is connected to the hardware device like a GPS, sensor, RFID tags, and sensor web and connected to any intelligent system, it also called physical layer as the information from the physical devices use only analog signal has been converted into a digital signal that is suited for web transmission. The closure device is plugged in to the perception layer and all are "network element" which is similar to the physical layer in the open system interconnect model. The main employment of this layer is to pull together information from the sensing technology.

2.3 Network Layer

It is a second lowermost layer of the IOT architecture.Its primary use is to bear and obtain data or information from the physical layer. It is a network management center for IOT. It gains data or info from the perception layer that has been processed and removed to the different networks via wired or wireless network. It takes in many protocols, but the principal protocol used are ipv4 and ipv6 as these protocols are used to addressing billions of billions network devices and it also transfers huge amounts of data between different networks.

2.4 Application Layer

It is a third layer for the internet of things. It ties the application to the network .The data or information from the network layer is given to the application and it runs on the application designed and it depends on the prerequisites of that diligence. For internet of things it developed a full reach of applications such as logistics management, intelligent transportation and identity authentication mainly for safety

III. OBJECTIVE OF PROPOSED SYSTEM

The proposed scheme consists of a sensors that continuously takes in data from the vehicle sensor environment and describes it to the gateway node. The information or data received at the gateway has been examined and filtered and then it is processed for efficient transmission in wireless networks. The wireless communication technology applied in the gateway node cc3200 Launchpad will get an IP address from connecting to the nearest Wi-Fi router. These gateways are utilized to transmit the data to the standalone web server via the internet and from the web server various clients can retrieve the required information. The system architure has been developed and shown in the figure 3.1.

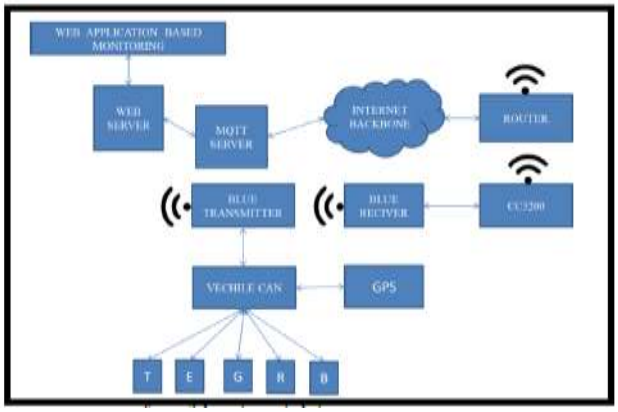

Figure 3.1. system articheture

There are many abbrivation in the articheture figure T-trip(km), E-engine oil level(%), G-gear oil

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level(%), R-raditor coolant level (%) and B-battery level(%).

3.1 Sensor

For this scheme we require dozens of sensor nodes, but most of the sensors are already deployed into the vehicle we just need to knock into the sensor data. Before that we demand to know about CAN in the vehicle it defines controlled area network in vehicles. A CAN is network its an controlled area network designed inside the vehicle system for indicating some parameters to the dash boards we just neeed to tap into that information or data form the CAN controller board it contains PIC for old model vehicle for new model vehicle has ARM controller for testing purpose we used the potentiometer as instead of sensors because we need vehicle to test that it became more complex and expensive so we used potentiometer for tapping information from that board we need to to process that information to cc3200 we need cc2530 controller for processing that information and in future we are planning to put each sensor in wireless working under zigbee.

3.2 CC3200 LANCHPAD

The cc3200 is the first single chip built in Wi-Fi board with ARM cortex M4 microcontroller in Launchpad designed by Texas instrument it has a clock frequency of about 80 MHz. It is a network processor. The favourable access point must be delineated in the plan and also the password. The cc3200 will connect to the access point by assigning an access point in the program using an inbuilt Wi-Fi chip and acquires an IP address by itself it can be watched in the serial port. It is also delineated in the program and this board is really desirable for developing internet of things applications. It supports internet protocols support and security is not excessively far. The device includes peripherals like UART, SPI, I2C, SD/MMC, I2S, and four-channel ADC and also have parallel interface. This panel can function at both station and client board. And as well it has a support for WPA2 and WPS security. And it supports for SSL stack, TCP/IP stacks, and many internet protocols. Cozir sensor is interfaced using UART. This sensor requires two different serials because one is used to spark off and another is used to receive data from the serial the received data will be looking like a junk format so the energy program helped to establish a correct format to subscribe to the MQTT server the CC3200 has an ARM cortex M4.The data has been treated by this microcontroller unit and then processed data been transmitted by the same chip with enabled WI-FI to the network by connecting to the specified access point in the push.

3.3 MQTT Server

MQTT (Message Queuing Telemetry Transport) is a lightweight messaging protocol that provides resource-constrained network clients with a simple way to distribute telemetry information. The protocol, which uses a publish/subscribe communication pattern, is used for machine-to-machine (M2M) communication and plays an important role in the Internet of Things (IoT). MQTT allows devices to send (publish) information about a given topic to a server that functions as an MQTT message broker. The broker then pushes the information out to those clients that have previously subscribed to the client's topic. To a human, a topic looks like a hierarchial file path. Clients can subscribe to a specific level of a topic's hierarchy or use a wildcard character to subscribe to multiple levels. MQTT is a good choice for wireless networks that experience varying levels oflatency due to occasional bandwidth constraints or unreliable connections. Should the connection from a subscribing client to the broker get broken, the broker will buffer messages and push them out to the subscriber when it is back online. Should the connection from the publishing client to the broker be disconnected without notice, the broker can close the connection and send subscribers a cached message with instructions from the publisher. MQTT was created by Dr. Andy Standford-Clark of IBM and Arlen Nipper of Arcom (now Eurotech) in 1999 as a cost-effective, reliable way to connect monitoring devices used in the oil and gas industries with remote enterprise servers. When challenged with finding a way to push data from pipeline sensors in the desert to off-site SCADA (supervisory control and data acquisition) systems, they decided upon a TCP/IP-based publish/subscribe topology which would be event-driven to keep satellite link transmission costs down. Although MQTT is still closely associated with IBM, it is now an open protocol that is overseen by the Organization for the Advancement of Structured Information Standards (OASIS). While the name suggests it, MQTT is not part of the original IBM MQ series, but as of v7.1, it is available in WebSphere MQ.

3.4 WEB SERVER

The web server uses the hypertext transfer protocol (HTTP) to establish a connection between client and the server .It uses HTML for describing the viewer

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that there are some method to access the data GET method is basic method of request given to the server by the client (web browser) the server will throw the server information to the requested client another method is POST sends the data from the client to the server. It is mostly used when client use the application form to fill the data. These use the standard message format given by W3C World Wide Web consortium. The server responds to the client using the response code for example: 200OK for successful completion request and also some the error code are there. for example HTTP 404 code indicates server side error. The server is unable to process the request. The web server can process the data one job is deliver content from stored webpages to uses then another job receive the data from the client to save it into the server for example filling form and submitting that for the ticket and also uploading the file to the email or to the some website. The web server are running in a back end server programming language C#, python, Perl, JavaScript. And asp.net and etc. there are two different types of web pages one is static and other is dynamic web page. Static web pages remains unaltered until the admin or web developer alter the data in the server it won't have any animation effect and its cheap for develop and need reduce time to build it. Dynamic web pages are more interactive and inter connected to many web pages and also more costly and complex to develop .for example static web pages are blogs are mostly static and dynamic web pages are Facebook, twitter, etc. web servers are used to control and monitor any independent wireless embedded system with enabled internet of things and the web server has been protected by the many security measures and also ever independent greenhouse monitoring data has been stored in the different database and information has been protected by the username and the password features which are given to the server to protect their individual data so that no one can see the others information. The password and user id information has been stored in the server for the authentication purpose in the encrypted manner and also web server running in the HTTPS and its port number is 8080 is encrypted data so no one can intercept the data from the server. The data that has been stored in the web server are environmental temperature and relative humidity and carbon-di-oxide with time in hours/minutes/seconds format these data has been converted into the graphical form by using the php and html programming the graph has been formed so more understanding and better look for that information.

3.5 DATABASE

The data from the MQTT broker has been published into the standalone Web server by the help of the python script thus the data has been stored iThe data base management system DBMS. It handles the user request and to create access data from the database the DBMS also called as relational database management system RDBMS. And it also makes sure of data integrity i.e. make sure of continuous access of data and also seen on the data losses and redundancy and parity and so on.

3.6 WEB SERVICE

The w3c defines a web services as a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-process able format (specifically web services description language, known by the acronym WSDL). Other systems interact with the web services in a manner prescribed by its descripition using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other web-related standard

IV. TEST ENVIRONMENT

We derside to our system using potentiometer insted of real sensor nodes. These information or data from the sensor has given to the controller board to process that information and then upload to the Mqtt server then given to the web server these values has been displayed by the web services. We just try give the abnormal values it active the trigger in the web services and also we tapped the gps data from the vehicle can network at its used for positioning car in the maps. It will more help full for the service person to give fast on site servicing and quick response and using these values we can predicte the when the vehicle will going to breck down due to this problem so we can take care in the before it happens so it will improve the vehicle performance and maintenance our testing output has shown in the screenshots below.

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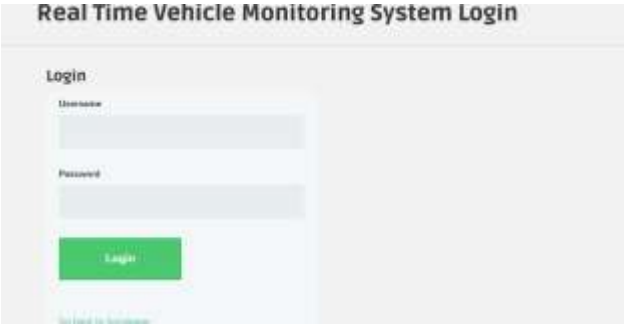

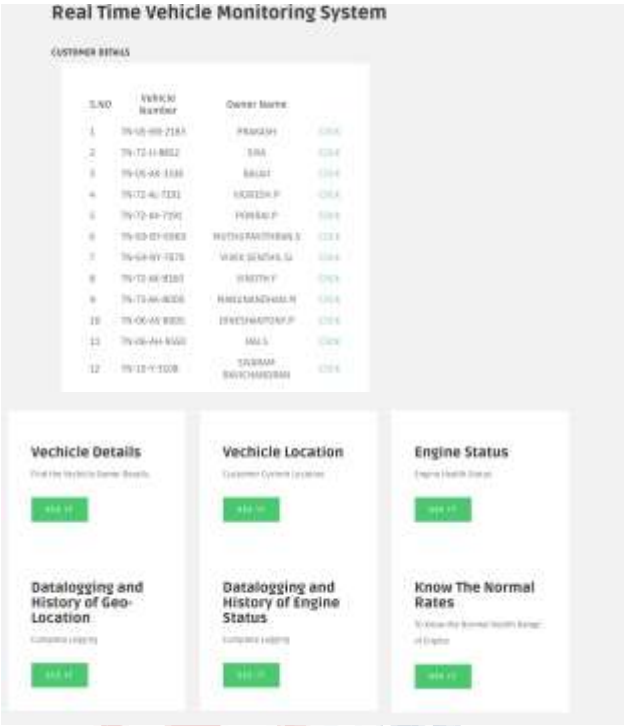

V. CONCLUSION

An assistive solution has been grown successfully for vehicle monitoring. IOT enabled devices are equipped with the coordinator node that publish and subscribe data through in MQTT broker, an exclusive URL is successfully produced with advanced security and control mechanism aspects. Prescription response and health advice is posted through the mail transfer protocol and message service and it also became major and everyday system usage for the vehicle monitoring system. This gimmick can be inbuilt into the every vehicle the company has been manufacturing and also it will use to cut the maintenance cost for a vehicle and improve the operation of the vehicle.

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