PREDICTIVE ANALYTICS ONAUTOMOTIVES

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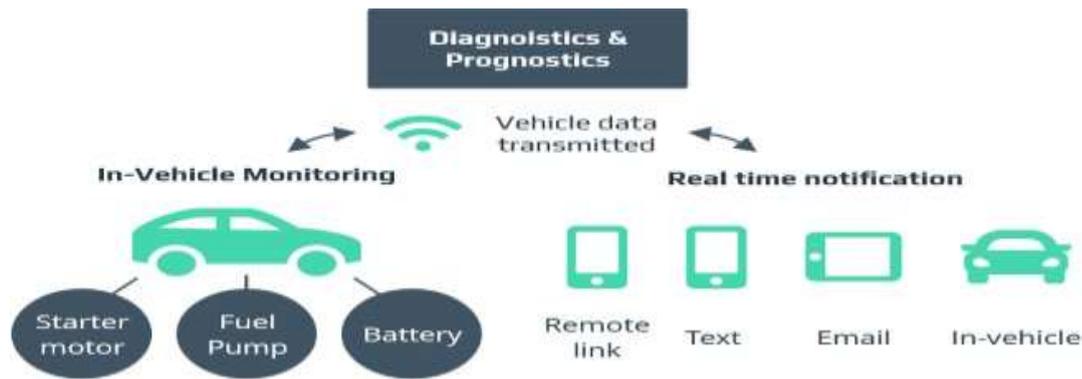*ΕΝΓΙΝΕΕΡΙΝΓ COLLEΓΕ, CΗΕΝΝΑΙ,INDIA*

ABSTRACT:

The technology of Internet of things (IOT) is an emerging and also a basic necessity of our daily life. Today the advancement of technology is not new, the advancement in technology is to help our environment healthy and wealthy. This paper discuss about such a case; that could be implement in Automobiles, with the use of IOT and Analytics . "PREDICTIVE ANALYTICS" is a terminology which is associated with our vehicles, which has a various kinds of data about our vehicles. The data that is shared is all about the status of our vehicles i.e. it predicts the status of our vehicle's , lubrication,breaking system etc. This "PREDICTIVE ANALYTICS" communicates with each other and send alerts to each other. This paper gives a brief idea about " PREDICTIVE ANALYTICS" of automobiles. It also gives a detail about how the technology of IOT, MQTT and ESP 8266 wifi are used in this.

IndexTerms: Internet of IOT, Predictive analytics, Automobiles, MQTT and ESP8266 wifi

INTRODUCTION:

In day to day world one of the promising automotive IOT is "PREDICTIVE MAINTENANCE". Where it is constellation of computer chips and sensors placed in the vehicles. It is like collection of data and processed in cloud to predict the fault part that requires maintenance before the fault is going to take place. Through the connection with cloud it sends alert to our application. Through this is the risk of malfunction can be reduced. And also this in helps in reducing breakdown and also accidents that occurs due to the fault occurs in automotive. This system help us in many ways by enabling an easy maintenance.Everything we need to know about IOT in automotive:

The physical devices of an automobile is connected with IOT device. That collects the data and share those data with other connected device. The major role is to identify the fault without human involvement.
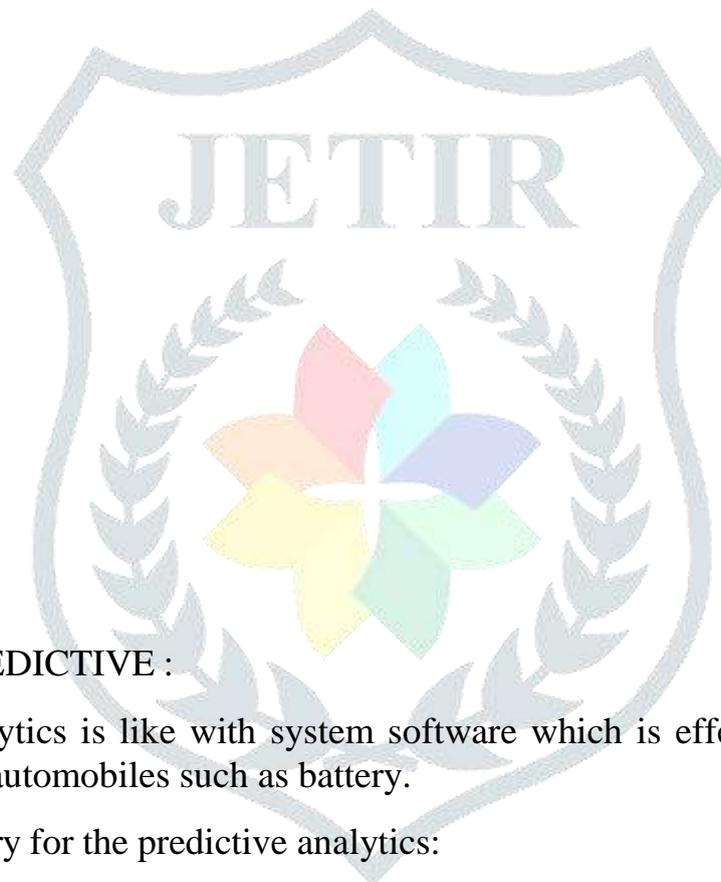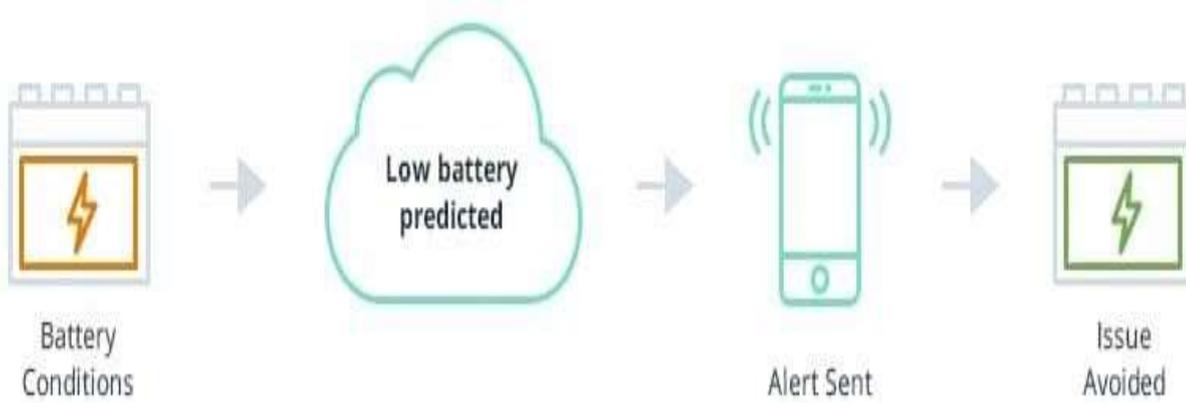
NEED OF PREDICTIVE ANALYTICS:

The basic problem that we often face is sudden breakdown without knowing the reason. After the service man comes and says about the fault we are not able to detect it. To avoid this we are supposed to introduce "PREDICTIVE ANALYTICS" using IOT. So that we our self can predict the fault before it takesplace via our control devices.

PROCESS OF PREDICTIVE MEASURES:

This idea of technology is with the use of IOT connectivity tool and that collects the data and the performance of different parts, that transfer the cloud with the use of MQTT software. The fault is detected with the use of ESP 8266 sensor. Here when the sensor ESP 8266 sense the fault in the hardware of vehicle and the data is transferred to our control device with the use of IOT technology.

This process the information gives a notification to the driver and advice is provided where the vehicle's part should be replaced or the service has to done inorder to avoid the potential incident. With this predictive method we can avoid breakdowns during the ride.

WORKING OF PREDICTIVE :

This predictive analytics is like with system software which is effectively in monitoring the hardware in the automobiles such as battery.

In this we take battery for the predictive analytics:

First the in-car monitoring system ESP 8266 sensor sense the status of the battery and the data is transferred to the server cloud and it predicts the potential maintenance issues then the recommendations are delivered to the driver via the connected device.

The list of parameters which are monitored:

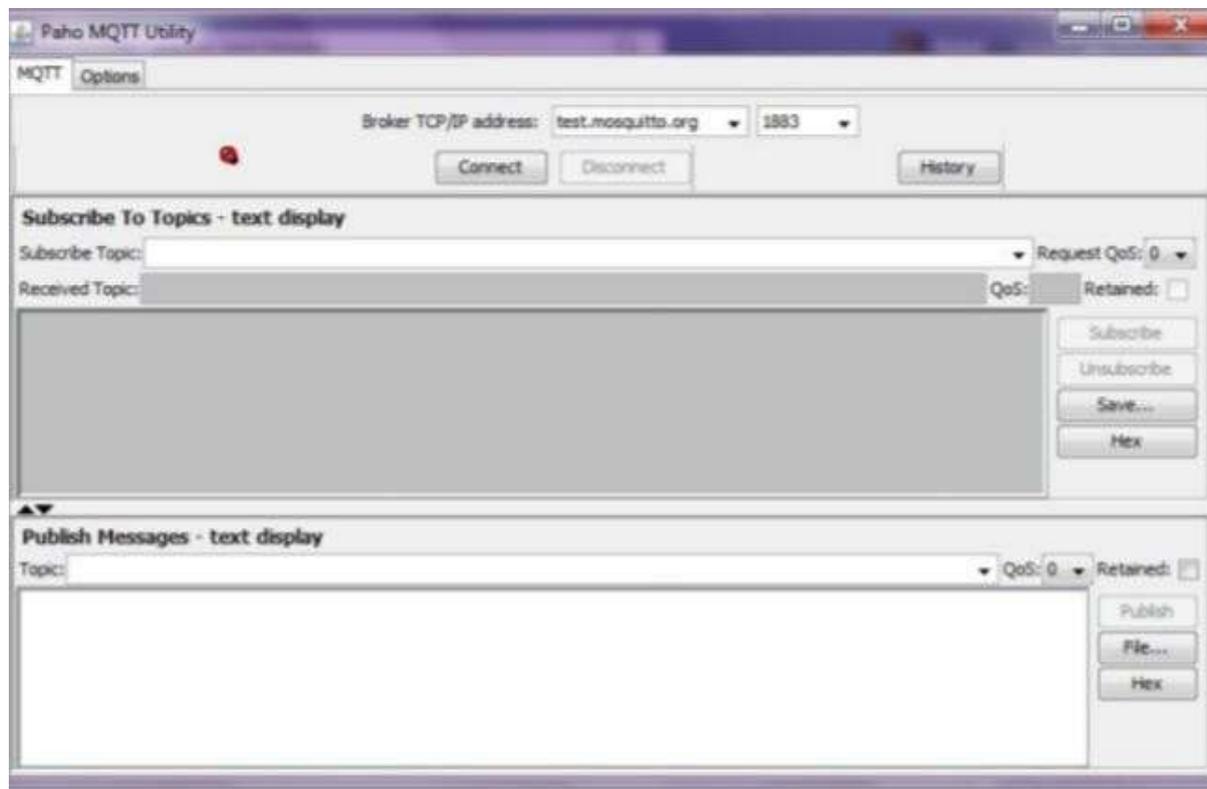| S. No	PARAMETERS
1	Battery
2	Wiring system
3	Engine
4	Radiator

MQTT (Message Queuing Telemetry Transport) is an standard messaging protocol for the Internet of things(IOT) . It is an extremely light weight published/subscribe messaging transport that is for connecting remote devices with the small code footprint and minimal network bandwidth. It is used in industries, such as automotive, manufacturing etc. MQTT can scale to connect with millions of IOT devices. It allows for messaging between device to cloud and cloud to device. MQTT has 3 defined quality of service levels :0-atmost once,1-at least once, 2- exactly once.

Mosquitto is an MQTT broker which Carry information from the sensor to the connected device. MQTT (Mosquitto)can remember the sensors which are connected to it in the past. MQTT broker has set a keep alive message which has a default time out of 60 seconds. If the sensor fails to send the message within 60 seconds, the broker pins its IP address to see whether it is connected. Every sensor has its own ID and IP address, each sensors have birth and LWT message. The birth message will be published every time when the sensors connected to the broker. This LWT message informs that the sensor has a fault. The MQTT brokerstores the LWT message for each and every sensor that connects to it, if the sensorfails to connect then the broker publish it as a fault.

SAMPLE DATA FLOW FOR CONNECTED CAR:

CarId=xxxxxx;Location=XXXX;ItemName=<<Value>>;currentStatus=<<value>>

We are using a cloud-based test Mosquitto server, Available for

public, at the address "test.mosquitto.org",

CHALLENGES IN THE PREDICTIVE ANALYTICS:

To implement a successive "PREDICTIVE ANALYTICS" some of themeasures has to be taken;

. Govt. and regulatory policies, restricting on what kind of sensitivedata can be transferred.

. Need better connectivity in terms of telecom, Bluetooth, wifi andother such networks for transmission of real time data and sensors.

. With higher number of sensors needed on the car, cost of buyinga new car can go up.

CONCLUSION:

Predictive analytics concept is benefit to our ecosystem and to have a safedrive. This paper talked about what is "PREDICTIVE ANALYTICS"through which fault in the vehicle can be predicted and solved, using MQTT, a popular protocol for IOT is discussed.

This paper also says about a simulation of predictive car sending sensor's data to cloud. This paper is concluded by sharing some of the challenges in implementing predictive analytics in our automobiles.

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