IOT Architecture For Vehicle Tracking System.

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Abstract: *Security in travel is primary concern for everyone.IOT based monitoring of vehicle parameters is described of effective information system that can monitor an automotive / vehicle / car condition in traveling. This project is designed to inform about the location of vehicle, vibration and temperature information that is occurred to a vehicle. This project uses accelerometer sensor which can detect the unevenness of vehicle and if vibrations occurred then a threshold limit. The signal send by the sensor are received by the microcontroller. Vehicle monitoring system uses wifi-module to send information over IOT. This monitoring system is composed of a GPS receiver, ARM-7, ACCELEROMETER, HEAT SENSOR and GPS Receiver who gets the geo satellite information in the form of latitude and longitude. The ARM -7 processes this information and this processed information is sent to the user/owner using WIFI-MODULE modem . A wifi modem is interfaced to the MCU. Heat sensor used to detect temperature level.*

Keywords: *IOT, WiFi Module, ARM-7,Accelerometer, Heat sensor.*

I.   Introduction

Vehicle Monitoring plays an important role. Parameters in vehicle if not detected or monitored can cause serious problems during running of vehicle. The proposed paper gives solution by keeping vital considerations in view. The Tire pressure monitoring systems described in referred papers make use of RS232 and Bluetooth which have drawback of limited operating range .This paper proposes an idea of using Internet Of Things which will extend the operating range. The advantages of idea proposed by this paper are reduction in number of accidents, inconvenience during driving, to increase the durability and life of tires, fuel Mileage, engine performance, fuel level monitoring and to provide proper vehicle handling.

This paper describes the idea of fuel leakage detection using sensor. Engine is most important part in vehicle since performance of vehicle is directly determined from engine. Hence performance monitoring of engine becomes critical part in vehicle monitoring. Performance of engine degrades if engine temperature rises above its limit. Apart from this engine temperature monitoring helps to design engine coolant. In this paper engine temperature is measured using temperature sensor. To extend the operating range of module this paper suggests the to use Internet Of Things (IOT). Internet of Things (IOT) is the internetworking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data broadband Internet is become more widely available, the cost of connecting is decreasing, more devices are being created with Wi-Fi capabilities and sensors built into them, technology costs are going down, and smart phone penetration is sky-rocketing. All of these things are creating a perfect storm for the IOT. Typically, IOT is expected to over advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications.
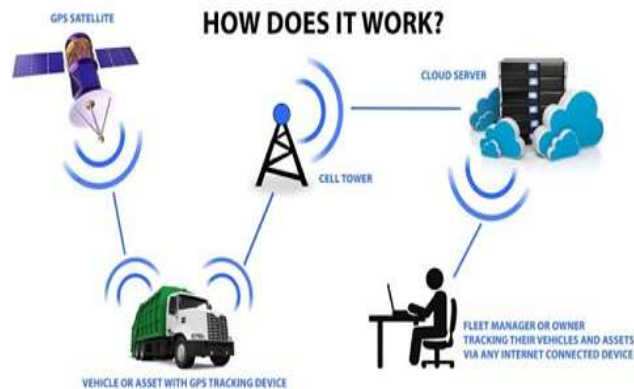
Fig: 1 IOT based Vehicle monitoring

The Internet of Things (IOT) is an arrangement of interrelated computing gadgets, mechanical and digital machines, objects, animals or individuals that are given one kind of an identifiers and the capacity to exchange information over a system without requiring human-to-human or human-to-PC communication. IOT is a new concept that has evolved from the convergence of wireless technologies. Wireless communication is the transfer of information or signal between two or more points that are not connected by an electrical conductor. In IOT devices equipped with Wi-Fi allow the machine-to-machine communication. Using this from of industrial machines to wearable or wireless devices, using built-in sensors to gather data and take action on that data across a network. The sensor and actuator can be setup in different place but they are working together over an internet network.

Major deaths occur due to the road accidents in all over the world. According to the recent Surveys from IIHS it is stated that these can be reduced by proper implementation of the IOT systems and based on notification sytems also. It can only reduce the deaths after accidents but we cannot manage the behaviours of the drivers such as alchohol driving and drug addicted persons drive etc.these behaviours cannot be controlled. Automatic detection of crashes is largely applied in various automobile industries such as tesla one of the leading example. The core principle of the project is to reduce the number deaths which caused due to lack of proper treatment at the right time. The system is currently in an unpolished level. i.e the complete end product has to be made only with the help of industries. A vehicle tracking system combines the use of automatic vehicle location of individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations. Modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via internet with specialized software. The history of vehicle tracking dates to the beginning of GPS technology in 1978.

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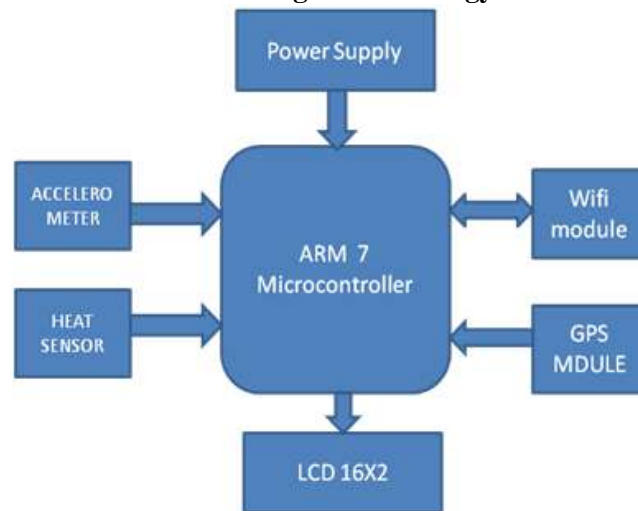
II. Design Methodology

Figure .2 IOT BASED VEHICLE MONITORING SYSTEM

Figure 2 shows vehicle monitoring system which consists of GPS module, Wifi Module , Heat sensor and Accelerometer. The ARM 7 is a 32 bit processor. If the accident is detected then information is collected by GPS module and sends it wireless to other vehicle. The power supply required for ARM-7 LPC2148 IS 3.3 volt. Accelerometer is used to detect crash event in terms of vibration. The system not only detect the vibration but also detect the HEAT   information.

A) **ARM-7 LPC2148 Microcontroller**

FIGURE:3 ARM 7 DEVELOPMENT BOARD

The microcontroller use in this project is ARM-7 LPC2148 Which is 32 bit. It works in 16 as well 32bit mode. These microcontroller uses Harvard architecture. Three different buses are used for transferring data and command to various peripherals like adc, uart, watchdog timer, .etc. It works on 3.3 volt supply voltage. It is having its own PLL so the maximum clock it reaches to 60 MHZ.

B) **GPS RECEIVER MODULE**

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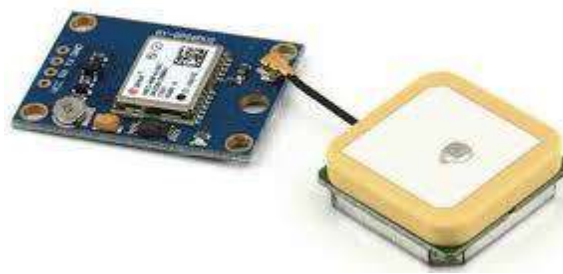
Figure.4 GPS module

GPS is navigation System which provides the location and timing services. Initially these were used for defence academy and later on came into usage for everyone. Main advantage of GPS is to track the location of anything which has these GPS device. It operates based on four or more satellites to get the location. In the project these are used for tracking the location of the vehicle.

C) ACCELEROMETER

Figure:5 Accelerometer.

The Accelerometer device/sensor which measures the unevenness of the vehicles through which we can conclude whether a vehicle is met with the accident or not.It measures through all the three axis i.e x,y, and z.the output signals generated by these system are the analog signals proportional to acceleration. The ADXL335 has a measurement range of ±3 g minimum.

D) WIFI MODULE

Figure: 6 ESP8266 Module

The ESP8266 local area network Module may be a self contained SOC with integrated TCP/IP protocol stack which will provide any microcontroller access to your local area network network. The ESP8266 is capable of either hosting AN application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with AN AT command set microcode, meaning, you'll merely hook this up to your Arduino device and acquire regarding the maximum amount WiFi-ability as a local area

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network defend offers (and that is simply out of the box)! The ESP8266 module is a very value effective board with an enormous, and ever growing, community.This module includes a powerful enough on-board process and storage capability that enables it to be integrated with the sensors and different application specific devices through its GPIOs with lowest development up-front and minimal loading during runtime. Its high degree of on-chip integration permits for lowest external electronic equipment, together with the front-end module, is intended to occupy lowest PCB space. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existance interfaces, it contains a self-calibrated RF permitting it to figure underneath all operative conditions, and needs no external RF components.
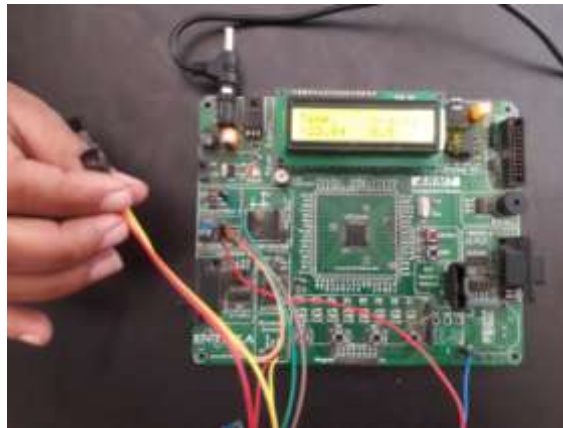
III. Result

Figure:7 Interfacing of Temperature sensor and accelerometer with ARM.

The above figure showing the result of temperature on LCD . The gps module is interfaced to UART 1 of ARM.

IV. Conclusion

The proposed system which uses wifi module sends a information of latitude and longitude of a vehicle. The designed system is implemented successfully to monitor various vehicle parameters by using suitable sensors and the parameters are displayed to user using LCD as interfacing device. India is currently ranked highest in the world for traffic fatalities, thus there is a critical need to reduce the number of road traffic-related fatalities across the country. Real-time monitoring of the vehicle important to avoid fatal accidents on the expressways.

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