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AI AND IOT BASED ELECTRICAL E-VECHICLE MONITERING SYSTEM

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ABSTRACT

In India transportation is a booming field where the count of e-vehicles increasing day by day.Security and maintenance of those e-vehicles is a risky one. Monitoring e-vehicle parameters and battery health level is an ideal to know without making any physical touch of the e-vehicle.IoT based e-vehicle parameter monitoring system is a capable one which leads to monitor our e-vehicle's parameters through an IOT.

In this technology world, technology is increasing by giving solutions to many problems. By using this technology, a solution for decreasing air pollution is implemented. The main cause of increasing air pollution is using various kinds of vehicles that run on combustion engines for transportation utilities. The implementation of Electric Vehicle (EVs) can resolve this air pollution problem and keeps the environment as pollution-free air and the world can survive in pure air. EVs are like machines that run on a charging battery. An EV's condition is depending on the battery's performance. The parameters for the battery's condition the voltage, current, and temperature. By using these parameters State of Charge (SOC) is determined. These performances are monitored as Battery Management System (BMS). In this paper, the EV monitoring system is implemented using the combination of Artificial Intelligence (AI) and Internet of Things (IoT) interfacing by the sensors in the vehicle's battery, and to the cloud. The performance of the battery is monitored using the mobile application of the cloud.

1. INTRODUCTION

Conventional vehicles are driven by internal combustion engine (ICE) and thus they are also named internal combustion engine vehicles (ICEVs). The vehicle is named the electric vehicle (EV) if an electric motor or a few electric motors are used to drive wheels of a vehicle. In addition, the vehicle is named the hybrid electric vehicle (HEV) if both an

electric motor and an ICE impel wheels of a vehicle. Electric vehicles are only discussed in this paper. A system schematic of EVs is illustrated. In EVs, the battery is the original energy source and provides electric power to electric motor drives and other equipments, such as lighting devices. The typical control schematic of EVs is depicted in Fig. 2. It can be observed that the typical control system of EVs includes five electric control units (ECUs), which are the Main ECU, Motor ECU, Battery ECU, Brake ECU, and Electric Equipment ECU. The main ECU controls the drive torque of EV by computing the motor torque based on information such as the accelerator opening and car speed command. The torque request value is sent to the motor ECU. The electric equipment ECU controls the DC-DC converter to generate a variety of DC voltage levels for lighting and other equipments. As we know, there are various types of electric motors in industrial applications.

2. LITERATURE REVIEW

2.1 YIN, Y., ZENG, Y., CHEN, X., FAN, Y.: "THE INTERNET OF THINGS IN HEALTH CARE": an overwiew.J.Ind.Inf.Integer.1,3-13(2016)

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these things to connect, collect and exchange data.

2.2 WANG, X., WANG, J.T.,ZHANG , X., SONG, J.: "A MULTIPLE COMMUNICATION STANDARDS COMPATIBLE IOT SYSTEM FOR MEDICAL USAGE. In: IEEE FAIBLE TENSION FAIBLE COMMUNICATION (FTFC)",Paris,pp 1-4(2013)

Iot involves extending Internet connectivity beyond standard devices, such as desktops, laptops, smart phones and tablets, to any range of traditionally dumb or non-internet-enabled physical devices and everyday objects. Embedded with technology, these devices can communicate and interact over the Internet, and they can be remotely monitored and controlled. With the arrival of driverless vehicles, a branch of IoT, i.e. the Internet of Vehicle starts to gain more attention

2.3 XU, B., XU, L.D., CAI, H., XIE, C., HU, J., BU, F: "UBIQUITOUS DATA ACCESSING METHOD IN IoT-BASED INFORMATION SYSTEM FOR EMERGENCY MEDICAL SERVICES". IEEE TRANS.Ind.Inf.10(2),1578-1586(2014)

A Remote health monitoring system is an extension of a hospital medical system where a patient's vital body state can be monitored remotely. Traditionally the detection systems were only found in hospitals and were characterized by huge and complex circuitry which required high power consumption. Continuous advances in the semiconductor technology industry have led to sensors and microcontrollers that are smaller in size, faster in operation, low in power consumption and affordable in cost.

3. WORKING PRINCIPLE

The main objective here is to comfort and safe guard the user of e-vehicle using AI technology and to make the task of maintaining and monitoring his/her e-vehicle easier. This system aims towards intuitive mechanism and will rely on prevention before the worse things occurs.IOT allows everything to be

sensed controlled it is a technology where all the gadgets and physical devices where operated and monitored using internet. In this project we are implementing an easy way to monitor an individual's e-vehicle's, health and parameters of battery using IOT Technology. The most important thing is security provided.
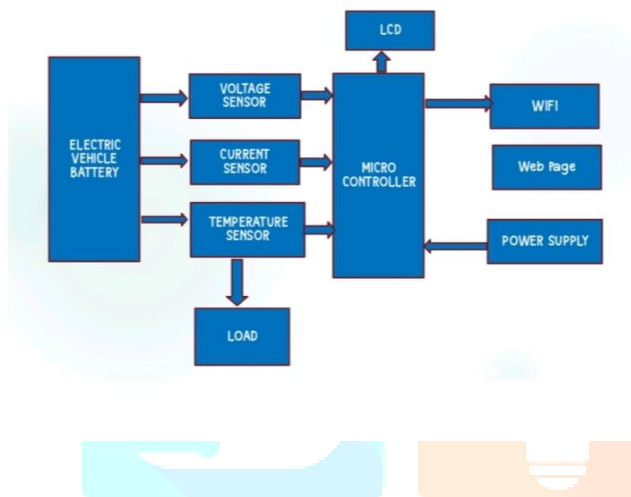

Fig No:1 Block Diagram

4. MAJOR COMPONENTS

- ➢ MICROCONTROLLER
- ➢ LCD DISPLAY
- ➢ TEMPERATURE SENSOR
- ➢ BATTERY
- ➢ CURRENT SENSOR
- ➢ RELAY
- ➢ DC MOTOR
- ➢ IOT

1. MICROCONTROLLER

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

TEMPERATURE SENSOR

Temperature sensor is a device which is designed specifically to measure the hotness or coldness of an object. LM35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). With LM35, the temperature can be measured more accurately than with a thermistor. It also possesses low self-heating and does not cause more than 0.1 °C temperature rise in still air. The operating temperature range is from -55°C to 150°C.The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

BATTERY

A battery works on the oxidation and reduction reaction of an electrolyte with metals. When two dissimilar metallic substances, called electrode, are placed in a diluted electrolyte, oxidation and reduction reaction take place in the electrodes respectively depending upon the electron affinity of the metal of the electrodes. As a result of the oxidation reaction, one electrode gets negatively charged called cathode and due to the reduction reaction, another electrode gets positively charged called anode. The cathode forms the negative terminal whereas anode forms the positive terminal of a battery.

CURRENT SENSOR

Sensing variable current flow is a major requirement in frequent electronics systems and the strategies to do so are as an assortment of as the applications themselves. A sensor is a unit that can determine a physical phenomenon and compute the latter, in other words it gives a measurable demonstration of the wonder on a particular scale or range. A current sensor is a device that recognizes electrical current in a wire or a system whether it is high or low and creates an indicator relative to it. It might be then used to presentation the measured current in an ammeter or might be archived for further classification in a data acquisition system or might be used for control purpose. Current sensor is "disturbing" as it is an incorporation of some of the sensor, which may cause system performance.

RELAY MODIULE

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, Or where several circuits must be controlled by one signal

5. CONCLUSION

In this study, Monitoring the battery for EVs have been discussed. By this solution we have provided a security to the e-vehicle owners by providing location tracking, fuel level monitoring, Engine's health etc. There are various ideas are proposed similar with our idea but all the ideas are only for four wheelers and trucks. The idea we proposed is for two wheelers. The cost will be less when compared with other ideas. By this the location of the e-vehicle will be seen in the mobile application and fuel level also indicated. This provides a security and easy to access for the e-vehicle to produce hybrid power architecture.

6. SNAPSHOT OF KIT
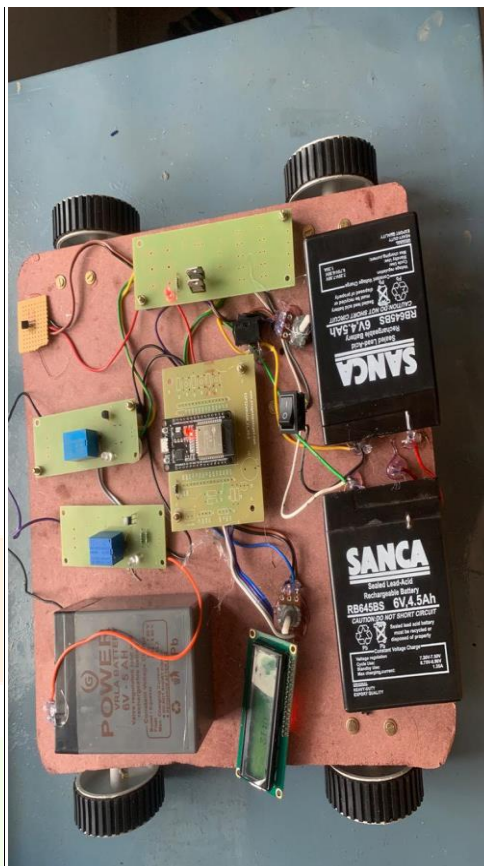
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