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UPS Battery Monitoring System Using IOT

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ABSTRACT: Battery performance is monitored by the internet of things (IOT). When there is a power cut all the applications are consuming the power through the battery due to this the amount of energy is decreasing and leads to the performance degradation. Most UPSs utilized battery- powered battery which is lithium particle battery. UPS battery has limited extend of making an excursion on account of battery size and body structure It is more modest to be contrasted and lead corrosive.

KEYWORDS: Battery, ESP8266, Arduino Microcontroller, Voltage sensor, LCD.

I.INTRODUCTION

Electricity plays a vital role in all parts of the world. In our country we have many different ways to consume electricity with major components and in some parts of our countries did not have the facility to use the power that is generated to have a better day. Even though we have great methods to generate power we don't know the exact amount of power we need. This is because we didn't have the clear plane on distributing the power to all areas without any lose and it depends on the natural value of the place too. Due to this shortage consumers are also not satisfied with power companies that regulate the power to our point. They have much statistical error while they are consuming this power. This leads to error in the monthly bills. Thus we are trying to implement a method that reduces the technical errors and statistical errors and even it will reduce the human efforts. Many people directly go to the venders place to check the monthly bill this leads to many errors and consume more time. If we use IT in a proper way to utilize these drawbacks we can save these drawbacks. This method gives the average consumption of the localities. This idea is economical and low cost for implementation.

Here the meter reading is delivered to the modem by SMS and it is noted and then it again sends to the serve through SMS. The purpose of the project is to remote monitoring and control of energy meter. This method is achieved by the microcontroller which is continuously monitor and records the data of the energy meter. Here the data are stored in the memory location then it is send to GSM modem to monitoring. For this process we need GSM modem with a sim card is required for energy meter.

II.WIRELESS SENSOR NETWORK

A wireless sensor network (WSN) is a computer network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants, at different locations. The cost of sensor nodes is similarly variable, ranging from

hundreds of dollars to a few cents. It depends on the size of the sensor network and the complexity required of individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and bandwidth. In computer science, wireless sensor networks are an active research area with numerous workshops and conferences arranged each year to gain more facilities to work properly.

III. EXISTING SYSTEM

Wireless communication is the process of communicating with the other devices without internal component connections. The communication can be delivered by the wirelessly without any interpretation. This is a broad term that incorporates all procedures and forms of connecting and communicating between two or more devices using a wireless signal through wireless communication technologies and devices. From the previous work there are several types of technology that have been used for wireless battery monitoring system such as GSM, ZigBee, GPRS, Android, WIFI and Bluetooth communication. GSM (Global system for Mobile Communication) is a type of wireless communication that are very popular worldwide. Its frequency band is either 900MHz or 1800MHz. Electric Vehicle battery are monitor using IoT were existing method. In this batteries of e-vehicle are user interface is capable to monitor multiple battery monitoring devices locations, and the conditions of batteries. In this there is a need to monitor the battery through the devices and have to monitor regularly by the human power. Here there is a need of monitoring by the IoT makes the system easy and reduce the operating values for the battery and makes the regular monitoring for making the battery state healthy. Dhotre et al developed an automatic battery charging and engine control system for EV using GSM module. SMS is sent to the user when battery health goes below threshold value. Then, user can reply via SMS to auto-start the engine to charge the battery.

IV. PROPOSED SYSTEM

Battery management is necessary for safety purpose and this management is used to increase the life of the battery too. There are several reasons that cause battery breakdown such as deterioration of battery and design defects.

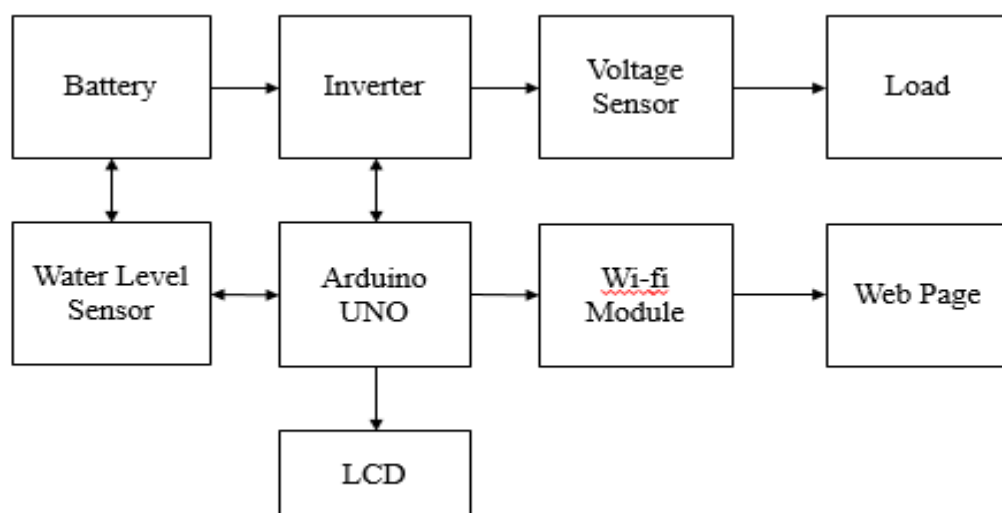


Fig.1.Block Diagram

Manual battery monitoring does not collect and store the data in the database for the further future purpose, but only show the data collected in real time. Therefore, it is essential to remotely monitor battery systems using wireless technology. There are various battery monitoring system using wireless communication that have been developed for

the industry such as uninterruptible power supply (UPS) which is important to ensure continuity of power supply for domestic and commercial during power interruption. Suresh et al. proposed a PLC-based battery health monitoring system for an UPS using GSM modules and SCADA by providing alert messages when batteries are in critical condition and room temperature. IoT technology that incorporates together within the monitoring system can help in improving the preventive maintenance in ensuring the battery quality and increase the safety of the user. The energy are stored on the battery and we want to maintain battery properly. So we monitoring the water and voltage thought using the Internet of Things. Our project focuses on the use of IOT for home/industry automation and monitoring various physical parameters over the internet. This internet of things projects have been proposed on existing system improvements and new innovative solutions to different problems.

A.ESP8266 MODULE

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor.

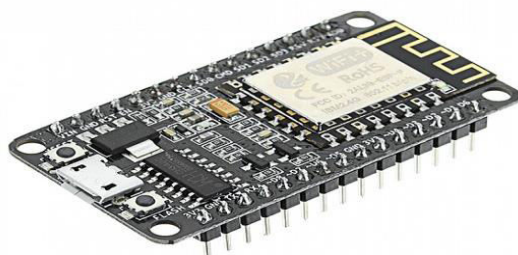


Fig.2.ESP8266 Module

B.ARDUINO MICROCONTROLLER

Arduino Microcontroller is a open source microcontroller. It can be used in both software and hardware. It is easy to use and for uploading the memory program in the Arduino. It consist of various pins and features for better efficiency. In our project we use Arduino ATmega328 Microcontroller. This microcontroller has 28 pins. It has Electrically Erasable Programmable Read Only Memory (EEPROM). This Arduino ATmega328 feature consists of advanced architecture, good performance, and low power consumption. It operates at a range of 3.3V to 5.5V but we use 5V as a standard. The program is uploaded on AVR micro controller attached on Arduino.



Fig.3. Arduino Microcontroller

C. LCD

A Liquid Crystal Display(LCD) is flat panel display, electronic visual display ,or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly.

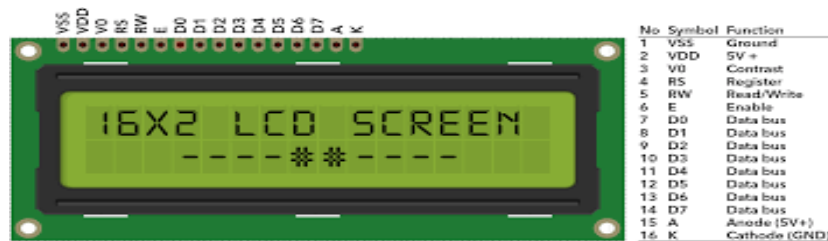


Fig.4. LCD Displays

V. SOFTWARE DISCRIPTION

An embedded system is an application that contains at least one programmable computer (typically in the form of a microcontroller, a microprocessor or digital signal processor chip) and which is used by individuals who are, in the main, unaware that the system is computer-based. Arduino software is used to control all the components. It is a type of Integrated Development Environment (IDE). This software can be written in C, C++ for the automation process. It can be run on operating systems like Windows, macOS, Linux etc. It is used to write and upload programs to Arduino compatible boards. Here the program for controlling the wheel movement and the movement of arm that are connected to the motors are uploaded in this Arduino software. The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The current Uno provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub *main()* into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs that convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. Arduino microcontrollers are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory. The default boot loader of the Arduino UNO is the Opti boot loader. Boards are loaded with program code via a serial connection to another computer.

VI. HARDWARE IMPLEMENTATION

In this Battery Monitoring system using IoT where you can monitor the battery voltage and water level of battery. The battery is the most important component for any device. So it is important to monitor the voltage level of the battery. In our battery is made up of lead acid. By using Internet of Things we can directly notify the user directly. When the battery voltage level is low we can check in web server and an alert SMS will receive on smart phone. So we can easily know the voltage level. It is also same as for water level. When the water level of battery is low it also give an alert SMS to smart phone. For getting an SMS we use ESP8266 Or WIFI module. For voltage measure we use voltage sensor and for water level we use water level sensor. By this way the voltage and water level of the battery is easily identify so we can monitor the battery.

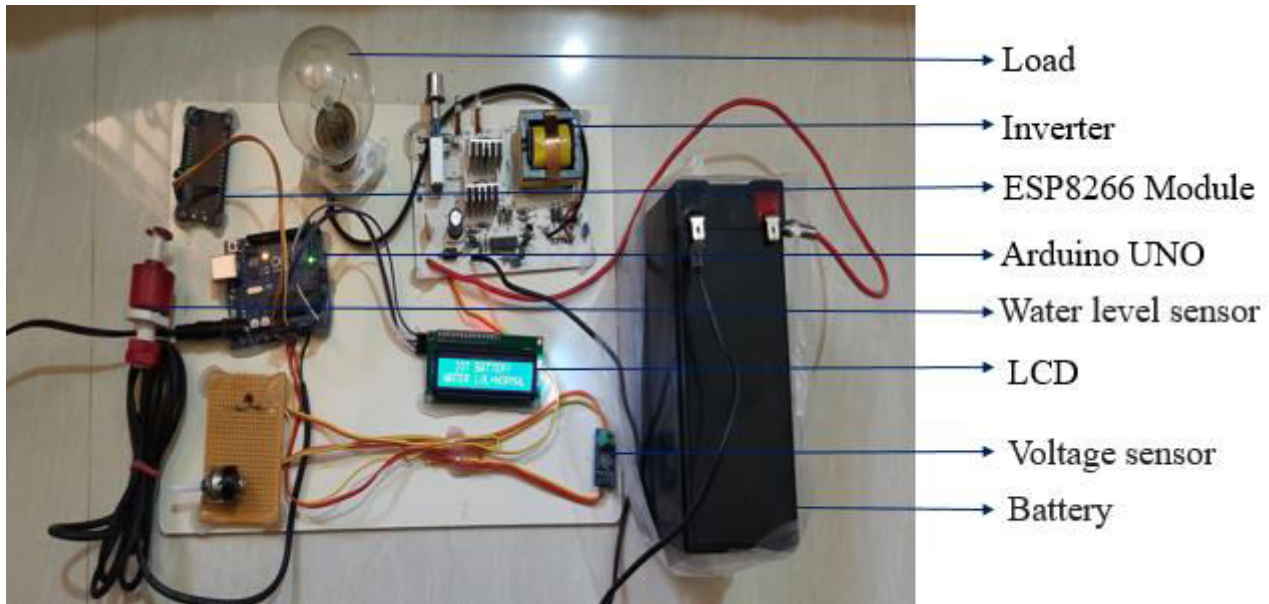


Fig.5.Snapshot of hardware implementation

VII. CONCLUSION

This project described the design and development of an IoT based battery monitoring system to ensure the battery voltage and battery water level can be monitored online. The development of the system consists of the development of the system hardware for the battery monitoring device and a web based battery monitoring user interface. The system can be used in smartphones by developing smartphone application that can help user to monitor battery and battery voltage remainder.

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