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# Battery Temperature Monitoring and Controlling Using Cooling System

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**ABSTRACT:** Now days, keeping of electricity is critical in demand to store electricity is vital. When batteries retained in segregation or a sealed compacted space, as in power plant or electrical vehicle tend to heat up extremely resulting in reduction of competence and life of the battery. The temperature factor that responsible for heat generation in the battery are charging and discharging of the battery. This heat degenerate by the battery during charging and discharging form is organized by cooling fan system. The relay is connecting to fan when the temperature of battery is exceed from target value then relay will turn ON the fan. The battery's optimal operating temperature is varies in between 25° C and 30°C. Battery monitoring and temperature control system that keeps the battery temperature within the desired range will significantly improve the power ingestion and improve the charge storing capability and battery lifetime. Battery monitoring and temperature control system is built using IoT technology and efficient hardware for battery system.

**KEYWORDS:** IoT, Temperature, Humidity, DHT11, DC voltage sensor

## I. INTRODUCTION

Battery is the combination of one or many cells which used for transferring the flow of electrons between the cathode and anode. Battery consists of two terminals which is classified into cathode a positive terminal and anode which is a negative terminal. The electrodes are immersed in an electrolyte. The chemical reactions take place inside the system which is known as redox reaction. Whenever an external load is connected to the battery the energy flows which is in DC form. The battery is of basically classified into two main types. They are rechargeable and non-rechargeable batteries. There are many types of batteries which are used for various applications some of them are lead-acid battery, lithium-ion battery, nickel-cadmium, fuel cell. Generally rechargeable batteries are extensively used which are lead-acid and lithium-ion battery. Lithium-ion battery have good charge storing capability, however lead-acid batteries are cheaper. Hence the lead-acid batteries are used widely. Battery plays a major role in the DC system and also in various power systems, electric vehicles, power station etc. Soaring temperature is the main hazard to a battery. It is not only hazard if the battery suffers from high temperature internally but also when the ambient air outside the battery becomes warm. Thus, monitoring the temperature inside the battery is essential. In various studies have shown that high temperature compromises the performance and lifetime of batteries. In fact, for each 8C rise in temperature, a sealed lead acid battery loses half of its lifetime and the heat damaged your battery. Its ability can't return to normal. If battery temperature is higher than the temperature of environment where is located then it can lose heat due to conduction, convection and radiation. As well as if environmental temperature is higher than internal temperature of battery then it will get heat. Also, fault in a battery is attached circuit can negatively impact its temperature.

## II. METHODOLOGY

Battery temperature monitoring and cooling system, we are using microcontroller which have an inbuilt Wi-Fi model ESP8266. Along with microcontroller, we are going to use DC Voltage to read the battery voltage, DST11 Sensor to get temperature as well as humidity values of battery, for heat exhausting we are using fan, relay use for to

turn ON/OFF fan and lastly all data will be shown in LCD as well as android and Web Application through Blynk server. Communication between cloud Blynk server and node through ESP8266 Wi-Fi model. For programming, we are store the essays ID and password with the help of Embedded C language. This system is based on IoT technology so there is no any range limitation and multiple user can use the application with the help of Gmail ID and password for security purpose.

In this system, firstly we need monitor temperature and humidity of battery through DST11 sensor; output will be send to microcontroller continuously for monitoring. If the battery temperature is get high beyond the range then cooling fan will automatically turn ON through relay for cooling purpose and if the battery temperature is get low beyond the range then exhaust fan turn OFF using relay so it will save the power consumption whenever its required. At the end, all data in terms of temperature and humidity will be display on LCD as well as on application (android and web application) through communication of Blynk server and ESP8266.

• **BLOCK DIAGRAM:**

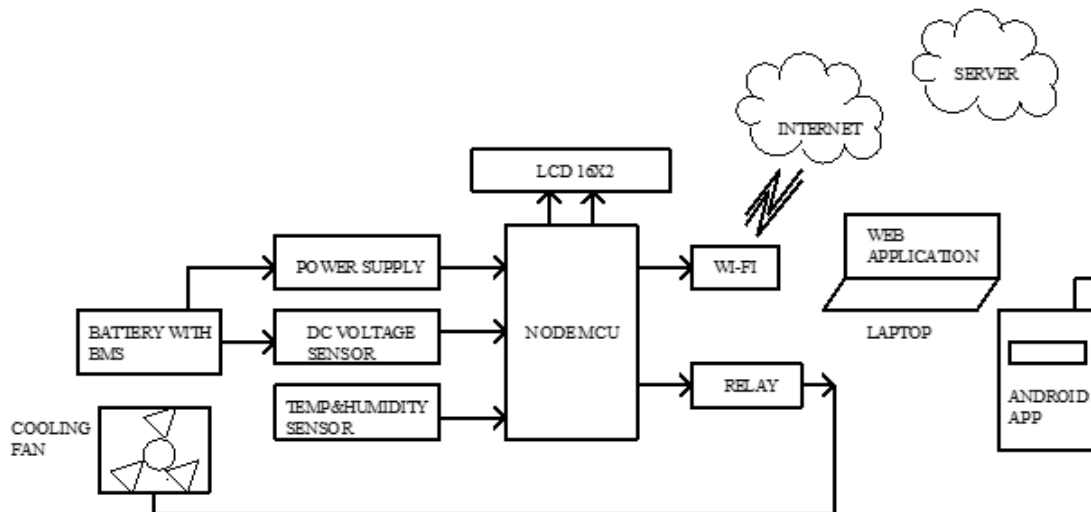
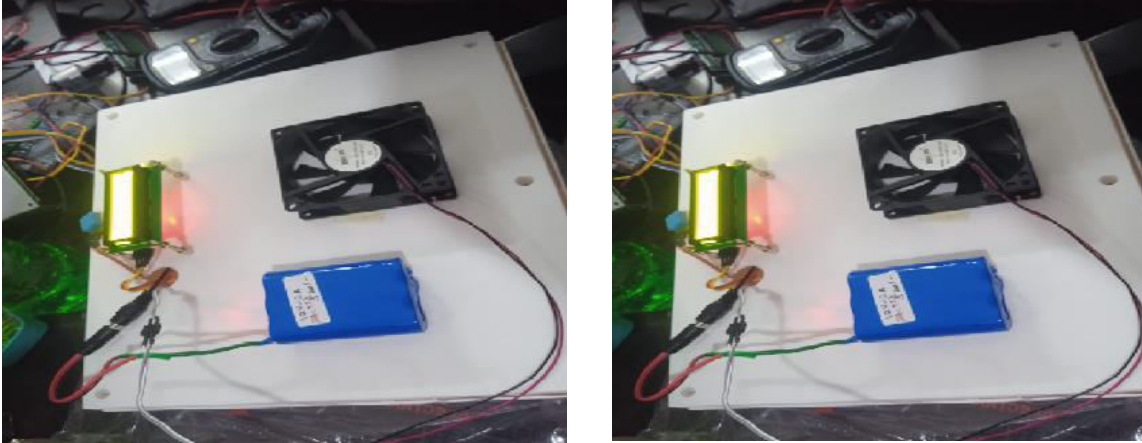


Fig 1: Block diagram

III. RESULTS





#### IV. CONCLUSION

A methodology has been planned for scheming and enhancing the battery with help of cooling fan by using relay. The cooling fan is working in this system in order to reduce temperature level of battery pack and heat exchanger. By using this system, it is perceived that the charge retentive capability of battery and period of battery.

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