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# EV BMS WITH CHARGE MONITOR AND FIRE PROTECTION

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## ABSTRACT

Battery storage forms the most important part of any electric vehicle (EV) as it stores the necessary energy for the operation of EV .So, in order to extract the maximum o/p of a battery & to ensure its safe operations it is necessary that a efficient battery management system exist is the same.It monitors the Parameters, determine SOC and provide necessary services to ensure safe operation of battery. Hence BMS forms a integral part of any EV and safe guards both the user and the battery by ensuring that the cell operates within its safe operating parameters. The proposed system only monitor the battery and charge it safely but also protect it to avoid accidents from occurring. The proposed model has following functions current, voltage measurement, state of charge (SOC) calculation, protection, battery status detection, liquid crystal display (LCD) etc. Electric vehicles (EVs) are automobiles powered by one or more electric motors, which draw energy from rechargeable batteries instead of relying solely on internal combustion engines (ICEs) that consume fossil fuels

**Keywords**: Electric Vehicles (EVS), Liquid Crystal Display (LCD), State Of Charge (SOC).

## I. INTRODUCTION

An electric vehicle EVs is a type of vehicle that uses one or more electric motors for propulsion. Instead of using an internal combustion engine (ICE) that burns fuel, an EV use a battery pack to store electrical energy to power an electric motor, which propel the wheels.Compared to conventional ICE vehicles, EVs provide a number of benefits, such as decreased emissions, quiet operation, and a less emission of fossil fuels. Since electricity is frequently less expensive than gasoline and electric motors are more efficient than ICEs, they also typically have reduced operational expenses.An EV are popular worldwide because of cleaner and most sustainable future. In many countries the government declares the many subsidies so that Ev gets promoted. Beside with advantages of Ev there are many limitations faced such as internal short circuit causes over temperature. A battery management system (BMS) is an electrical device that controls and keeps track of the operation of rechargeable batteries, such as those found in renewable energy sources and electric cars. During regulating the charging and discharging BMS continuously monitors the SoC and SoH of battery.

The BMS normally consists of a number of parts, such as sensors for measuring the temperature, voltage, and current of the battery as well as control circuits for controlling how the battery is charged and discharged in response to various conditions. Software algorithms that forecast the battery's remaining capacity and project its remaining life may also be present in the BMS.

One of the key functions of a BMS is to prevent the battery from being SOC and SOH, which can cause permanent damage to the battery and reduce its lifespan. The BMS accomplishes this by controlling the charging and discharging process and shut down the battery if any abnormal conditions occur.

## II. METHODOLOGY

This This This proposed system consist of, Arduino microcontroller. The Li-ion battery is balanced charged using a li-ion battery charging circuit. The battery temperature is measured using a DS18b20 temperature sensor that is connected to an Arduino's analog pin. The results are display on LCD.

A 5V relay linked to Arduino Uno is turned off when an over temperature is detected, cut off power to the battery. The Arduino Uno is connecting to a fire sensor, which gives a signal to relay to avoiding a fires hazard.

Motors are coupled to an Arduino Via motor driver. The motor driver that we are utilizing is linked to the Arduino UNO pins. While charging, the voltage sensor is used to check voltage and limit the flow of current to the battery using charging circuitry.

The LCD display, the current & voltage level of battery. As soon as the battery is fully charged, the system cuts

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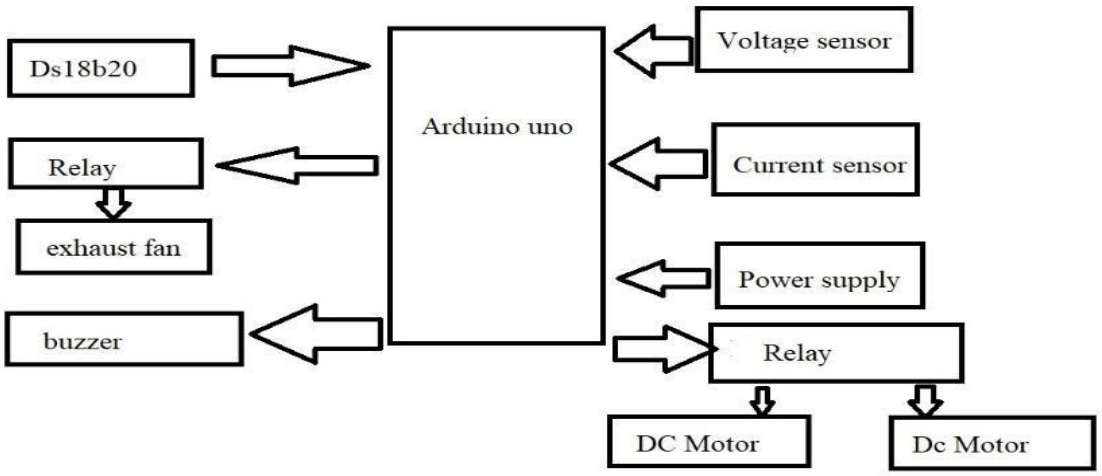
off the supply and displays Battery fully charged on LCD. When system start to operate the current sensor keeps track of current drawn from battery and displays the parameter on LCD Display. The temperature sensor is used to monitor temperature of battery while charging as well as discharging. If the battery temperature is observed to deviate from standard values, the system automatically cuts off input as well as output supply and displays the temperature as well as a buzzer alert on the LCD display. Thus, the system allows for a smart and efficient battery charging as well as protection system.

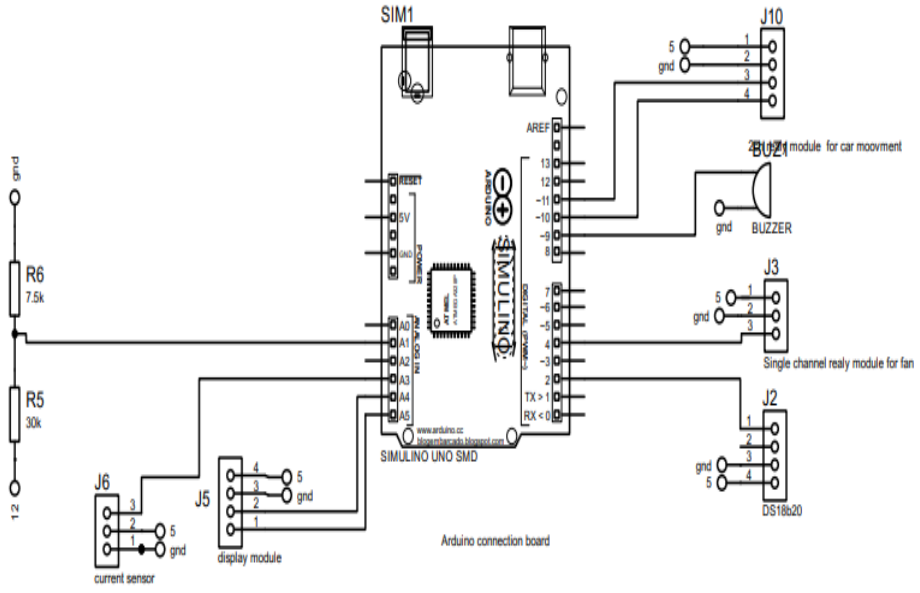
## III. BLOCK DIAGRAM




## IV. COMPONENTS

1. Arduino Uno
2. Li-ion Battery
3. DC Motor
4. Bluetooth HC-05
5. DS18b20 temperature sensor
6. LCD Displat
7. Current Sensor
8. Voltage Sensor
9. Relay Module

## V. CONNECTION DIAGRAM



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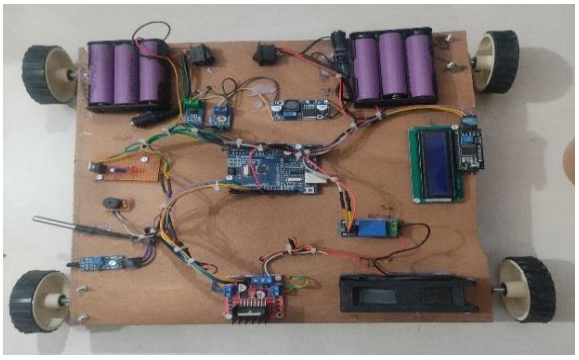
## VI. MODEL OF PROJECT



## VII. RESULTS

In this project we have monitored the voltage, current and temperature of the battery. The result of this project is that if the temperature of the battery increases for any reason or the battery is overcharged, the sensor will automatically turn on the fan and alarm system and you will see an indication on the display. Even if there is a fire due to a short circuit in the EV, the sensor will know about it immediately so that the safety of the battery and the EV increases.



## VIII. CONCLUSION

An essential part of electric vehicles that guarantees the security, dependability, and longevity of the battery pack is the EV BMS with charge monitor and fire protection. By supplying crucial safety features like temperature control, fault detection, and fire protection, the system lowers the possibility of battery fires and enhances the overall efficiency of electric vehicles. In order to improve the features and capabilities of EV BMS with charge monitor and fire protection. A few potential future work areas include enhancing the precision and dependability of battery monitoring systems to deliver more accurate and precise data regarding the charge, health and function of the battery pack.

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