DESIGN AND DEVELOPMENT OF INTELLIGENT CONTROLLER FOR EV BMS APPLICATION

https://youtu.be/TN_LQdhc0qs

The design and development of an intelligent controller for an Electric Vehicle Battery Management System (BMS) is a critical component for ensuring efficient operation, safety, and longevity of electric vehicle (EV) batteries. This paper presents a low-cost, integrated approach to monitor and manage the battery's performance using an Arduino Nano, Raspberry Pi, and several supporting components including an LM2596 voltage regulator, an LCD display for real-time data visualization, and sensors to monitor battery voltage and current. The system is designed to interface with a battery pack, with the voltage sensor connected to the Arduino Nano to measure the battery's voltage in real-time, while the current sensor is used to monitor the flow of current to the motor. The Arduino Nano acts as the primary controller, processing the sensor data and displaying vital information, such as battery voltage, current, and remaining charge (battery life) on LCD screen. The Raspberry Pi serves as a secondary processor for advanced data analysis and system optimization, enabling communication between the controller and other components. The LM2596 voltage regulator ensures stable power supply to the system components. The intelligent controller enables effective battery health management, prevents overcharging, and ensures balanced power distribution, making it a key advancement in the application of BMS in electric vehicles. This system ensures optimal performance and safety, improving the overall reliability and efficiency of EV operations.

The main building blocks of the project are:

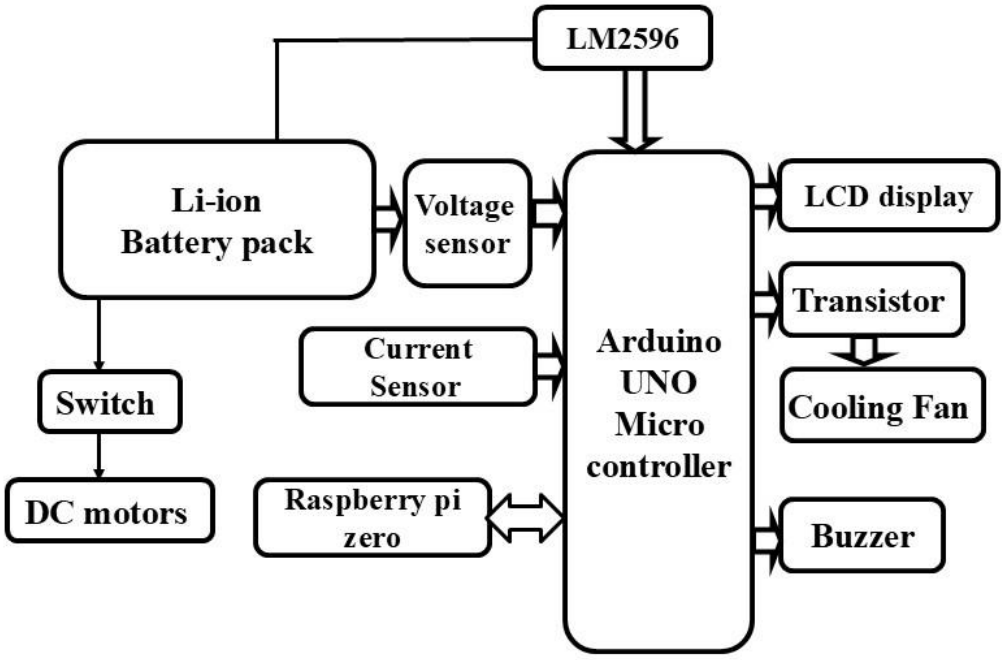
- ARDUINO NANO Microcontroller.
- Voltage sensor.
- Current sensor.
- Raspberry pi zero.
- Li-ion Battery.

- LM5296.
- DC Motor.
- LCD display.

Software's used:

- Arduino IDE for Embedded C programming.
- Express SCH for Circuit design.

Block Diagram



Block Diagram