ABSTRACT

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Study Program   :   *Electrical Engineering*

Title   :   *"Monitoring System for Battery Condition in Vehicles Using an Internet of Things Based ESP32 Microcontroller"*

Vehicles need an accumulator to store electrical energy in chemical form, which will be used to supply power to the ignition system, lights, and other electrical components. The problem that arises is that vehicle users do not know whether the accumulator condition has reached a voltage level above or below average. To overcome this, periodic monitoring is needed to secure the condition of the accumulator in the vehicle. This research develops a tool with a 12V 35Ah accumulator monitoring system that can monitor the accumulator condition of the vehicle. This monitoring system method uses a 25V DC voltage sensor to measure accumulator voltage, an ACS712 current sensor to measure vehicle currents, and a DHT22 temperature sensor to measure temperature in this accumulator. Sensors can send data to the microcontroller, and the 20x4 LCD can display data in the form of voltage, current, and temperature in real time. Therefore, the Blynk platform can become an Internet of Things (IoT) system monitoring facility that is capable of displaying data results for reading 25V DC voltage sensors, ACS712 current sensors, and DHT22 temperature sensors. The data that Blynk receives can be saved and displayed as a graph. Hence, the purpose of this research is to make a tool with a monitoring system that is able to measure voltage, current, and temperature in the vehicle accumulator in three conditions, such as off, on, and running conditions. If the voltage, current, and temperature levels exceed predetermined limits, the researcher uses a buzzer as an offline indicator and notifications on the Blynk platform as an online indicator. The results of the research conducted for 1-hour show that this monitoring system can measure voltage, current, and accumulator temperature when the vehicle is off, on, and running. When the vehicle is turned off, it has a voltage range (12.56V – 10.50V), current (23.63A – 0A), and temperature (35.1˚C – 36.7˚C). When the vehicle is running, the voltage range is (11.39V – 14.39V), current (0.3A – 32.3A), and for temperature (38.6˚C – 39.5˚C). When the vehicle is running it has a voltage range (13.94V – 14.46V), current (23.33A – 24.33A), and temperature (38.1˚C – 39.7˚C).

Keywords: Accumulator, 25V DC Voltage Sensor, ACS712 Current Sensor, DHT22 Temperature Sensor, ESP32, Monitoring System, Blynk