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Design, development and implementation of an Android application based battery tester for USB powered devices

In this work, we proposed a method to design, develop and implement an Android application based battery tester for USB based system, such as: smart phones, tablets, or other USB powered devices to evaluate its performance. In the proposed method, a shunt resistor of known value is selected. The output of the USB powered devices is applied to the resistor through its USB port. The voltage drop across the resistor is a function of current flowing through it. Hence, based on the known value of voltage and current, battery power and capacity is evaluated. A low power, 16-bit precision analog to digital converter ADS1115 is used to convert the analog output of the resistor to digital format. Further, ESP32 microcontroller is used to process, evaluate the parameters of USB powered devices, and transmit the data through Bluetooth. The Android application running on the mobile, developed on MIT App inventor, connected to ESP32 through Bluetooth is used for data visualization and analysis. The observations are displayed on LCD, interfaced to ESP32 as well as in the Android application running on the mobile phone. The results of various tests on the system will be discussed in this paper.

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