

Powering a Raspberry Pi controlled battery charger with CC-CV method

Abstract

A battery charger is a device applied to provide energy to rechargeable or secondary batteries by forcing current through it. A battery is one of the best choices for devices such as cell phones, digital cameras, and laptops, and the power adapter is described as the charger. In this research, using Raspberry Pi switch mode to securely charge batteries prevents overcharging and it can be controlled and monitored all the time. To achieve this result, the constant current (CC) stage and constant voltage (CV) stage of battery charge management is thoroughly implemented to increase a battery's life and performance. The CC and CV stages are important parameters that reflect battery performance. The management of the CC and CV stages not only prevents over-or under-charge but also improves the battery life and performance score. This paper aims to manage the state of battery charging within a certain limit by using Raspberry Pi. A regional transmission organization provides a signal to the battery. The expected result of the output voltage is in the range of 5 to 12 V, a constant output current of 0.5 A, and the charging time depends on the set current and battery capacity. By using Raspberry Pi, the charging system signal is given by a switch mode, which is sent to the battery by putting bias on a battery's power output considering the state of charge (SoC) status so that the performance score and battery life improve. If charging mode continues after the battery is fully charged, it may shorten battery lifespan and cause a short circuit and explode, causing fire accidents. The novelty of this research is it is expected to be portable; can be brought anywhere if a power supply is unavailable.