

***Prototype Design Of Electric Bicycle Battery Monitoring System Reviewed  
From Battery Capacity And Remaining Electric Motor Range***

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***ABSTRACT***

*Batteries, as widely used primary energy storage systems, are increasingly being utilized in electric vehicles as an energy storage medium. Therefore, estimating battery capacity and predicting its lifespan are essential to ensure safe battery operation. This study aims to design, develop, and test a system in the form of a prototype. The displayed parameters include battery capacity and the estimated remaining mileage of the electric motor. In the tests conducted using the discharge method, a 5V DC motor was simulated as the electric motor load, and a 12V lithium-ion battery served as the energy source. The system performs readings using an INA219 sensor to measure battery capacity and energy consumption, alongside an LM393 speed sensor to measure motor speed. The experimental results show that at motor speeds of 120 RPM and 250 RPM, the system successfully displays the battery capacity and the remaining mileage of the electric motor. The system achieved high accuracy, with average reading errors of 0.04% for voltage, 0.34% for battery capacity, and 0.82% for the remaining mileage. This indicates that the monitoring system prototype functions effectively, with error values remaining well below limit of 5%.*

***Keywords:*** *Lithium-ion battery, Battery capacity monitoring, Remaining mileage estimation, INA219 sensor, LM393 sensor.*