

# The Estimation of Battery State of Health using Probabilistic Neural Network

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In this study, a probabilistic neural network (PNN) is used to estimate the state of health (SOH) of Li-ion batteries. The accurate prediction of SOH can help avoid inconveniences or fatal accidents from the sudden malfunction of the battery. A total of 110 pieces of Li-Co batteries are used. Constant current/voltage recharging and constant current discharging are performed for the life-cycle test of the battery. The data obtained from the recharging and discharging electric characteristics as well as the life-cycle test of the battery are used to estimate the SOH of the battery. The test data show that the constant current charging time, the instantaneous voltage drop at the start of discharging, and the open circuit voltage are the most important characteristics for estimating the SOH of the battery. The PNN is trained using 100 pieces of batteries. The remaining 10 pieces are used to verify the feasibility of the proposed method. The effectiveness of the PNN training using a number of samples is discussed and analyzed. The results show that the average error of the prediction is 0.28% and the standard deviation is 1.15%. The computation time of the PNN is 62.5 ms. Thus, the proposed method can accurately estimate the SOH of the battery in a short period.



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