Study of state of charge of battery based on neural network for electric vehicles

徐永佾、張舜長

E-mail: 364807@mail.dyu.edu.tw

ABSTRACT

Since the oil crisis in recent years, electric vehicles have become the future trend. Lithium battery used in electric vehicle is the first choice of other batteries. It is important in electric vehicles to completely manage the lithium battery having current residual capacity(State of Charge, SOC) Lithium battery used in electric vehicle is more appropriate than other secondary batteries, otherwise LiFePO4 battery is more appropriate than lithium-ion battery. For the reason of LiFePO4 battery has high voltage, high cycle life, and low self discharge rate, this paper selected LiFePO4 battery as the experimental material. The battery capacity of LiFePO4 batteries can affect by temperature, charge and discharge current extrinsic factors. It is quite difficult to accurately predict the battery residual capacity. The neural network has nonlinear, variability, multiple input and output and fault-tolerant features that make the neural network can accurately forecast the battery residual capacity. By used charge and discharge test, host in the experiment under different external conditions got battery charge and discharge data, then used it became neural network input and got target. Neural network within MATLAB program used in this study to establish the estimated battery residual capacity. Using LabVIEW graphical software design in the battery capacity computing and monitoring characteristics of the battery program can control the discharge current. Discharge data storage, finally use the discharge data input to neural network battery residual capacity can estimate module and compare error of the actual capacity and estimate capacity. Back-propagation network has high accuracy in scg algorithm the actual residual capacity and estimate average error residual capacity is 7%.

Keywords : Neural Network、Matlab、State of Charge

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