

Supplementary Materials

End-cloud collaboration approach for state-of-charge estimation in lithium batteries using CNN-LSTM and UKF

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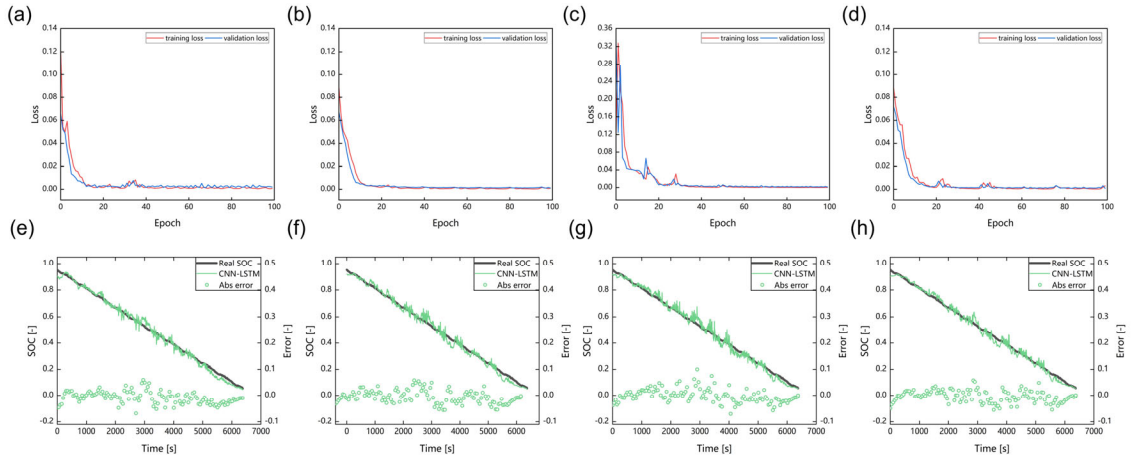


Figure S1. The training and testing process of the CNN-LSTM: (a), (b), (c) and (d) are the training loss and

validation loss for the network structure Conv-Pooling-LSTM, Conv-Conv-Pooling-LSTM,

Conv-Pooling-LSTM-LSTM and Conv-Conv-Pooling-LSTM-LSTM respectively. (e), (f), (g) and (h) are the SOC

estimation results for the different structures, respectively.

Table S1. The SOC estimation results with different network structures for US06 profiles at 25°C.

Model structure	RMSE(%)
Conv-Pooling-LSTM	2.38
Conv-Conv-Pooling-LSTM	2.58
Conv-Pooling-LSTM-LSTM	2.56
Conv-Conv-Pooling-LSTM-LSTM	2.39

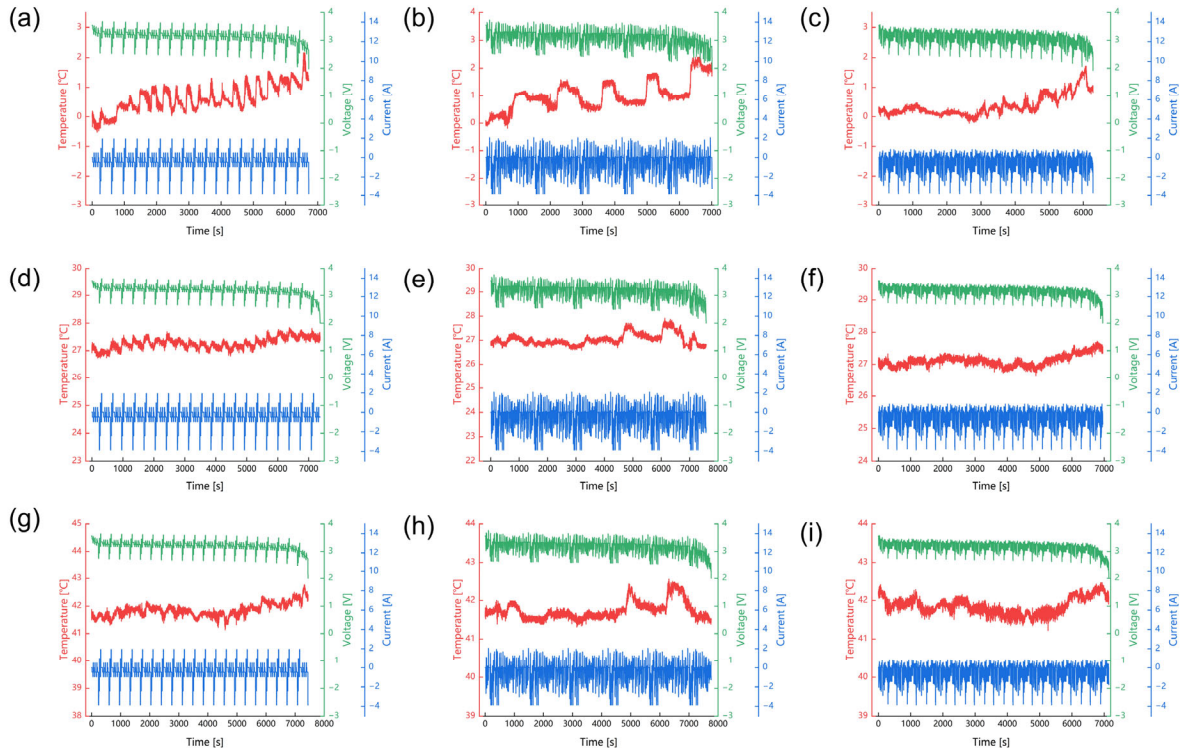


Figure S2. Current profiles and measured voltage and temperature under different driving cycles and different

temperatures. (a), (b) and (c) donate DST, FUDS and US06 at 0°C, and (d), (e) and (f) are for 25°C, (g), (h) and (i)

are for 40°C, respectively.

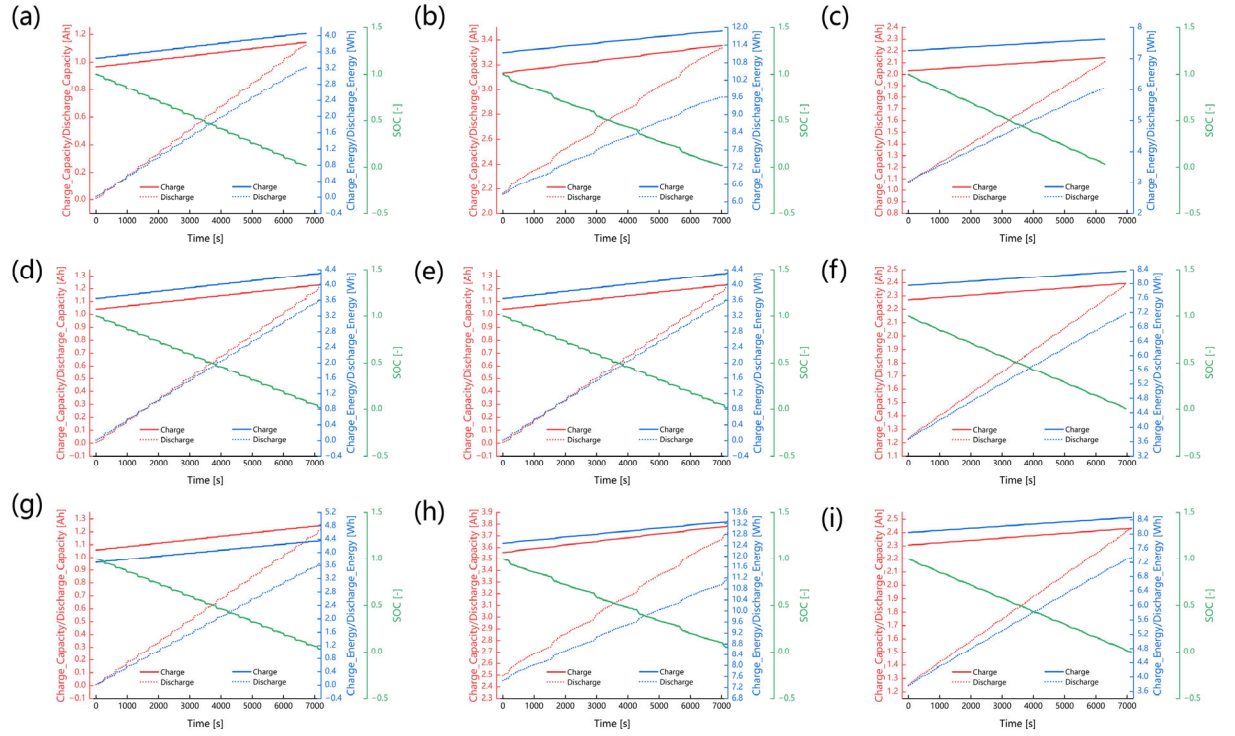


Figure S3. Other variable values including charge capacity, discharge capacity, charge energy and discharge

energy for the dataset under different driving cycles and different temperatures. (a), (b) and (c) donate DST, FUDS

and US06 at 0°C, and (d), (e) and (f) are for 25°C, (g), (h) and (i) are for 40°C, respectively.

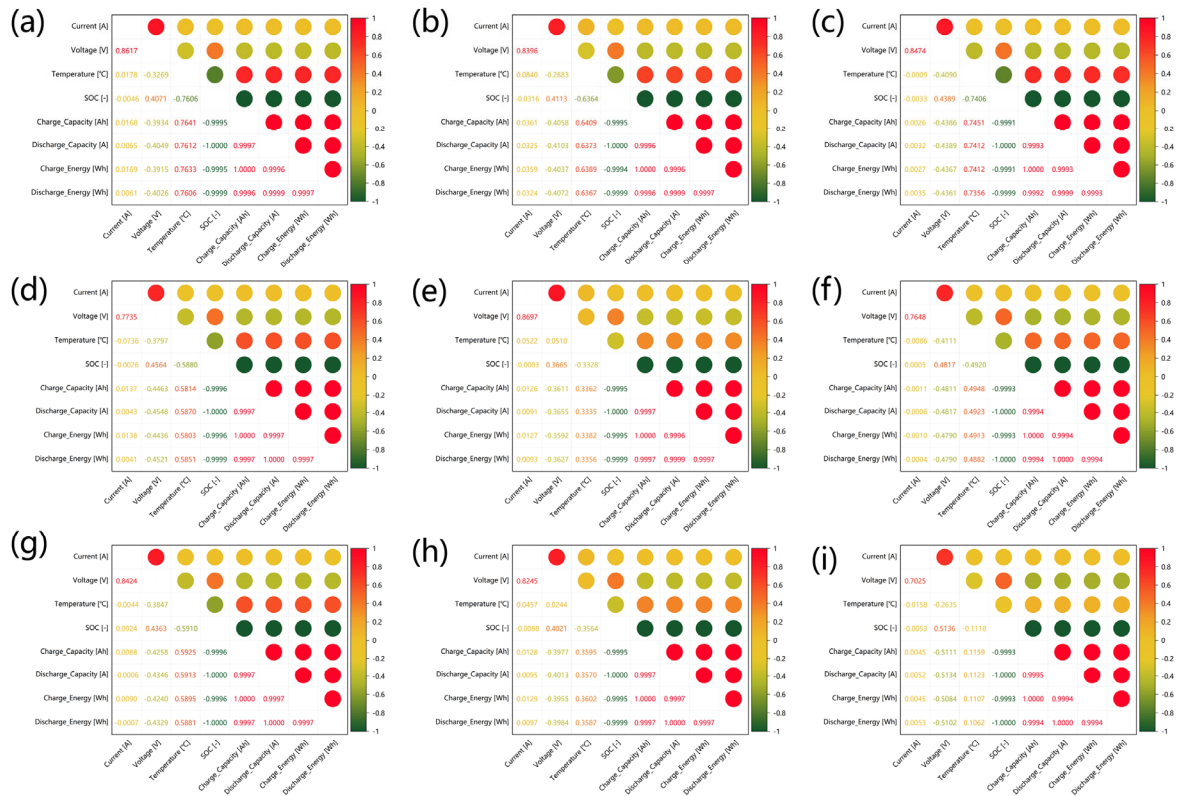


Figure S4. Correlation analysis for the variable values with SOC.