

Online-applicable temperature prediction module for electric vehicle (EV) battery

Taejin Kim¹, Hyunjae Kim¹, and *Byeng D. Youn¹

¹School of Mechanical and Aerospace Engineering, Seoul National University, Korea

*Corresponding author: bdyoun@snu.ac.kr

A thermal runaway is mainly responsible for battery failures. From the perspective of battery failure, it is most important to monitor and manage the battery temperature. Currently an electric vehicle (EV) employs sensor-based technology for temperature monitoring. This, however, causes other problems such as the increase of a maintenance cost due to sensor malfunction. This demands an effective temperature monitoring technique while maintaining high monitoring accuracy. This research thus proposes an online applicable temperature prediction module, which replace some thermal sensors for an online temperature monitoring technique for the EV battery pack. The temperature prediction module can be developed in two ways. First, the artificial neural network (ANN) can be used to develop pack level temperature estimation with reduced number of sensors. Second, Kalman filter is used to estimation cell level temperature without a sensor. Two case studies will be used to demonstrate the effectiveness of each proposed idea for the EV battery.

Keywords: Li-ion battery, Temperature estimation, ANN, Kalman filter