Oxford Brookes University
School of Engineering, Computing and Mathematics

Own Project Proposal Form

Student Name: Nicholas Muir
Student Number: 17053998
Subject Area: Engineering

Project Title/Topic: Developing an AI driven statistical model to parameterise electrochemical lithium-ion battery models

Description of Project (including industrial or research relevance):
Using software such as Julia for its statistical model capability for electrochemical battery models and integrating machine learning based algorithms to further parameterise the behaviour of lithium-ion cells.

Main Aim and Objectives and Outline Specification:
The key aim would be to produce a piece of software to closely validate the real-life cell data to the AI based model. The individual aims are as follows:

- State the relevance of the physical battery model and show the limitations RC battery models
- Perform a sensitivity analysis with Julia to show statistical relevance to the model for the ~26 possible variables of physical electrochemical modelling variables
- Research different machine learning or generation-based AI algorithms to find which is a suitable fit to Julia
- Implement the AI driven technique to software and get preliminary results
- Validate the data generated against real life measurements to show the validity and performance of the model

Expected Outcome:

To produce a systematic methodology for data-driven battery models and a software tool to accurately predicted electrochemical models with validation from real life measurements

Sponsor (if any):
HVES

Date: 06/12/2021