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Topic

“**Feature analysis** for rapid battery testing based on a mechanistic battery model”

Description

Due to fluctuating availability of renewable energies, the importance of **energy storage systems** (ESS) increases. Based on their high energy efficiency, batteries are one trending technology to store electrical energy. However, the production of batteries is afflicted with large ecological side effects. Volfang is a start-up which addresses this problem by building ESSs based on 2nd-life batteries of electrical vehicles. Thereby the lifespan of those batteries can be improved significantly.

The analysis of **battery degradation** is a complex task, yet it is crucial for 2nd-life batteries to ensure good quality and safety in their refurbished application. An extensive testing of battery modules often takes multiple days, which makes it economically difficult to compete against ESSs, built with new batteries. Thus, a quick and reliable testing method is required for 2nd-life batteries to be competitive with new batteries not only ecologically but also economically. However, **rapid testing** requires precise knowledge of the battery to be tested, as the information gathered in a rapid test is limited. Hence, our goal is to conduct a study of favourable features that can be tested in a short amount of time with a maximum output of information about the battery’s level of degradation.

The feature study is to be executed based on a **mechanistic battery model**, wherewith several degradation paths of a battery type are to be simulated. Based on the received data, favourable features that provide sufficient information for estimating the battery degradation, need to be found . The thesis will be under the guidance of one of the **inventors developers** of the mechanistic battery model who is one of the leading battery researchers in the field.

You should bring...

- A technological field of study
- Programming experience with e.g. python, MATLAB.
- Experience with machine learning methods and common libraries like Tensorflow or Pytorch
- You enjoy working through vast amounts of data, clearing them up and finding correlations.
- Good english knowledge
- Right motivation and focus

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Paid Master Thesis



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Deine Volfang.



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