

Abschlussvortrag Research Track Franck Andy Dzoupet Yimtchi

"Explainable deep learning for battery life prediction"

Battery degradation remains a critical challenge in the pursuit of green technologies and sustainable energy solutions. Despite significant research efforts, predicting battery capacity loss accurately remains a formidable task due to its complex nature, influenced by both aging and cycling behaviors. Current deep-learning methods, e.g. convolutional neural networks (CNNs), frequently struggle to provide precise predictions of battery life. To address these challenges, we propose the use of explainable deep learning techniques. By employing explainable deep learning, we aim to gain deeper insights into the behavior and decision-making processes of these models. CNNs and transformers are employed to predict the remaining useful life (RUL), as a common measure that indicates the remaining operational cycles a battery can complete before falling below a specified performance threshold. Further, the Grad-CAM (gradient-weighted class activation mapping) method is utilized to better understand how these deep-learning models make predictions for the RUL task. Results show that this enhanced understanding can help identify and rectify the shortcomings in existing approaches, thus improving their accuracy and reliability in predicting battery life.

Betreuer der Arbeit:	Prof. Dr. Andreas Rausch, Dr. Stefan Wittek
Datum:	Dienstag, 13. Mai 2025, 16:00 Uhr
	Online-Meeting über BBB
	Link: https://webconf.tu-clausthal.de/rooms/sim-uc9-rvy/join