

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Mittwoch, 25. Januar 2023, 14:00 Uhr

Hörsaal des Zuse-Institutes Berlin

(Takustr.7, 14195 Berlin)

Disputation über die Doktorarbeit von

Herrn Peter Tillmann

Thema der Dissertation:

Optimizing bifacial tandem solar cells for realistic operation conditions

Thema der Disputation:

Application of layer-wise relevance propagation for explainable neural networks in image recognition

Die Arbeit wurde unter der Betreuung von **Prof. Dr. C. Schütte** durchgeführt.

Abstract: Neural networks are a powerful technique for machine learning and artificial intelligence. The subtype of convolutional neural networks is especially suited image recognition and has led to a wide range of applications such as autonomous driving, automated classification of medical images and facial recognition. For many of these applications it is desirable to get an understanding of the relevant image features and decision process of the neural network. Layer-wise relevance propagation is a common method to improve the explainability of neural networks. In this talk, I will present the algorithm for layer-wise relevance propagation and show examples how it helps to better understand the decision process of neural networks.

As a small case study, I partially reproduced results from a publication on automated detection of COVID-19 induced anomalies in thorax X-ray images with neural networks. These results detected COVID-19 with a very high detection accuracy. However, with layer-wise relevance propagation it is shown that the neural network at least partially learned to discriminate between the text annotations in the images instead of truly detecting COVID-19 induced thorax anomalies.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. C. Schütte