A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

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D I S P U T A T I O N

Dienstag, 13. Juli 2021, 11:30 Uhr

WebEx

Disputation über die Doktorarbeit von

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Thema der Dissertation:

Data-driven Disease Assessment from time-resolved Fluorescence Optical Imaging

Thema der Disputation:

Generative Adversarial Networks

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

Abstract: In biological and medical imaging, data acquisition and data annotation are expensive. However, for methods such as Convolutional Neural Networks (CNN), large annotated datasets are required for good results. Generative Adversarial Networks (GANs) can generate images, that resemble the data that they have been trained on [1]. In contrast to other generative approaches, GANs do not require the optimization of a loss function, that quantifies the reconstruction error. GANs consist of a generative model G and a discriminative model D, which are trained simultaneously in a minmax two-player game. While training of D aims to maximize the probability of correctly distinguishing generated from original samples, G aims to fool D. This is achieved by minimizing the probability for a classification as generated sample, making D the error function. Eventually, G captures the distribution of the original data and generates new samples. This approach can be used to generate artificial samples of medical images, such as computed tomography (CT), which can subsequently be used to pre-train a classification model. This way, it is possible to train a CNN that distinguishes highly accurate between benign and malignant pulmonary nodules in CT images using only 60 samples [2]. Compared to using only augmentation, this approach increases the accuracy by approx. 20%. In this talk, I will explain the theoretical background of GANs and highlight the applicability in a medical imaging problem.
[1]: https://papers.nips.cc/paper/5423-generative-adversarial-nets
[2]: https://doi.org/10.1155/2019/6051939

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