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, 30. Juni 2021, 10:00 Uhr

WebEx

Disputation über die Doktorarbeit von

Herrn Roman Schulte-Sasse

Thema der Dissertation:

Integration of Multi-Omics Data with Graph Convolutional Networks to Identify Cancer-Associated Genes

Thema der Disputation:

Deep Learning on Graphs

Die Arbeit wurde unter der Betreuung von **Prof. Dr. A. Marsico** durchgeführt.

Abstract: The increase in available high-throughput molecular data creates computational challenges for the identification of cancer genes. Genetic as well as non-genetic causes contribute to tumorigenesis, and this necessitates the development of predictive models to effectively integrate different data modalities while being interpretable. In this talk, I will introduce EMOGI, an explainable machine learning method based on graph convolutional networks to predict cancer genes by combining multiomics pan-cancer data—such as mutations, copy number changes, DNA methylation and gene expression—together with protein–protein interaction (PPI) networks. EMOGI was on average more accurate than other methods across different PPI networks and datasets.
By using layer-wise relevance propagation, we were able to stratify genes according to whether their classification was driven by the interactome or any of the omics levels, and to identify important modules in the PPI network. We propose 165 novel cancer genes that do not necessarily harbour recurrent alterations but interact with known cancer genes, and we show that they correspond to essential genes from loss-of-function screens. We believe that our method can open new avenues in precision oncology and be applied to predict biomarkers for other complex diseases.

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

Interessierte werden hiermit herzlich eingeladen

Die Vorsitzende der Promotionskommission
Prof. Dr. A. Marsico