Machine Learning and ontologies in biomedical research

Visiting Guest Lecture and Seminar
Professor Robert Hoehndorf, KAUST, Saudi Arabia
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The life sciences have invested significant resources in the development and application of semantic technologies to make research data accessible and interlinked, and to enable the integration and analysis of data. Utilizing the semantics associated with research data in data analysis approaches is often challenging. Now, novel methods are becoming available that combine symbolic methods and statistical methods in Artificial Intelligence. In my talk, I will describe how to apply knowledge graph embeddings for analysis of biological and biomedical data, in particular identification of gene-disease associations and drug targets. I will also show how information from text-mining can be combined in a multi-modal machine learning model to further improve predictive performance of these models, and how these methods can help to improve interpretation of causative genomic variants in personal genomic sequence data.

Bio:
Robert Hoehndorf is an Assistant Professor in Computer Science at King Abdullah University of Science and Technology. His research focuses on the applications of artificial intelligence in biology and biomedicine. Robert has developed several methods that combine deep learning and symbolic AI (formal logics, knowledge representation, ontologies) in biology and bio-medicine, and is developing some of the world's leading systems for protein function prediction, finding gene-disease association, and identifying causative variants in genomic sequences. He is an associate editor for the Journal of Biomedical Semantics, BMC Bioinformatics, Applied Ontology, and editorial board member of the journal Data Science. He published over 90 research papers in journals and international conferences in the area of artificial intelligence in health and life sciences.

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