UNIVERSITY OF PASSAU
Faculty of Business Administration and Economics

A cordial invitation to the opening talk of the
Brown Bag Seminar
Recent Developments in Data Science:

Seeing a Forest through its Trees: Recent Enhancements on Born-Again Tree Ensembles for Interpretable Machine Learning

by
Maximilian Schiffer

Date:	21.06.2021 (Monday) at 11:00
Location:	Zoom
Link and further information:	Course 39740 Seminar: Doctoral Seminar "Recent Developments in Data Science" in Stud.IP

https://www.wiwi.uni-passau.de/forschung/brown-bag-seminar-rdds/

Abstract:

The use of machine learning algorithms in finance, medicine, and criminal justice can profoundly impact human lives. Consequently, research into explainable and interpretable machine learning has rapidly grown in an attempt to better control and fix possible sources of mistakes and biases. This seminar consists of two parts. In the first part, we will concisely review recent enhancements in the field of interpretable and explainable machine learning, particularly to obtain a general understanding of the definition, differences, and limitations of explain ability and interpretability in machine learning applications. In the second part, we will then focus on tree ensembles, which constitute a core technique for prediction and classification tasks, and have been used in various application fields. Tree ensembles offer a good prediction quality in various domains, but the concurrent use of multiple trees reduces the interpretability of the ensemble. Against this background, we study born-again tree ensembles, i.e., the process of constructing a single decision tree of minimum size that reproduces the exact same behavior as a given tree ensemble in its entire feature space. We will discuss how to construct such a tree using a dynamic-programming based algorithm that exploits sophisticated pruning and bounding rules to reduce the number of recursive calls. This algorithm generates optimal born-again trees for many datasets of practical interest, leading to classifiers that are typically simpler and more interpretable without any other form of compromise.

Speakers:

Prof. Dr. Maximilian Schiffer

Dr. Maximilian Schiffer is a tenure track Assistant Professor of Operations and Supply Chain Management at TUM School of Management, Technical University of Munich. Before joining TU Munich, he was a visiting postdoctoral scholar at Stanford University and a postdoctoral scholar at RWTH Aachen University. Dr. Schiffer is an associate member of the GERAD. He received a Ph.D. degree in operations research from RWTH Aachen University in 2017. Prof. Schiffer's expertise lies in the fields of Prescriptive Analytics, Operations Research, Machine Learning, and Data Science applied to various application fields, e.g., transportation problems, supply chains, production networks, and big data. His research currently focuses on electric vehicles, autonomous systems, interpretable machine learning, as well as innovative applications in supply chain and production management. He is the recipient of several awards, including the INFORMS TSL Dissertation Award and the GOR Doctoral Dissertation Award. He is currently serving on the editorial board of OR Spectrum and Transportation Research Part C.