PhD research topic proposal

BME, Doctoral School of Mathematics and Computer Science

Name and degree of supervisors : Kovács Edith Alice, PhD

Are you willing to supervise Stipendium Hungaricum applicants?

No

Title of the topic: **New Directions in Machine Learning Based on Structure Learning**

Short description:

Probabilistic graphical models utilize graph structures to represent dependencies and conditional independence among random variables. These models include directed acyclic graphs called Bayesian networks and undirected graphs called Markov networks. Such representations offer interpretable insights into complex data, making them valuable tools for decision-makers.

The primary objective of this PhD research is to develop novel machine learning methods for clustering and classification by uncovering the underlying data structures. Additionally, it aims to provide interpretable, probabilistic insights into the results, enabling users to better understand the outcomes.

Among the objectives of this thesis is the application of structural learning to detect anomalies while also uncovering their potential causes. These methods will be adapted to tackle real-world challenges across diverse fields, with specific applications determined by the candidate's interests and expertise.

Requirements: An MSc degree in (applied) mathematics, engineering, or computer science, with a background in probability and statistics. Prior experience with machine learning and programming skills in Python and/or R are an advantage.

Contact:

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Place of work:

Department of Analysis and Operations Research, Institute of Mathematics BME