PhD research topic proposal

BME, Doctoral School of Mathematics and Computer Science

Name and degree of supervisor :

Roland Molontay, PhD

Are you willing to supervise Stipendium Hungaricum applicants?

Yes

Title of the topic:

Interpretable machine learning and network science in anomaly detection

Short description:

Interpretable machine learning models enable the identification of unusual patterns and outliers in data, providing insights into the underlying reasons behind anomalies. By enhancing the explainability of machine learning results, these models facilitate a deeper understanding of complex data patterns, thus improving the accuracy of anomaly detection systems. In addition, network science tools play a crucial role in anomaly detection by uncovering irregularities and deviations within intricate networks of interconnected data points.

The aim of the PhD program is to research and develop interpretable machine learning and network science methods that facilitate the easier detection of anomalies in both structured and unstructured data. The research can be diversified based on the applicant's interests and experience, examining log anomalies in industrial environments, anomalies related to cryptocurrencies, and anomalies associated with procurement procedures.

Requirements: An MSc degree in (applied) mathematics, physics, or computer science with a solid background in graph theory, algorithms, probability, statistics and machine learning. Strong programming skills (preferably in Python and/or R) are needed. Prior experience with complex networks and interpretable machine learning is an advantage.

Contact:

E-mail:

molontay@math.bme.hu

Place of work:

Human and Social Data Science Lab, Department of Stochastics, Institute of Mathematics, BME