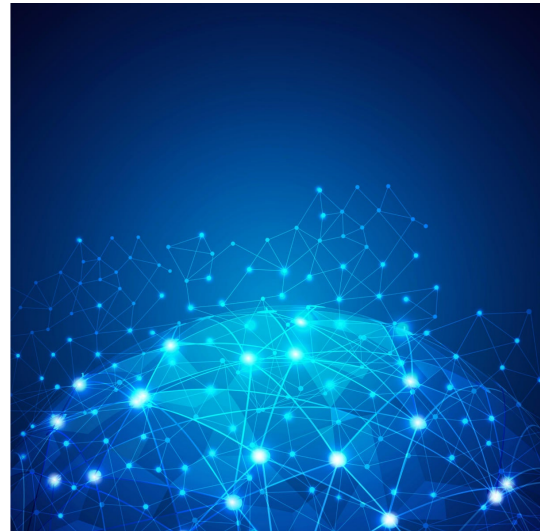




## Graph Neural Networks for Financial Crime Analysis

Neural networks have become the go-to approach for learning from many different types of data, be it text, images, medical scans or audio. Recently, they have also been designed and applied with increasing success to graph data. Graph neural networks have achieved great success with social networks, knowledge graphs, chemistry, or physics simulations. These models are mostly based on the message passing framework, where nodes exchange messages over the edges and update their states based on all of the aggregated incoming messages. When analysing networks, subgraph patterns, such as cycles, cliques, and motifs, are often highly informative features. However, standard Graph Neural Network (GNN) architectures are severely limited in terms of the type and the complexity of the subgraph patterns they can discover.



In this project, we will explore ways of increasing the expressive power of GNNs to surpass the pattern detection capabilities of the current state-of-the-art networks. The goal is to improve the accuracy of results, whilst ensuring a scalable solution. Our models will in particular be applied to financial transaction network data to detect criminal activity, such as money laundering and credit-card fraud. Note that this will be an **external Master's thesis** in collaboration with a company. The duration will be 4-6 months.

**Requirements:** Strong background in machine learning, data science, and deep learning. Hands-on experience with Python, PyTorch, GNNs and PyTorch Geometric is an advantage as well as knowledge in graph theory, distributed computing and graph neural networks. We will have weekly meetings to address questions, discuss progress and think about future ideas.

**Interested? Please contact us for more details!**

### Contact

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