Accenture
Graph Machine Learning for Healthcare

About the Organisation

Accenture Labs are Accenture's dedicated arm of research and development.
We are focused on solving critical business problems with advanced technology, bringing fresh insights and innovations to our clients, helping them capitalize on dramatic changes in technology, business and society. Our dedicated team of technologists and researchers work with leaders across the company to invest in, incubate and deliver breakthrough ideas and solutions that help our clients create new sources of business advantage.
At Accenture Labs Dublin, based at The Dock, we focus on Artificial Intelligence technologies and systems like explainable AI, knowledge discovery and computational creativity applied to business areas as diverse as healthcare, life science, workforce, supply chain and consumer products.

Role Description and Responsibilities

Project Title: Graph Machine Learning for Healthcare

Analysis Methods: Deep Learning, Knowledge Graphs, Graph Machine Learning

Broader Objectives: Design graph machine learning models to infer complex relations from biomedical knowledge graphs.

Data Sources: Accenture's large dataset of structured real-world clinical records. Publicly available datasets on population-level multi-omics data (genomic, biological pathways, diseases, drugs, etc).

Recent advances such as Graph Neural Networks and Knowledge Graph Embeddings have been used successfully to predict missing, unseen edges in large graph databases [1,2,3]. Accenture Labs adopt them in client projects for drug discovery, oncology decision-support, and clinical research hypothesis verification.

Despite an excellent trade-off between predictive power and scalability, many aspects of these architectures are still under research scrutiny. Graph machine learning research directions include supporting multi-hop complex reasoning, time-awareness, learning in an incremental fashion or with few examples, leveraging multi-modal data, ensuring human interpretability, uncertainty quantification, just to name a few [5,6]. An area of significant interest is the interplay with large (biomedical) language models, to refine output generation with the help of structured graph information.

The research intern will join a precision medicine project and will be in charge of designing,

implementing, and evaluating novel principled ways to tackle one or more research problems listed above, with the ultimate goal of inferring knowledge from incomplete clinical and genomic knowledge graphs. The intern is expected to explore and experiment with a range of techniques from prior art, propose original research, and implement ideas that will be validated with the research team in Accenture Labs Dublin.

Expected Outcomes

Expected outcomes: Software prototype, technical report, submission to major AI academic conference (open publication policy), opportunity to contribute to our open-sourced graph machine learning library [4].

[1] https://kge-tutorial-ecai2020.github.io/

[2] https://www.cs.mcgill.ca/~wlh/grl_book/

[3] https://arxiv.org/abs/2004.14843

[4] https://github.com/Accenture/AmpliGraph

[5] https://arxiv.org/abs/2012.05876

[6] https://arxiv.org/abs/2011.03459

Supervision and Mentorship

On-site supervision by XX and other members of the research team in Accenture Labs Dublin.

Ideal Intern

The key requirements we are looking for in the ideal candidate are:

• Strong academic background in machine learning/deep learning methodology, especially with deep generative networks.

• Strong proficiency in at least one programming language, ideally Python, and relevant toolboxes: Scikit-Learn, Tensorflow, Keras.

• Strong proficiency in working with software version control, e.g., Git.

• Interest in solving real-world scientific problems and in acquiring commercial awareness

• Demonstrable experience of performing well both when working part of a team and individually

• Ability to pause your PhD for the duration of the internship and return subsequently

We invite applicants to include in the application form any relevant links to illustrate programming experience (e.g. GitHub handle) and scientific accomplishments (e.g. Google Scholar, dblp, arXiv links, personal homepage).

Internship Logistics

Turing Internship Network

This internship will be based in Accenture, Dublin. The internship will not be remote and requires relocation to Dublin, Ireland.

The start date is expected to be XX, although this date is negotiable.

The duration will be 6 months.

The remuneration will be pro-rated, based on an equivalent annual salary of €40k.

This is a full-time position, and we regret that we are unable to consider part-time applications.