Hussain Hussain

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EDUCATION

PhD in Computer Science (Ongoing) — Dec 2019 – Dec 2023 (expected)
Graz University of Technology — Graz, Austria

- My research focuses on graph neural networks (GNNs) and their robustness and fairness, aiming to understand GNNs behavior from the perspective of graph structural characteristics, such as homophily, node centrality and structural similarity.
- Advisor: Prof. Roman Kern

MSc in Computer Science; *graduated with distinction* — Oct 2017 – Nov 2019
Graz University of Technology — Graz, Austria

- Thesis title: **Graph Embedding for Trust-based Recommender Systems**
- Advisor: Prof. Denis Helic

EXPERIENCE

University Assistant — Dec 2020 – Present
Graz University of Technology — Graz, Austria

- **Teaching**: **Databases** (706.010) and **Data Management** (INF.02018UF) - responsible for the practical part. **Knowledge Discovery and Data Mining 2** (706.715) [link] - lecture about **graph mining** in addition to supervising students projects in this course and in **Natural Language Processing** (706.230) [link].
- Advising master's and bachelor's **projects/theses**.
- I **organize the TU Graz Data Team** [link], where students jointly participate in open data science challenges.
- **Other projects**: Multivariate time series anomaly detection and exploration in aircraft engines; Parameter estimation for injection molding machines.

Data Science Researcher — May 2019 – Present
Know Center GmbH — Graz, Austria

- **Molecule toxicology classification** using dimensionality reduction methods [publication].
- **Text-aware knowledge graph completion** leveraging BERT's context-awareness via neighborhood aggregation [publication].
- **Information extraction** from technical requirement specification. I developed a method using iterations of weakly supervised learning.

Software Engineer — Nov 2017 – May 2019
SSI Schäfer Software Solutions GmbH — Graz, Austria

- Implementing **communication protocols** within an automated logistic system.
- Defining and detecting **system deadlocks** and implementing test units for corner cases.

PUBLICATIONS

1. **Hussain Hussain**, Meng Cao, Sandipan Sikdar, Denis Helic, Elisabeth Lex, Markus Strohmaier, Roman Kern
Adversarial Inter-Group Link Injection Degrades the Fairness of Graph Neural Networks, *22nd IEEE International Conference on Data Mining (IEEE ICDM 2022).* [paper] [code]

2. **Hussain Hussain**, Tomislav Duricic, Elisabeth Lex, Denis Helic, Roman Kern
The interplay between communities and homophily in semi-supervised classification using graph neural networks, *Applied Network Science 6, 80 (2021).* [paper] [code]

3. **Hussain Hussain**, Tomislav Duricic, Elisabeth Lex, Denis Helic, Markus Strohmaier, Roman Kern
Structack: Structure-based Adversarial Attacks on Graph Neural Networks, *Proceedings of the 32st ACM Conference on Hypertext and Social Media. 2021.* [paper] [code]

4. Mario Lovrić, Tomislav Duricic, Han TN Tran, **Hussain Hussain**, Emanuel Lacić, Morten A Rasmussen, Roman Kern
Should We Embed in Chemistry? A Comparison of Unsupervised Transfer Learning with PCA, UMAP, and VAE on Molecular Fingerprints, *Pharmaceuticals 14 (8), 758.* [paper]

5. Xinglan Liu, **Hussain Hussain**, Houssam Razouk, Roman Kern
Effective Use of BERT in Graph Embeddings for Sparse Knowledge Graph Completion, *ACM/SIGAPP 2022 790-793.* [link]

6. **Hussain Hussain**, Tomislav Duricic, Elisabeth Lex, Roman Kern, Denis Helic
On the Impact of Communities on Semi-supervised Classification Using Graph Neural Networks - *International Conference on Complex Networks and Their Applications 2020, 15-26.* [paper] [code]

7. Tomislav Duricic, **Hussain Hussain**, Emanuel Lacic, Dominik Kowald, Denis Helic, Elisabeth Lex
Empirical Comparison of Graph Embeddings for Trust-Based Collaborative Filtering - *International Symposium on Methodologies for Intelligent Systems 2020, 181-191.* [paper]

TECHNICAL SKILLS

- **Languages.** Python, Java, C++.
- **Tools/Frameworks.** Tensorflow, Pytorch, NumPy, Pandas, Matplotlib, NetworkX, Pytorch Geometric, DGL, SpaCy.

SERVICES AND PROGRAMMING AWARDS

- **Reviewer**: KDD 2022, ISMIS 2022, LoG 2022, TheWebConf 2023, WebSci 2023
- Catalyst Coding Contest: 1st place in Graz **(top 1% worldwide)**.   2019
- Catalyst Coding Contest: 2nd place in Graz **(top 5% worldwide)**.   2018
- ACM-ICPC (programming contest) **world finalist** and **regional medalist** [Full ICPC record].   2013-2018
  ACM-ICPC is the largest programming contest in the world.