Pengyu Zhang

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INtelligent Data Engineering Lab, University of Amsterdam | Third-year Ph.D. Student
Research Interests: Temporal Knowledge Graphs, Knowledge Acquisition

RESEARCH STATEMENT

I develop time-aware models for multimodal knowledge graphs. My research focuses on combating temporal degradation in entity linking through dynamic contrastive learning, graph-text fusion, and low-degree node enhancement. My long-term goal is to design robust, adaptive KGs that reflect the evolution of knowledge.

EDUCATION

- **University of Amsterdam**, Netherlands — Oct 2022 - Present
  Ph.D. in Informatics, INtelligent Data Engineering Lab
  Supervisor: Prof. Dr. Paul Groth and Dr. Klim Zaporojets
- **Beijing University of Technology**, China — Sep 2019 - Jul 2022
  Master of Science in Control Engineering
  Supervisor: Prof. Dr. Yong Zhang
- **Shenyang Institute of Technology**, China — Sep 2010 - Jul 2014
  Bachelor of Engineering in Automation

PUBLICATIONS

- **Pengyu Zhang**, Congfeng Cao, Klim Zaporojets, Paul Groth. CYCLE: Cross-Year Contrastive Learning in Entity-Linking. Proceedings of the 33rd ACM International Conference on Information and Knowledge Management. 2024. paper, code
- **Pengyu Zhang**, Congfeng Cao, Paul Groth. TIGER: Temporally Improved Graph Entity Linker. ECAI 2024. IOS Press, 2024. 3733-3740. paper, code
- James Nevin, **Pengyu Zhang**, Dimitar Dimitrov, Michael Lees, Paul Groth, Stefan Dietze. Understanding the Impact of Entity Linking on the Topology of Entity Co-occurrence Networks for Social Media Analysis. International Conference on Knowledge Engineering and Knowledge Management. Cham: Springer Nature Switzerland, 2024. paper, code
- **Pengyu Zhang**, Yong Zhang, Xinglin Piao, Yongliang Sun, Baocai Yin. Relationship updating network with contrastive learning. Physica A: Statistical Mechanics and its Applications. 646 (2024): 129874. paper, code
- **Pengyu Zhang**, Yong Zhang, Jingcheng Wang, Baocai Yin. MVMA-GCN: Multi-view Multi-layer Attention Graph Convolutional Networks. Engineering Applications of Artificial Intelligence. 126 (2023): 106717. paper, code

- **Pengyu Zhang**, Yong Zhang, Yanjie Cui and Baocai Yin. Visual Analysis for Name Disambiguation of Academic Papers. (in Chinese) Journal of Computer-Aided Design and Computer Graphics. 2022, 34(11): 1659-1672. (CCF-A, EI). paper, video, video
- Xin Zheng, **Pengyu Zhang**, Yanjie Cui, Rong Du and Yong Zhang. Dual-Channel Heterogeneous Graph Network for Author Name Disambiguation. Information 12.9 (2021): 383. paper, code

RESEARCH PROJECTS

- **CYCLE**
  - Proposed a dynamic contrastive mechanism using temporal signals to mitigate temporal degradation in entity linking tasks.
  - Enhanced the performance of low-degree nodes by leveraging structural fairness and joint graph-text modeling.
- **TIGER**
  - Designed a model that fuses graph-based and text-based information to improve temporal robustness in entity linking.
  - Addressed performance degradation caused by evolving entity descriptions in temporal knowledge graphs.
- **RUNCL**
  - Tackled low-degree node performance degradation by incorporating graph generation and optimal neighborhood selection.
  - Improved node classification performance on GNN benchmarks with skewed degree distributions.
- **MVMA-GCN**
  - Introduced a multi-view, multi-layer attention mechanism to model diverse node relationships and link types.
  - Optimized semi-supervised node embeddings using Hilbert-Schmidt independence criteria for relation disentanglement.
- **Visual Analytics for Name Disambiguation**
  - Built a visualization system for academic social networks to support name disambiguation in publication databases.
  - Responsible for data preprocessing, interface design, and interactive module implementation across multiple views.