Tao Xiang

Technical University of Munich | xiang.tao@outlook.de | https://leoxiang66.github.io/

EDUCATION

Technical University of Munich (2021 - 2024)
M.Sc. Computer Science
Grade: 1.7/5.0 (1.0 is the best)
Thesis: Persistent Memory Dialogue Systems Based on Knowledge Graphs

- Supervisor: Prof. Dr. Enkelejda Kasneci

Technical University of Munich (2018 - 2021)
B.Sc. Computer Science
Grade: 2.3/5.0 (passed with merit)
Thesis: Extending a Newton-CG Second-order Optimizer to Natural Language Processing

- Supervisor: Prof. Dr. Hans-Joachim Bungartz

RESEARCH EXPERIENCE

Research Assistant (Mar. 2023 - Sep. 2023)
Chair for Human-Centered Technologies for Learning
TUM School of Social Sciences and Technology
Project: PEER (https://www.edu.sot.tum.de/hctl/forschung/peer/). A project aimed at assisting German primary and secondary school students in improving and optimizing their essays, utilizing state-of-the-art NLP techniques such as LLMs (Large Language Models).

- I was involved in the development of a web and mobile application for data collection and assisted with data preprocessing. The project is currently ongoing, and the collected data will be utilized to train a language model capable of generating feedback for input essays.
- GitHub: https://github.com/Kasneci-Lab/AI-assisted-writing
- Paper (published): Kathrin Seßler, Tao Xiang, Lukas Bogenrieder, and Enkelejda Kasneci. “Peer: Empowering Writing with Large Language Models.” SpringerLink, January 1, 1970. https://link.springer.com/chapter/10.1007/978-3-031-42682-7_73.

Research Intern (Nov. 2022- May. 2023)
Chair of Software Engineering for Business Information Systems (sebis)
Department of Computer Science
TUM School of Computation, Information and Technology
SAP SE

Guided research: https://wwwmatthes.in.tum.de/pages/10smssz0f49ed/Guided-Research-Tao-Xiang
Topic: Generative Question Answering for a Chatbot in the Human Resources Domain.

- The project is designed to tackle the issue of the excess number of support tickets annually within the HR sector of the German IT company, SAP SE. To alleviate manual labor and enhance response efficiency, we trained a generative QA chatbot using the internal dataset provided by SAP SE. Moreover, to address the issue of insufficient computational resources due to excessively long inputs, we explored and compared the performance of efficient transformers (LongT5) and regular Transformers (T5).
- Paper (accepted): A Semi-Automatic light-weight Approach towards Data Generation for a Domain-Specific FAQ chatbot using Human-in-the-Loop. Anum Afzal, Tao Xiang, Hugo Pitorro and Florian Matthes

Course: Nonlinear system identification based on Machine Learning (Oct. 2022 - Jan. 2023)
TUM School of Engineering and Designand & Southeast University

A project that employs machine learning and deep learning algorithms to identify parameters of non-linear systems.

- As a co-first author, I participated in data preprocessing and conducted experiments with sequence-oriented neural networks, including LSTM and Transformers.
- Paper (published): Weixuan Yuan*, Rui Zhu*, Tao Xiang*, Stefano Marchesiello, Dario Anastasio, and Qingguo Fei. “Nonlinear System Identification Using Audio-Inspired WaveNet Deep Neural Networks.” AIAA Journal, 2023, 1–9. https://doi.org/10.2514/1.j062860.

Interdisciplinary Project in an Application Subject (IDP) (Oct. 2022 - Mar. 2023)
TUM School of Engineering and Designand

A project that employs state-of-the-art machine learning and Natural Language Processing techniques to uncover and explore the latest promising research trends in academic fields.

- As the first author, I proposed the TrendFlow framework, manually constructed the dataset, implemented the KeyBart-adapter model, and carried out comprehensive experiments to evaluate TrendFlow's performance in research trend analysis tasks.
- GitHub
- Paper (published): Tao Xiang, Sufang Chen, Yiwei Zhang, and Rui Zhu. “Trendflow: A Machine Learning Framework for Research Trend Analysis.” Applied Sciences 13, no. 12 (2023): 7029. https://doi.org/10.3390/app13127029.

Master's Lab Course - Machine Learning for Natural Language Processing Applications (2022)
Research Group Social Computing
TUM School of Computation, Information and Technology

Topic: "PARL: A Dialog System Framework with Prompts as Actions for Reinforcement Learning"

- As the first author: proposed the idea of PARL
- The framework enhances an open-domain dialogue agent using Reinforcement Learning (RL), with the action space defined as a series of human conversational behaviors and actions defined as natural language prompts (e.g. "Give the user advice")
- GitHub: link
- Paper (published): Tao Xiang, Yangzhe Li, Monika Wintergerst, Ana Pecini, Dominika Młynarczyk, and Georg Groh. “Parl: A Dialog System Framework with Prompts as Actions for Reinforcement Learning.” Proceedings of the 15th International Conference on Agents and Artificial Intelligence, 2023. https://doi.org/10.5220/0011725200003393.

Conversational AI Workshop (2022)
Chair of Software Engineering for Business Information Systems (sebis)
Department of Computer Science
TUM School of Computation, Information and Technology

A workshop aimed at creating a knowledge-driven QA chatbot using Google's Dialogflow framework.

- A four-person's team
- Acquired skills in the areas of conversational interfaces, dialogue design, natural language understanding platforms, knowledge application and backend integration
- GitHub

Master's Seminar Course - Natural Language Processing: Methods and Applications (2022)
Chair of Software Engineering for Business Information Systems (sebis)
Department of Computer Science
TUM School of Computation, Information and Technology

Topic: "Task-Oriented Dialogue Systems: Methods and Applications"

- Studied state-of-the-art methods and technologies for task-oriented dialogue systems
- Discussed possible research direction in the future

Bachelor's Seminar Course - Computational Aspects of Machine Learning (2020-2021)
Chair of Scientific Computing
TUM School of Computation, Information and Technology

Topic: "Machine Learning as a Black Box Solution"

- Studied the basic pipeline and commonly used algorithms of Auto-ML
- Analyzed and compared the differences of various algorithms from a computational perspective

PUBLICATIONS

Published

1. Weixuan Yuan*, Rui Zhu*, Tao Xiang*, Stefano Marchesiello, Dario Anastasio, and Qingguo Fei. “Nonlinear System Identification Using Audio-Inspired WaveNet Deep Neural Networks.” AIAA Journal, 2023, 1–9. https://doi.org/10.2514/1.j062860.
2. Tao Xiang, Yangzhe Li, Monika Wintergerst, Ana Pecini, Dominika Młynarczyk, and Georg Groh. “Parl: A Dialog System Framework with Prompts as Actions for Reinforcement Learning.” Proceedings of the 15th International Conference on Agents and Artificial Intelligence, 2023. https://doi.org/10.5220/0011725200003393.
3. Tao Xiang, Sufang Chen, Yiwei Zhang, and Rui Zhu. “Trendflow: A Machine Learning Framework for Research Trend Analysis.” Applied Sciences 13, no. 12 (2023): 7029. https://doi.org/10.3390/app13127029.
4. Peng Hao, Tao Xiang, Zhehui Huang, and Chenye Tang. “The Detection of Hela Cells in Brightfield Images.” 2021 IEEE International Conference on Computer Science, Artificial Intelligence and Electronic Engineering (CSAIEE), 2021. https://doi.org/10.1109/csaiee54046.2021.9543103.
5. Kathrin Seßler, Tao Xiang, Lukas Bogenrieder, and Enkelejda Kasneci. “Peer: Empowering Writing with Large Language Models.” SpringerLink, January 1, 1970. https://link.springer.com/chapter/10.1007/978-3-031-42682-7_73.
6. Anum Afzal, Tao Xiang and Florian Matthes. “A Semi-Automatic Light-Weight Approach Towards Data Generation for a Domain-Specific FAQ Chatbot Using Human-in-the-Loop.”Proceedings of the 16th International Conference on Agents and Artificial Intelligence 2024 | Conference paper. DOI: 10.5220/0012266100003636

AWARDS

QQ BROWSER 2021 AI Algorithm Competition the 15th Place Award (￥2000) 2021

Others

- Language: Chinese (Native), English (Proficient), German (B2-C1)
- Software development: https://memomind.cn/product
- GitHub link
- HuggingFace link
- ORCID_link