

Keyu Wang

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EDUCATION

University of Tuebingen

M.Sc. in Machine Learning

Tuebingen, Germany

Oct. 2024 – Present

Current GPA: 1.28/1.0 (Germany System: 1.0 is the best, 5.0 is the lowest)

Relevant coursework: Non-convex Optimization of Deep Learning, Efficient Machine Learning in Hardware, Understanding LLMs, Statistical Machine Learning, Probabilistic Machine Learning, etc.

Southeast University

B.Eng. in Artificial Intelligence

Nanjing, China

Sep. 2020 – Jun. 2024

Cumulative GPA: 3.79/4.0, Top 10% (Chinese System: 4.0 is the best, 0 is the lowest)

Relevant coursework: Linear Algebra, Calculus, Optimization, Probability Statistics & Stochastic Processes, Data Structures, Database, Distributed Systems, Machine Learning, Deep Learning, Natural Language Processing, etc.

RESEARCH INTERESTS

- **AI Efficiency & ML Sys:** Efficient and scalable model training, fine-tuning, deployment and inference.
- **Reasoning:** Chain-of-Thought, Pretraining/RL/Inference Scaling, Sequence Modeling, Neuro-Symbolic Reasoning, etc.
- **Optimization & ML Theory:** Theory of DL and LLMs, e.g., normalization, optimization and generalization, etc.
- **Generative AI:** Large Language Models, Diffusion Models, Multimodal Large Language Models.

PUBLICATIONS

Google Scholar: <https://scholar.google.com/citations?user=IvXDjWUAAAAJ&hl=zh-CN>

- [1] **Keyu Wang**, Guilin Qi, Jiaqi Li and Songlin Zhai. “Can Large Language Models Understand DL-Lite Ontologies? An Empirical Study.” *Findings of the Association for Computational Linguistics: EMNLP 2024*, pages 2503–2519.
- [2] **Keyu Wang**, Guilin Qi, Jiaoyan Chen, Yi Huang and Tianxing Wu. “Embedding Ontologies via Incorporating Extensional and Intensional Knowledge.” *Data Intelligence*, Vol. 7, Issue 4, 1222-1241, 2024.
- [3] **Keyu Wang**, Site Li, Jiaye Li, Guilin Qi and Qiu Ji. “An Embedding-based Approach to Inconsistency-tolerant Reasoning with Inconsistent Ontologies.” *The 12th International Joint Conference on Knowledge Graphs*, 2023.

RESEARCH EXPERIENCE

Wild, Efficient, and Innovation AI Lab | ELLIS Tuebingen & MPI-IS

Research intern | Supervisor: Dr. Shiwei Liu

Tuebingen, Germany

Mar. 2025 – Present

Reasoning-aware Pruning (In Process, Paper Coming Soon)

Demystifying different roles of LLMs’ layers in terms of retrieval, knowledge, and reasoning:

- Contributed to demonstrate how evaluation metrics, multiple-choice-loglikelihood and generate-until, affect per-layer pruning performance drops, and conduct some experiments in the reasoning part.
- Preparing for the paper (second author).

Knowledge Science & Engineering Lab | Southeast University

Research intern | Supervisor: Prof. Dr. Guilin Qi

Nanjing, China

Feb. 2022 – Jun. 2024

Evaluating LLMs’ Reasoning and Understanding with Description Logic Knowledge Bases:

- Conducted an empirical evaluation for LLMs’ capability of understanding DL-Lite ontologies covering 6 tasks from syntactic and semantic aspects.
- Demonstrated that LLMs excel at understanding formal syntax and model-theoretic semantics of concepts and roles, yet struggle with negative inclusion and deductive reasoning with many instances.

Knowledge Embedding via Incorporating Extensional and Intensional Knowledge:

- Designed a dual-space ontology embedding framework EIKE combining geometry-based extensional modeling with language-based intensional embeddings to capture both structural and textual semantics.
- Achieved state-of-the-art results on triple classification and link prediction across three datasets, demonstrating EIKE’s comprehensive and representative domain understanding.

Embedding-based Rational Inconsistency-tolerant Reasoning in Description Logics:

- Proposed a monotonic selection relations for comparing maximal consistent subsets in inconsistent belief bases, extending from propositional to description logics by leveraging semantic embeddings.
- Proved seven key properties to ensure that it leads to a rational inference relation and empirically demonstrated over 10% reasoning improvement with negligible runtime overhead.

INDUSTRIAL INTERNSHIP

BSH Home Appliances Holding (China) Co., Ltd

Intern | Head: Rick Du; Mentor: Huilong An

Nanjing, China

Jul. 2023 – Jun. 2024

AI-enabled efficient R&D in Wash Machine/Dryer:

- Developed LSTM-based models to predict washing performances with different program sequences to reduce product testing costs, outperforming prior regression and decision-tree baselines.
- Built a graph knowledge base linking hardware configurations, program design, test standards, sensor data and performance metrics for Bosch & Siemens washing machines, enabling better R&D pipelines.

AWARDS

Selected Grants

- **Provincial Innovation and Entrepreneurship Project Fund for University Students** (< 5%)

Role: Lead | Value: 8000 CNY (\approx 1067 EUR)

Jul. 2022 – May. 2023

Selected Awards

- **First Prize in Advanced Mathematics Competition of Southeast University** (rank 8, < 0.5%) Apr. 2021
- **First Prize in Programming Contest of Southeast University** (rank 5, < 5%) Dec. 2020
- **Silver Medal in China Southeast Mathematical Olympiad** Jul. 2019

EXTRACURRICULAR

Student lecturer for *An Entertaining Introduction to AI at the Second Class for Students*

Sep. 2023 – Dec. 2023

Engineering leader & co-founder of AI Association of Southeast University [SEU-131AIClub]

May 2022 – Jun. 2023

Study advisor for freshman undergraduates

Sep. 2022 – Jun. 2023

SKILLS

Programming: Python (PyTorch), C/C++, Triton, Java, etc.

Tools: VS Code, Jupyter Notebook, Shell, Linux, Git, L^AT_EX, Markdown, etc.

Languages: Chinese (Native), English (Fluent, IELTS 7.5).