Keyu Wang

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EDUCATION

University of Tuebingen   Tuebingen, Germany
M.Sc. in Machine Learning   *Oct. 2024 – Present*

    Current GPA: 1.29/1.0 (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   Nanjing, China
B.Eng. in Artificial Intelligence   *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 & MLSys:** 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-toleranct
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   Tuebingen, Germany
Research intern | Supervisor: Dr. Shiwei Liu   *Mar. 2025 – Present*

    Reasoning-aware Pruning: In Process

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

- Contributed to demonstrate how evaluation metrics, e.g., multiple-choice-loglikelihood & generate-until,
affect per-layer pruning performance drops, and conduct experiments in the reasoning part.

Knowlegde Science & Engineering Lab | Southeast University   Nanjing, China
Research intern | Supervisor: Prof. Dr. Guilin Qi   *Feb. 2022 – Jun. 2024*

    Evaluating LLMs' Reasoning and Understanding with Description Logic Ontologies: [paper]

- Evaluated LLMs' capacity of understanding DL-Lite ontologies by syntax checking, instance checking,
subsumption checking, functionality checking, query answering and satisfiability checking.
- 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.

    Embedding Ontologies via Incorporating Extensional and Intensional Knowledge: [paper]

- Designed a dual-space embedding framework combining geometry-based extensional modeling with language-based intensional embeddings, achieving SOTA triple classification and link prediction.

Embedding-based Rational Inconsistency-tolerant Reasoning in Description Logics: [paper]
- Proposed a monotonic selection relation for comparing maximal consistent subsets in an inconsistent belief base, extending from propositional logic to description logics by leveraging semantic embeddings.
- Proved 7 key properties and empirically shown over 10% reasoning boosting with negligible runtime.

INDUSTRIAL INTERNSHIP

BSH Home Appliances Holding (China) Co., Ltd   Nanjing, China
Intern | Head: Rick Du; Mentor: Huilong An   *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, LaTeX, MarkDown, etc.

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