Shahab **Rahimirad**

srahimir@purdue.edu | LinkedIn | GitHub | Website | Google Scholar

SUMMARY

Computer Science PhD student at Purdue University researching large language model reasoning, reinforcement learning, and multi-agent systems. Recently published an ACL 2026 paper on graph-informed language agents for social reasoning, with additional work in adaptive decoding, RL with verifiable rewards, and theory-of-mind agents. Current research pursues interpretable reasoning in language models.

EDUCATION

Purdue University Jan. 2023 - Dec 2027 (expected)
PhD Computer Science **(3.75/4.0 GPA)**

- **Coursework:** Natural Language Processing, Reinforcement Learning, LLM Reasoning, Computer Vision

Sharif University of Technology Sep. 2016 - Aug 2021
B.S. Computer Engineering **(3.84/4.0 GPA)**

- **Coursework:** Machine Learning, Information Retrieval, Deep Learning

PUBLICATIONS

Bayesian Social Deduction with Graph-Informed Language Models *ACL 2026* (Paper | Code)
S. Rahimirad*, G. Gergerli*, L. Romero, A. Qian, M. Olson, S. Stepputtis, J. Campbell.

Sequence-Level Rényi Entropy from Particle Decoding for Adaptive LLM Reasoning *Under Review*
E. Potraghloo*, M. Heidari*, A. Pourghani*, **S. Rahimirad***, S. Azizi, S. Kundu, A. Hashemi, J. Campbell, V. Gupta

Predicting Reasoning Correctness with Sparse Autoencoder Statistics *Under Review*
S. Rahimirad, J. Campbell.

RESEARCH EXPERIENCE

PhD Researcher — Purdue University Aug. 2024 – Present
Collaborative AI for Machines and People Lab - Advisor: Joseph Campbell

- Developed GRAIL, a language agent combining factor-graph belief inference with an LLM for social deduction; achieved a 67% win rate against human players
- Fine-tune language models using reinforcement learning with verifiable rewards and symbolic helpers to improve reasoning on constraint-satisfaction tasks.
- Investigate reasoning failures using attention analysis, sparse autoencoders, and activation steering.

Undergraduate Research - Sharif University Jan. 2021 – Aug. 2021
Bachelor's Thesis - Advisor: Hamid Beigy

- Evaluated and compared RNN architectures (LSTM and GRU) and Transformers, improving over prior benchmarks across diverse corpora spanning formal, informal, and mixed-language domains

INDUSTRY EXPERIENCE

NuraFin Tech, Tehran, Iran Mar. 2021 – Dec. 2022
Data Scientist

- Built a real-time copy-trading system to replicate clients' trading strategies and automate order execution.
- Designed an ensemble method of XGBoost, Random Forest, and LSTM models for long/short signals, enabling investment specialists to achieve a 100% live return from July 2021 to June 2022 in the volatile cryptocurrencies market.
- Led a 3-person research team in developing ML algorithms and time-series forecasting for price analysis.
- Spearheaded the team's testing to achieve 98% code coverage, significantly enhancing reliability.

SKILLS

Programming Languages Python, Java, SQL, C++, C, MATLAB, R, JavaScript, Go

Frameworks/Libraries Pandas, NumPy, TorchRL, TensorFlow, PyTorch, scikit-learn, Transformers, VeRL

Tools Git, bash, slurm, Linux, Jupyter Notebook, Markdown, LaTeX, Docker, Weights & Biases, AWS cloud

Methods LLM-Finetuning, Bayesian inference, Reinforcement Learning, LLM post training, Neural network design, Mechanistic Interpretability, Computer Vision