Heydar Soudani

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About Me

I am a final-year PhD candidate at Radboud University working on ***trustworthy AI*** for information-seeking tasks. My research spans ***Retrieval-Augmented Generation***, ***deep research agents***, and ***uncertainty quantification***, with the goal of building systems that solve complex reasoning tasks and can signal when their answers should not be trusted. My work has appeared at ACL, EMNLP, SIGIR, ACM Computing Surveys, COLING, SIGIR-AP, and ICTIR.
Alongside my academic research, I collaborate with industry as an applied AI researcher; most recently on agentic search for the legal domain at Thomson Reuters, and on uncertainty quantification for production RAG systems at KPN.

Education

PhD **Computer Science**, Radboud University, Nijmegen, Netherlands — Feb 2023 – Present
- ***Title*:** Trustworthy Information-Seeking Systems
- ***Supervisors*:** Faegheh Hasibi, Arjen P. de Vries

MS **Computer Engineering**, Sharif University, Tehran, Iran — Sep 2019 – Jun 2022
- ***Title*:** Predicting Novelty Concepts in Data Stream
- ***Supervisors*:** Hamid Beigy

BS (Major) **Electrical and Electronics Engineering**, Polytechnic of Tehran, Tehran, Iran — Sep 2014 – Sep 2019
- ***Title*:** Providing new cloud services on the Kubernetes platform
- ***Supervisors*:** Hassan Taheri

BS (Minor) **Computer Engineering**, Polytechnic of Tehran, Tehran, Iran — Sep 2016 – Sep 2018

Selected Publications

[1] **EMNLP 2026**. "When Deep Research Agents Stagnate: Enhancing Reasoning with Retrieval-Aware Agent Control"
[2] **SIGIR 2026**. "Uncertainty Quantification for Retrieval-Augmented Reasoning"
[3] **SIGIR 2026**. "Total Recall QA: A Verifiable Evaluation Suite for Deep Research Agents"
[4] **ICTIR 2026**. "Uncertainty Quantification for Multimodal Retrieval Augmented Generation"
[5] **ACM Computing Surveys 2026**. "A Survey on Recent Advances in Conversational Data Generation"
[6] **ACL (Findings) 2025**. "Why Uncertainty Estimation Methods Fall Short in RAG: An Axiomatic Analysis"
[7] **SIGIR-AP 2024**. "Fine Tuning vs. Retrieval Augmented Generation for Less Popular Knowledge"
[8] **COLING 2022**. "Persian Natural Language Inference: A Meta-learning Approach"

Work Experience

Doctoral Researcher, Nijmegen, Netherlands — Radboud University, Feb 2023 – Present
- ***Supervisors*:** Faegheh Hasibi, Arjen de Vries
- ***Duties*:** Researching trustworthy generative information access, with a focus on deep research agents and uncertainty quantification.

Data Scientist Intern, Zug, Switzerland, Remote — Thomson Reuters, Nov 2025 – May 2026
- ***Supervisors*:** Navid Rekabsaz, Elizabeth Lingg
- ***Duties*:** Researched and developed agentic search systems for the legal domain. Published at EMNLP.

Data Scientist Intern, Amsterdam, Netherlands, On-site — KPN

- ***Supervisor*:** Gianluigi Bardelloni
- ***Duties*:** Applied uncertainty quantification methods to internal RAG systems to make their responses more reliable.

May 2025 – Oct 2025

Web Developer, Andishe Fartak Amirkabir (Atrovan), Part-time

Atrovan, Tehran, Iran
Dec 2017 – Jun 2022

- ***Duties*:** Developed web applications for diverse domains, including a smart metering system (AtroMeter), a fleet management system (Navgoon), a home automation platform (Smart Home), and a building management system (BMS)

Research Assistant, Control of Multi Vehicle Systems Laboratory (CMVL)

Polytechnic of Tehran
Jan 2016 – Oct 2017

- ***Supervisor*:** Farzaneh Abdollahi
- ***Duties*:** Collaborated on AVR and Raspberry Pi programming, computer vision for localization, and PCB design with Altium Designer.

Technical Skills

Languages: Python, C/C++, SQL, JavaScript, LaTeX

ML / LLM: PyTorch, TensorFlow, Hugging Face Transformers, LLM fine-tuning (LoRA / PEFT), RL post-training, LLM Evaluation & Benchmarking, Uncertainty Quantification, Prompt Engineering, NumPy, Pandas, scikit-learn

RAG & Agents: Retrieval-Augmented Generation (RAG), AI agents / Agentic Search, LangChain / LangGraph, Dense & Sparse Retrieval, Reranking, FAISS, OpenAI / LLM APIs

Infrastructure & Tools: Git, Linux, HPC / Slurm, Docker, Kubernetes, AWS, vLLM, Weights & Biases

Academic Service

Tutorials, Talks & Organizing

Organizer. Dutch-Belgian Information Retrieval Workshop — DIR, 2025

Doctoral consortium. Knowledge Injection in LLMs for Efficient and Trustworthy Responses — SIGIR, 2025

Tutorial. Data Augmentation for Conversational AI (2nd edition) — WebConf, 2024

Tutorial. Data Augmentation for Conversational AI (1st edition) — CIKM, 2023

Reviewing

Full papers: ACL 2025 • EMNLP 2026 • SIGIR 2026 • CIKM 2026
Short papers: SIGIR 2026 • ECIR 2026 • WSDM 2026
Journals: TOIS • ACM Computing Surveys

Thesis Supervision

Uncertainty Quantification for Multimodal Retrieval-Augmented Generation
Failure Modes of Deep Research Agents in Context-Aided Forecasting

Languages

English (C1) • **Dutch** (A1) • **Persian** (Native) • **Arabic** (Native)

References

Faegheh Hasibi, Assistant Professor, Radboud University, f.hasibi@cs.ru.nl

Evangelos Kanoulas, Professor, University of Amsterdam, e.kanoulas@uva.nl