

Farima Fatahi Bayat

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EDUCATION

UNIVERSITY OF MICHIGAN

Ph.D. in Computer Science & Engineering

2022 - Present

Advisors: Lu Wang, H. V. Jagadish

UNIVERSITY OF MICHIGAN

M.Sc. in Computer Science & Engineering

2020 - 2022

GPA: 3.92 / 4.0

UNIVERSITY OF TEHRAN

B.Sc. in Computer Engineering

2014 - 2018

Advisor: Mehdi Modarressi

GPA: 3.45 / 4.0

SELECTED PUBLICATIONS

- ◇ **F. Fatahi Bayat**, L. Zhang, S. Munir, and L. Wang, "FactBench: A Dynamic Benchmark for In-the-Wild Language Model Factuality Evaluation," *arXiv*, 2024.
- ◇ X. Liu, **F. Fatahi Bayat**, L. Wang, "Enhancing Language Model Factuality via Activation-Based Confidence Calibration and Guided Decoding Authors," *Empirical Methods in Natural Language Processing*, 2024.
- ◇ **F. Fatahi Bayat**, X. Liu, H. V. Jagadish, and L. Wang, "Enhanced Language Model Truthfulness with Learnable Intervention and Uncertainty Expression," *Association for Computational Linguistics (Findings)*, 2024.
- ◇ K. Qian, Y. Sang, **F. Fatahi Bayat**, A. Belyi, X. Chu, Y. Govind, S. Khorshidi, R. Khot, K. Luna, A. Nikfarjam, X. Qi, F. Wu, X. Zhang, Y. Li, "APE: Active Learning-based Tooling for Finding Informative Few-shot Examples for LLM-based Entity Matching," *Proceedings of the Fifth Workshop on Data Science with Human-in-the-Loop*, 2024.
- ◇ **F. Fatahi Bayat**, K. Qian, B. Han, Y. Sang, A. Belyi, S. Khorshidi, F. Wu, I. F. Ilyas, and Y. Li, "FLEEK: Factual Error Detection and Correction with Evidence Retrieved from External Knowledge," *Empirical Methods in Natural Language Processing (Demonstration Track)*, 2023.
- ◇ **F. Fatahi Bayat**, N. Bhutani, and H. V. Jagadish, "CompactIE: Compact Facts in Open Information Extraction," *North American Chapter of the Association for Computational Linguistics*, 2022.
- ◇ H. Mahdiani, A. Khadem, A. Ghanbari, M. Modarressi, **F. Fatahi Bayat**, and M. Daneshtalab, " Δ NN: Power-efficient Neural Network Acceleration using Differential Weights," *IEEE Micro*, 2019.

AWARDS AND HONORS

- Rackham Conference Travel Grant. 2024
- Rackham Doctoral Intern Fellowship, University of Michigan. 2023
- Rackham Conference Travel Grant. 2022
- Awarded scholarship as an exceptional talent student, University of Tehran. 2018

Few B.Sc. students with the highest GPA are admitted to the M.Sc. program without an entrance exam.

PROFESSIONAL SERVICES

Reviewer at ACL (Association for Computational Linguistics)	2024
Reviewer at EMNLP (Empirical Methods in Natural Language Processing)	2024
Reviewer at ICLR (International Conference on Learning Representations)	2024
Reviewer at VLBD Journal (The International Journal on Very Large Data Bases).	2023
Reviewer at Computer Speech and Language Journal	2023

RESEARCH EXPERIENCE

UNIVERSITY OF MICHIGAN

LAUNCH LAB

Fall 2023 - present

Advisor: Lu Wang

- Dynamic benchmark curation for factuality evaluation of language models
- Developed a method to improve truthfulness in language models by identifying context-specific intervention intensities, ensuring factual responses when confident, and refusing to answer otherwise.
- Developed an activation-based calibration method, which was further leveraged to create a confidence-guided decoding strategy for eliciting truthful, high-confidence answers.

DATABASE RESEARCH GROUP

January 2021 - December 2022

Advisor: H. V. Jagadish

- Developed an end-to-end open information extraction system that extracts compact facts from raw text.

GEMS LAB - Volunteer Researcher

November 2019 – December 2020

Advisor: Danai Koutra

- Developed a multimodal recommendation system that exploits text and graph embedding techniques to infer consumer preferences and make product recommendations.

UNIVERSITY OF TEHRAN - NETWORK-ON-CHIP (NoC) LAB

Research Assistant

September 2017 – August 2018

Advisor: Mehdi Modarressi

- Extended the Ristretto tool to optimize neural network weights for hardware-based object recognition.

WORK EXPERIENCE

APPLE CORPORATION - KNOWLEDGE PLATFORM TEAM

Winter/Spring/Summer 2023

Machine Learning Research Intern

Manager: Yunyao Li

- Developed a fact verification system that detects hallucinations generated by Large Language Models (LLMs) and revise them using a retrieval-based method.
- Proposed a self-refining information extraction system and leveraged it for fact verification.

Used: Python, PySpark.

DIGIKALA CORPORATION - DATA SCIENCE GROUP

Summer 2019

Data Engineer Intern

- Developed a recommendation system that ranks related items to each product on the website.
- Developed a framework for estimating the purchase probability of a user in the current session by monitoring the users' recent behavior.

Used: Python, MySQL, Apache Kudu, Redis.

TEACHING EXPERIENCE

UNIVERSITY OF MICHIGAN - ELECTRICAL ENGINEERING AND COMPUTER SCIENCE DEPARTMENT

Graduate Student Instructor

- “EECS 595: Natural Language Processing” by David Jurgens Winter 2024
- “EECS/CSE 595: Natural Language Processing” by Joyce Y. Chai Fall 2023, Fall 2024

UNIVERSITY OF TEHRAN - ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

Teaching Assistant

- “Computer Architecture” by Saeid Safari Winter 2017
- “Operating Systems” by Mehdi Kargahi Fall 2017
- “Computer Aided Digital System Design” by Mehdi Modarressi Winter 2018
- “Computer Networks” by Ahmad Khonsari Winter 2018

NOTABLE PROJECTS

◇ Efficient and Expressive Counterfactual Explanations for Graph Neural Networks

“EECS 692: Advanced Artificial Intelligence” Final Project, Instructor: Joyce Y. Chai

- Find counterfactual graph edits that explain Graph Neural Network predictions by leveraging reinforcement learning to approximate the discrete optimization of where to add or delete nodes within an initial graph.
- Explore a continuous relaxation of the above optimization problem that can be solved through gradient descent.

Used: PyTorch, PyTorch-geometric.

◇ COVID-19 X-Ray Image Classification Using Transfer Learning and Contrastive Learning.

“EECS 545: Machine Learning” Final Project, Instructor: Hongluk Lee

- Development of a decision fusion model that jointly exploits transfer learning (pre-trained CNN models) and contrastive learning (Siamese Neural network) techniques to detect COVID-19 virus from chest X-ray images.

Used: PyTorch, Jupyter Notebook, Google Colab.

◇ Conversation Entailment.

“EECS 595: Natural Language Processing” Final Project, Instructor: Joyce Y. Chai

- Development of a BERT-based encoder-decoder model that predicts whether a hypothesis sentence entails a conversational premise. (achieved the second-best performance among EECS 595 final projects)

Used: PyTorch/Hugging Face, Jupyter Notebook, Google Colab.

◇ Part-of-Speech (POS) Tagger.

“EECS 595: Natural Language Processing” Project, Instructor: Joyce Y. Chai

- Implementation of a Part-of-Speech tagging system that exploits the encoder-decoder paradigm, with a BiLSTM as its encoder and a Softmax layer as the decoder, to assign POS tags to sentence tokens.
- Implementation of a Part-of-Speech tagger based on the first-order Hidden Markov Model which uses the Viterbi algorithm to assign POS tags to words in a sentence.

Used: Python, PyTorch.

◇ Atalk (Course-defined Programming Language) Compiler.

“Compiler Design and Implementation” Final Project, Instructor: Faezeh Ghasemi

- Design a compiler for Asynchronous Talk (ATalk), an actor-oriented programming language in which actors are concurrent entities with one execution thread and one mailbox.

Used: ANother Tool for Language Recognition (ANTLR), Java, SPIM MIPS Processor Simulator.