Farima Fatahi Bayat

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EDUCATION

UNIVERSITY OF MICHIGAN
Ph.D. in Computer Science — 2020 - Present
Advisor: H. V. Jagadish
GPA: 3.92 / 4.0

UNIVERSITY OF TEHRAN
B.Sc. in Computer Engineering — 2014 - 2018
Advisor: Mehdi Modarressi
GPA: 3.45 / 4.0

RESEARCH INTERESTS

◇ Information Extraction ◇ Knowledge Representation ◇ Natural Language Generation ◇ Graph Mining

PUBLICATIONS

◇ **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.

◇ B. Moon, **F. Fatahi Bayat**, S. Nair, A. Slaughter, "Challenges for Introducing Artificial Intelligence to Improve the Efficiency of a Next Generation Assessment Approach," *ELearn (Special Issue)*, 2021.

◇ H. Mahdiani, A. Khadem, A. Ghanbari, M. Modarressi, **F. Fatahi Bayat**, and M. Daneshtalab, "ΔNN: Power-efficient Neural Network Acceleration using Differential Weights," *IEEE Micro*, 2019.

COURSEWORK

GRADUATE
Advanced Artificial Intelligence
Natural Language Processing
Machine Learning
Algorithms
Database Management Systems

UNDERGRADUATE
Theory of Formal Language and Automata
Signals and Systems
Real-Time and Embedded System
Compiler Design and Implementation
Machine Learning with Graphs (audited)
Practical Deep Learning for Coders (audited)

RESEARCH EXPERIENCE

UNIVERSITY OF MICHIGAN - Database Research Group
Graduate Student Research Assistant — Winter 2021 - Present
Advisor: H. V. Jagadish

- Seeking to minimize implicit and explicit hallucinations in textual summaries generated by Table-to-Text methods.
- Developed an end-to-end open information extraction system that extracts compact facts from raw text with high precision, using a pipelined approach.

UNIVERSITY OF MICHIGAN - 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 implementation of an object recognition system.

WORK EXPERIENCE

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 TEHRAN - Electrical and Computer Engineering Department

Teaching Assistant

- "Operating Systems" by Mehdi Kargahi — Fall 2018
- "Computer Aided Digital System Design" by Mehdi Modarressi — Winter 2018
- "Computer Architecture" by Saeid Safari — Winter 2017
- "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: Honglak 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.

AWARDS AND HONORS

Received 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 entrance exam.

Ranked 5th in *Class of 2014*, Hardware Group, University of Tehran. 2018

Best Bachelor Project Award, School of ECE, University of Tehran. 2018

This award goes to the best B.Sc. thesis in the School of Electrical and Computer Engineering, University of Tehran.

TECHNICAL SKILLS

LANGUAGES

Software

- C/++
- Python
- CUDA

Scripting

- Python
- JavaScript
- Bash Script

Query

- SQL
- MQL (MongoDB Query Language)

TOOLS

Machine Learning

- PyTorch
- Caffe

Databases

- MySQL
- MongoDB

Web

- HTML/CSS
- Jupyter Notebook
- React (basic)

LINKS

LinkedIn | GitHub | Google Scholar