Fateme Sadat Haghpanah

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Education

◇ **M.Sc. in Computer Science, University of Toronto** Jan. 2021 – May 2023 (expected)
Select Courses: Natural Language Processing and Computing (ongoing), Topics in Machine Learning for Health (A), Topics in Computational Social Science (A), Machine Learning (A+). GPA: 4.00/4

◇ **M.Sc. in Biomedical Engineering, Columbia University** Sept. 2018 – Dec. 2019
Select Courses: Applied Data Science (A), Empirical Methods of Data Science (A), Applied Deep Learning in Biomedical (A+).

◇ **B.Sc. in Computer Engineering, Sharif University of Technology** Sept. 2013 – Jan. 2018
Select Courses: Signal and Systems, Probability and Statistics for Computer Engineering, Data Structures and Algorithms, Discrete Structures, Advanced Programming.

Professional Experience

◇ **Research Assistant at University of Toronto** Jan. 2021 – Present
Affiliated with "*Vector Institute for Artificial Intelligence*," "*University Health Network*," and "*SickKids, the Hospital for Children*."

- Designed and developed a novel classification algorithm to detect cerebral microbleeds (CMB) in preterm infants' MRI scans, achieving over 90% precision and recall. The neural network model is the first-ever developed one for infant brain scans.
- Developed a supervised convolutional neural network model to expedite the diagnosis of brain tumors in children within hospital emergency rooms with the AUC ROC score of 0.95.
- Frameworks: PyTorch, Sci-kit Learn, Pandas, OpenCV.

◇ **Research Assistant at Columbia University** Sept. 2018 – Sept. 2020

- Implemented machine learning algorithms to segment distinct regions and tissues of neonatal brains, aiming to gain a better understanding of their development.
- Designed a novel neural network-based segmentation algorithm to enhance MRI safety by identifying various tissues of the entire body using different MRI scan modalities.
- Frameworks: PyTorch, Sci-kit Learn, Pandas, OpenCV.

◇ **Data Scientist at CafeBazaar - Divar** Sept. 2017 – Aug. 2018
Divar is a classified-ad platform in Iran which is one of products of CafeBazaar.

- As the project owner, developed an innovative search algorithm that employs semantic networks and word embedding to enhance the relevancy of search results, ultimately leading to a better user experience.
- Utilized behavioral pattern analysis of unstructured data from user action logs to refine user queries and optimize search filters for various categories, resulting in an improved search experience.
- Developed a machine learning-based image search algorithm utilizing Convolutional Neural Networks to aid human reviewers in identifying and removing duplicate listings from the platform.
- Framework: Python, PySpark, fastText, Apache Zeppelin, SQL, Airflow.

Select Projects

◇ **Neural Machine Translation** Jan. 2023 – Apr. 2023

- Implemented an encoder-decoder model with both single and multi-head attention mechanism to translate English to French using the Hansards dataset.

◇ **Causality in Medical Imaging** Sept. 2022 – Dec. 2022

- Investigated the impact of causality on medical imaging by utilizing supervised machine learning algorithms to detect MRI acquisition parameters using the PPMI dataset, aiming to assess the potential improvement in performance.

◇ **Can You Recognize the Emotion From an Image of a Face?** Sept. 2019 – Dec. 2019

- Created a facial emotion recognition classifier using feature extraction and selection techniques like HOG, SIFT, PCA, and landmark detection. Trained different classification models, including LDA, SVC, RandomForest, MLP, KNN, AdaBoost, and CNN-based approaches.

Select Skills

- **Programming Languages** : Python, C/C++, MATLAB, SQL.
- **Tools and Frameworks** : PyTorch, Tensorflow, Sci-kit Learn, Numpy, Pandas, Jupyter, OpenCV, PySpark, Git, Apache Spark, Apache Zeppelin, Apache Airflow, Tableau.
- **Languages** : Persian (Native), English (Fluent), Spanish (Beginner).

Publications

- Yun Wang*, Fateme Sadat Haghpanah*, Xuzhe Zhang, Katie Santamaria, Gabriela Koch da Costa Aguiar Alves, Elizabeth Bruno, Natalie Aw et al. **ID-Seg: an infant deep learning-based segmentation framework to improve limbic structure estimates.** Brain Informatics 9, no. 1 (2022): 12.
- Xuzhe Zhang, Elsa D. Angelini, Fateme S. Haghpanah, Andrew F. Laine, Yanping Sun, Grant T. Hiura, Stephen M. Dashnaw et al. **Quantification of lung ventilation defects on hyperpolarized MRI: The Multi-Ethnic Study of Atherosclerosis (MESA) COPD study.** Magnetic Resonance Imaging 92 (2022): 140-149.
- Yun Wang*, Fateme Sadat Haghpanah*, Natalie Aw, Andrew Laine, and Jonathan Posner. **A transfer-learning approach for first-year developmental infant brain segmentation using deep neural networks.** bioRxiv (2020): 7.

Honors and Awards

- **CRA-WP Scholarship** to attend CRA-WP Grad Cohort Workshop for Women. April 2022 and 2023
- **Vector Institute for Artificial Intelligence Research Grant** 2021 and 2022
- **Temerty Innovation Grant for AI in Medicine** 2021
  Won a research grant of 200K from T-CAIREM as one of the three winners for the proposal titled "Machine Learning-Based Innovation in Ocular Pediatric Assessment Using Point of Care Ultrasound."
- **Ranked 4th** out of 50 students of B.Sc Hardware Engineering Students, 2013 beginners. Sept. 2017
- **Ranked 99th Percentile** in the Nation-wide Undergraduate Entrance Exam. July 2013
  Among more than 250,000 students in the fields of Mathematics and Physics.
- **Bronze Medal** in 8th Iranian National Olympiad of Astronomy & Astrophysics (INOA). 2012

Teaching Experience

- **Teaching Assistant at University of Toronto** Sept. 2021 – Peresent
  Intro to Machine Learning (Winter 2023), Intro to Computer Programming (winter 2022), Intro to the Theory of Computation (Fall 2021, Summer 2022, Fall 2022).
- **Teaching Assistant at Columbia University** Sept. 2019 – Dec. 2019
  Bio Statistics for Engineers (Fall 2019).
- **Teaching Assistant at Sharif University of Technology** Sept. 2014 – May 2018
  Computer Architecture (Fall 2016 and 2017, Spring 2017), Very Large Scale Integration (Fall 2017), Logical Circuit (Spring 2016), Advanced Programming (Fall 2014), Fundamentals of Programming (Fall 2014).

Service and Volunteering

- **Organizing** the **Graduate Application Assistance Program (GAAP)** Fall 2022
  GAAP is a student-run, volunteer-led effort that aims to ensure that underrepresented groups receive feedback on a draft of their application.
- **Volunteering** in the **Graduate Application Assistance Program (GAAP)** Fall 2021
- **President** of the **Student Scientific Chapter (SSC)** May 2016 – May 2017
  SSC is the Computer Engineering Department's student committee of the Sharif University of Technology, concerned with directing extra-curricular activities.
- **Member** of the **Student Scientific Chapter (SSC)** May 2015 – May 2016
- **Co-Founder** of the **Winter Seminar Series (WSS)** Dec. 2015 and 2016
  WSS is a premier event at Sharif University, focused on building a professional community and providing a platform for networking and knowledge exchange in computer science and engineering.