ZAHRA HOSSEINI

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Research Interests

- **Generative Models**
- **Computer Vision**
- **Computer Graphics**
- **Machine Learning**

Education

York University   Sep. 2022– May. 2024 (expected)
Master of Applied Science in Electrical and Computer Engineering   *GPA:4/4*

Iran University of Science and Technology   Sep. 2017 – Jun. 2022
Bachelor of Science, Computer Engineering   *GPA:3.8/4*

Research Experience

Biomotion Lab - CVIL Lab - York University   Sep. 2022 - present
Research Assistant Under the Supervision of Prof. Niko Troje and Dr. Kosta Derpanis.   Toronto, Canada

- We are working on eye-contact modeling using generative models to enhance quality of virtual meeting by finding a way to recreate eye contact in virtual meetings.
- Experienced with eye trackers, OptiTrack motion capture system, and virtual reality headsets. Proficient in research, data collection, and technical support. Expertise in software analysis and troubleshooting.

University of Toronto   May. 2021 - Oct. 2021
Research Intern Under the Supervision of Prof. Farzad Khalvati   Remote Colloboration

- I analyzed a Persian poetry dataset using various machine learning models, including SVM, Random Forest, and Neural Networks, involving preprocessing, feature selection, PCA, and embedding clustering.
- We presented our work at the 4th Annual Digital Humanities Conference.

IPM Institute For Research In Fundamental Sciences   Jul. 2020 - Mar. 2022
Research Intern Under the Supervision of Prof. Hajar Falahati   Tehran, Iran

- Developed a new approach for 3D garment reconstruction and deformation from 2D input image using SMPL.
- Improved accuracy of object detection by finding a better approach for background removal and adjusting edges using traditional computer vision techniques.
- Utilized CNN-based systems to estimate body position, detect body parts, and map clothes onto the body.

Iran University of Science and Technology   Nov. 2021 - Jul. 2022
Research Assistant Under the Supervision of Prof. Sauleh Etemadi   Tehran, Iran

- Bachelor's Thesis: "Improving the Accuracy of Fake News Detection by Extracting Sub-Claims"
- Investigated previous research, collected and evaluated data on T5 and GPT-NEO models using few-shot learning method.
- Developed a new approach of extracting sub-claims to improve accuracy of fake news detection.

Tehran Institute for Advanced Studies (TeIAS)   Sep. 2020 - Mar. 2021
Research Intern Under the Supervision of Prof. Taher Pilehvar, Meetings' website   Tehran, Iran

- Summarized technical papers in machine learning and NLP.
- Implemented image captioning network.

Projects

Mean Shift for Self-Supervised Learning | *Python, PyTorch*   Apr. 2023

- Reproduced Mean Shift for Self-Supervised Learning, a paper on unsupervised image clustering with deep neural networks.

Crime Data Analysis in Toronto - Robbery Incidents | *Python, PyTorch*   Apr. 2023

- Analyzed crime data in Toronto, focused on robberies. Conducted time-series and spatial analysis to identify patterns, evaluated accuracy, and developed insights.

Directed-Reading Course | *Writing Skills*   Jan. 2023

- Surveyed and presented various papers on computer vision and machine learning, including human motion and shape capture, 3D pose and shape estimation from single images, gaze detection, human dynamics, and trajectory prediction.

Detecting COVID-19 with Chest X-Ray | *Python, PyTorch*   Nov. 2021

- A deep learning model trained to classify Chest X-Ray scans to 3 classes:
  Normal, Viral Pneumonia and COVID-19.

License Plate Classifier | *Python, Tensorflow*   **Dec. 2020**
- A deep learning model trained to classify Iranian cars license plates to 3 classes:
  Correct readable license plate, Altered license plate, and No license plate. (github)

Facial Expression Recognition | *Python, Tensorflow*   **Sep. 2020**
- I built and trained a convolutional neural network in Keras from scratch to recognize facial expressions. (github -
  Certificate)

Music Classifier | *Python, PyTorch*   **Apr. 2021**
- As my final project for the NLP course, I classified music into two classes before the 2000s and after the 2000s based on
  the lyrics. I gathered a dataset for the first phase of this project. (dataset repository)

Swan | *Python, Django*   **Jul. 2021**
- In a group of two, we implemented the back-end side of a website for marketing teams to easily post on various social
  media and contact their customers using MTA. (github)

GoardBame | *Python, Django*   **Jan. 2021**
- In a group of two, we implemented the back-end side of a website for collecting board games and board game cafes
  information. Also, create a plat form to connect board game lovers. (github)

Other Experiences

National Taiwan University, Machine Learning Summer School (MLSS)   **Jul. 2021**
This school allowed me to hear about newest machine learning techniques from great professors and students. (Certificate)

Research talk Session organizer   **Apr. 2021**
We hold regular sessions with successful researchers graduated from our department.

Machine Learning Genoa Center, Summer Schools (MaLGa)   **Jun. 2021**
Accepted and participated in some classes of all of three courses Machine Learning, Deep Learning , and Computer Vision

ASR Gooyesh Pardaz company (website)   **Jul. 2020**
As a back-end developer, developed a website using Django to collect and improve Persian Question Answering Dataset.

Volunteer Work   **Dec. 2020**
Translated week 2 of NYU's Deep Learning course to Farsi.(#664)

Honors and Awards

Graduate Scholarship of Excellence   **Sep. 2022**
Awarded fully funded scholarship valued at $69,000 for the duration of the program.

Graduate International Award, York University   **Sep. 2022**
Awarded for academic excellence and outstanding achievements in graduate studies.

National Universities Entrance Exam   **Aug. 2017**
Ranked among top 1% in the National Universities Entrance Exam with over 148,000 participants

Teaching Assistant

Introduction to the Theory of Computation-EECS 2001   **Winter 2022**
Design and grade assignments and Exams.   *Instructor: Dr. Enas Tarawneh*

Computational Thinking-EECS 1011   **Fall 2022**
Instruct labs, design and grade assignments.   *Instructor: Prof. James Smith*

Computational Intelligence   **Spring 2022**
Design and grade assignments.   *Instructor: Prof. Naser Mozayeni*

Algorithms Design, course website   **Spring 2021**
Designed and graded assignments.   *Instructor: Prof. Sauleh Etemadi*

Formal Languages and Automata Theory, course website   **Spring 2021**
Instructed the discussion classes. Designed and graded assignments and projects.   *Instructor: Prof. Reza Entezari-Maleki*

Data Structure, course website   **Fall 2020**
Designed and graded assignments and projects. Mentored a group of students.   *Instructor: Prof. Sauleh Etemadi*

Algorithms Design   **Fall 2020**
Instructed the discussion classes. Designed and graded assignments and projects.   *Instructor: Prof. Reza Entezari-Maleki*

Computer-Aided Digital System Design, Lead TA   **Fall 2020**
Instructed the discussion classes. Designed and graded projects.   *Instructor: Prof. Hajar Falahati*

Advanced Programming, Mentor, course website   **Spring 2020**
Mentoring a group of students and helping them during the course.   *Instructor: Prof. Sauleh Etemadi*

Fundamentals of Programming   **Fall 2019**
Designed and graded assignments and projects.   *Instructor: Prof. Zeynab Movahedi*

Logical Circuits   **Fall 2019**
Instructed the discussion classes. Designed and graded assignments and projects.   *Instructor: Prof. Hajar Falahati*

Relevant Coursework

- Neural Networks and Deep Learning A^+
- Data Analytics and Visualization A
- Directed Reading A^+
- Machine Learning Theory A^-
- Computer Vision A^+
- Diffusion Models - Directed Reading *Audited*
- Natural Language Processing (CS224N) A^+
- Artificial Intelligence(CS188) A^+
- Computational Intelligence A^+
- Computer Vision Masterclass Certificate
- Neural Networks and Deep Learning Certificate
- Machine Learning Real World projects Certificate
- AI For Everyone Certificate

Technical Skills

Languages: **Python, C#, Matlab, R**, C, C++, LaTeX
Frameworks, Libraries: **PyTorch, Tensorflow**, OpenCV, Numpy, Scikit-Learn
Tools:TObii Pro Glass 3, Tobii Lab Pro, OptiTrack Motion Capture, Motive
Website Development: Django, Django-rest framework, Object Storage system

Languages

- English (Fluent), Farsi (Native), Kurdish (Native), French (Beginner)