Amir Alimohammadi

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Research Interests

- Computer Vision
- Generative Models
- Computer Graphics
- Image Manipulation

Education

- **M. Sc. in Computing Science** 2023 - Present
  - Simon Fraser University (SFU), Vancouver, Canada GPA: 4.07/4.33 (3.76/4)
- **B. Sc. in Computer Engineering** 2018 - 2023
  - Sharif University of Technology (SUT), Tehran, Iran GPA: 18.09/20 (3.84/4)

Publications

- **"Cora: Correspondence-aware image editing using few step diffusion" Siggraph 2025**
  - **A. Alimohammadi***, A. Mikaeili*, S. Nag, N. Hassanpour, A. Tagliasacchi, A. Mahdavi Amiri
- **"SMITE: Segment Me In TimE" ICLR 2025**
  - **A. Alimohammadi**, S. Nag, S. Asgari Taghanaki, A. Tagliasacchi, G. Hamarneh, A. Mahdavi Amiri
- **"Toward Reliable Human Pose Forecasting with Uncertainty" RA-L 2024**
  - S. Saadatnejad, **A. Alimohammadi***, P. Saremi*, M. Mirmohammadi*, Z. TehraniNasab*, M. Daghyani*, Y. Zoroofchi Benisi*, T. Mordan, A. Alahi

Experience

- **Research Assistance, Simon Fraser University** Sep 2023 - Present
  - Supervising by Prof. Ali Mahdavi-Amiri
  - Working on Generative Models
- **Research Intern, Sharif University** Oct 2022 - Aug 2023
  - Supervising by Dr. Ehsaneddin Asgari and Dr. Mohammadjavad Faraji
  - Worked on predicting trend changes in the Cryptocurrency market using different machine learning methods
- **Research Intern, VITA lab, EPFL** Dec 2021 - Jul 2022
  - Supervised by Prof. Alexandre Alahi and Dr. Saeed Saadatnejad
  - Tackled 3D human pose forecasting via a novel method of modeling uncertainty
- **Teacher / Tutor** 2017 - 2022
  - 0.5k+ hours of teaching and tutoring experience in the best schools across the country
  - Several of my students got medals at Iran Mathematical Olympiad
  - Taught Number Theory, Algebra, problem-solving, and combinatorics.

Honors and Awards

- 2017 **Gold** medalist at 35th National Mathematical Olympiad
- 2016 **Silver** medalist at International Mathematics Competition
- 2015 **Bronze** medalist at International Mathematics Competition

Related Coursework

- Special Topics in Graphics, HCI, Visualization, Vision, Multimedia (A+)
- Special Topics in Artificial Intelligence (A)
- Computer Vision (A+)
- Directed Reading of Diffusion Models (A)
- Artificial Intelligence (20/20)
- Advanced Information Retrieval (20/20)
- Linear Algebra (18.5/20)
- Data Structures and Algorithms (19.3/20)
- Design of Algorithms (20/20)
- Probabilities and Statistics (18.3/20)
- Advanced Programming (20/20)
- Deep Learning & Machine Learning (Self Studied)

PROJECTS

- **Cora (Computer Vision)** Jan 2025 - Feb 2025
  - Designed an open-source, text-guided image-editing framework that performs accurate pose changes, object insertions, and background swaps in only **4 diffusion steps**, enabling near real-time feedback.
  - Developed three key modules: correspondence aware latent correction, content adaptive attention interpolation, and query based structure alignment. These components enable continuous control over appearance and structure for precise editing without requiring model fine-tuning.
- **SMITE (Computer Vision)** Feb 2024 - Sep 2024
  - Developed an open-source framework for temporally consistent video segmentation, leveraging pre-trained diffusion models to predict and segment objects across video frames using one or few reference images, ensuring fine-grained, flicker-free segmentation.
  - Enhanced segmentation precision through tracking, temporal voting, and low-pass regularization mechanisms to handle occlusions, varying poses, and lighting conditions.
  - Introduced SMITE-50, a benchmark dataset with multi-granularity annotations.
- **Intrinsic Diffusion (Computer Vision)** Sep 2023 - Dec 2023
  - Developed new methods for extracting depth information from images using generative diffusion models, leveraging h-space (latent space) to enhance depth predictions without fine-tuning. Achieved competitive results in intrinsic scene property extraction for computer vision tasks.
- **CryptoPredictions (Time Series)** Oct 2022 - Aug 2023
  - Implemented an open-source library for price prediction/forecasting a sequence of prices of cryptocurrencies given an observed sequence. It has 9 models, 10 metrics, and more than 30 indicators and also supports more than 15 popular cryptocurrencies.
- **Unposed (Computer Vision)** Dec 2021 - May 2022
  - Implemented an open-source library for 3D human pose forecasting (Vita-lab), with several models, datasets, and metrics implemented in a standardized way to move toward a unified and fair evaluation, and promote research in this field.
- **Predicting customer behavior (ML)** Oct 2021 - Jan 2022
  - Implemented a deep neural network for predicting whether clicking on an item will lead to a purchase.
  - Involving different phases: Exploratory Data Analysis (EDA), Feature Engineering, Testing various algorithms(Wide and Deep, Light GBM, Xgboost, MLPClassifier), Evaluation, Deployment(MLOps)
- **Examining the linguistic features of Shahnameh (NLP)** Feb 2022 - Jul 2022
  - The Shahnameh is a long epic poem. Consisting of some 50,000 couplets (two-line verses), the Shahnameh is one of the world's longest epic poems. This project takes a query and finds the 10 most relevant couplets by certain methods, such as Transformers, and TF-IDF. It has also implemented classification based on the names of the stories and clustering to find similarities in each cluster. Some algorithms like Hyperlink-Induced Topic Search has been tested in this project as well.
- **C-minus compiler** Apr 2021 - May 2021
  - C-minus compiler project consisted of design and build a one-pass compiler for a simplified version of C programming language called C-minus. Project covered the main components of the compiler: 1) scanner, 2) parser, 3) intermediate code generator, and 4) semantic analyzer.
- **Plants vs Zombies** Nov 2019 - Dec 2019
  - Plants vs Zobies is a famous card game that we have implemented it in Java by purpose of getting more familiar with Java language. Learning object oriented design concepts, and introducing with basic concepts of socket-programming.

Teaching Assistant

- Visual Computing 1 & 2 (May 2024 - Present)
- Intro to AI (Jan 2024 - Apr 2024)
- Cyber Security (Sep 2023 - Dec 2023)
- Linear Algebra (Sep 2021 - Jan 2022)
- Computer Structure (Sep 2021 - Jan 2022)
- Design of Algorithms (Sep 2021 - Jan 2022)
- Data Structures and Algorithms (Sep 2021 - Jan 2022)
- Computer Networks (Sep 2021 - Jan 2022)
- Data Structures and Algorithms (Sep 2020 - Jan 2021)
- Linear Algebra (Sep 2020 - Jan 2021)

Skills Summary

- **Languages**: Python, Java, R, Bash
- **Frameworks**: PyTorch, OpenCV, Matplotlib, NumPy, Pandas, Diffusers
- **Concepts**: Computer Vision, Generative Models, Diffusion Models, Object Detection and Tracking
- **Soft Skills**: Fast learner, Teamwork, Curious, Creative, Problem-solving

Hobbies and Interests

In my spare time, I enjoy going to the gym because it keeps me fit. I am also a fan of table tennis. Moreover, I love reading psychology books because they help me gain a better understanding of people and improve my social skills.

Languages

- **Persian**: native
- **English**: IELTS 7.5 (Reading:8, Speaking:6.5, Listening:8.5, Writing: 6.5)