Amir Mohammad Babaei

amir.m.babaei.academic@gmail.com | amirmohamadbabaee.github.io | amirmohammad-babaei

Education

Sharif University of Technology (SUT) *Tehran, Iran*

MSc in Computer Engineering, **Artificial Intelligence and Robotics** *Sep. 2023 - Present*

- GPA: **18.32/20.00** (**4.00/4.00**)
- Member of Sharif Image Processing Laboratory (Sharif IPL)
- Supervisor: Prof. Shohreh Kasaei

  Thesis: Blind Image Super-Resolution Using Deep Generative Neural Network Architectures

Amirkabir University of Technology (AUT) *Tehran, Iran*

BSc in Computer Engineering *Sep. 2019 - Sep. 2023*

- GPA: **19.09/20.00** (**3.96/4.00**)
- Ranked **4th** among 149 students
- Supervisor: Dr. Maryam AmirMazlaghani

  Thesis: Graph-based Convolutional Multivariate Time Series Forecasting Approach for Urban Traffic Forecasting

Research Interests

Deep Generative Models	3D Reconstruction	Image/Video Restoration
Computer Vision	Multimodal Learning	Deep Learning

Research Experience

Sharif University of Technology - Image Processing Laboratory (IPL) *Tehran, Iran*

Advisor: Prof. Shohreh Kasaei *Nov. 2023 - Present*

- My thesis focuses on improving the efficiency of deep generative models for Image Super-Resolution, especially diffusion models.
- Developed a novel weakly-supervised approach for video instance segmentation (VIS), enabling accurate segmentation without relying on video mask annotations.

University of Toronto - Dept of Electrical and Computer Engineering *Full Remote*

Advisor: Dr. Alireza Esmaeilzehi *Nov. 2022 - Aug. 2024*

- Collaborated with Dr. Alireza Esmaeilzehi, Postdoctoral Fellow at the University of Toronto, on advanced deep learning and computer vision research since Fall 2022. Co-authored a paper on Computer Vision accepted by a highly reputable journal.

Publications

Published

Esmaeilzehi, A., **Babaei, A.M.**, Nooshi, F., Zaredar, H., and Ahmad, M.O., "**CLBSR: A deep curriculum learning-based blind image super-resolution network using geometrical prior**," Image and Vision Computing, vol. 154, p. 105364, Feb. 2025. DOI: 10.1016/j.imavis.2024.105364

Under Review

Arefi, F., **Babaei, A.M.**, Ramezanian, V., Mansourian, A.M., Kasaei, S., "**Improving Weakly-supervised Video Instance Segmentation Using Keypoints Consistency**," *Computer Vision and Image Understanding Journal*, Submitted in November 2024

In Preparation

Babaei, A.M., Nabati, S., Dehghanian, Z., AmirMazlaghani, M., "**GSCINet: Graph-based Convolutional Multivariate Time Series Forecasting Approach for Urban Traffic Forecasting**," Work in Progress

Honors and Awards

2024	Nominated for the **Best Bachelor Thesis Award** in the Computer Engineering Department	*AUT*
2023	Reviewer for the *Circuits, Systems, and Signal Processing (CSSP)* Journal	*SUT*
2023	Admitted to the Master of Science program at Sharif University of Technology based on **exceptional academic performance**, without the need for an entrance exam	*SUT*
2023	Ranked **4th** Highest GPA among 149 Undergraduate Computer Engineering Students	*AUT*
2019	Ranked **top 1%** in the Iranian University Entrance Exam; **Recognized as Outstanding Student**	*AUT*

Languages

- English (TOEFL iBT: **101** (R:**28**, L:**27**, S:**23**, W:**23**))
- Persian (Native)

Teaching Experience

Fall 2024	**Deep Learning Teaching Assistant**, Computer Engineering Dept., under the supervision of Prof. Hamid Beigy	*SUT*
	Advanced 3D Computer Vision Teaching Assistant, Computer Engineering Dept., under the supervision of Prof. Shohreh Kasaei	*SUT*
Spring 2024	**Fundamental of 3D Computer Vision Teaching Assistant**, Computer Engineering Dept., under the supervision of Dr. Hanieh Naderi	*SUT*
Spring 2023	**Head of Data Mining Teaching Assistance**, Computer Engineering Dept., under the supervision of Prof. Ehsan Nazerfard	*AUT*
	Applied Linear Algebra Teaching Assistant, Computer Engineering Dept., under the supervision of Prof. Maryam AmirMazlaghani	*AUT*
Spring 2022	**Signals and Systems Teaching Assistant**, Computer Engineering Dept., under the supervision of Dr. Atefeh TermehChi	*AUT*
Fall 2021	**Head of Applied Linear Algebra Teaching Assistance**, Computer Engineering Dept., under the supervision of Prof. Ehsan Nazerfard	*AUT*

Professional Experience

May 2023 - Feb. 2024	**Data Scientist**, Collaborated to develop data-driven solutions for the company challenges. Contributed to the development of *channel classifier*, *channel recommender system*, and *intelligent advertisement* projects as part of the data science team at Bale.	*Bale Messenger*
Jul. 2022 - Sep. 2022	**Research Intern**, Collaborated to develop audiovisual speech recognition for Persian language, and also gathering Persian audiovisual dataset for training phase.	*Asr Gooyesh Pardaz*

Skills and Expertise

Programming Languages	Python, Java, C/C++, MATLAB (GNU Octave)
Tools	Git, Linux, Bash, GDAL, LaTeX, FFmpeg, OpenMP, CUDA, LangChain, Ollama, AWS EC2
Libraries & Frameworks	PyTorch, BasicSR, KAIR, PyTorch Geometric, Hugging Face Transformers, JAX, Keras, TensorFlow, Numpy, OpenCV, Pandas, Scikit-learn, Matplotlib

Selected Projects

For a complete list of projects, please visit my GitHub: github.com/AmirMohamadBabaee

- **Deep Learning Homework Assignments**
  In these assignments, I implemented various algorithms, including *PCA*, *t-SNE*, *autoencoders*, *CNNs*, *RNNs*, *LSTMs*, *GRUs*, *language models*, *GNNs*, *GANs*, *VAEs*, and *reinforcement learning*. Each method was applied to different tasks, and the results were documented throughout the project. (Link)
- **Deep Generative Models Homework Assignments**
  The assignments involved implementing popular generative models, including *autoregressive models*, *VAEs*, *GANs*, *NF*, *EBM*, and diffusion models like *DDPM*. (Link)
- **Digital Image Processing Homework Assignments**
  In this series of assignments, I explored *Fourier Series Analysis*, *quantization techniques*, *DCT compression*, and *CLAHE* for image enhancement. I also worked on *image restoration*, *Hough transform*, *template matching*, *classical segmentation*, *image compression*, and *morphological image processing*. (Link)
- **Panorama**
  This project focused on creating an application replicating a cellphone camera's panoramic feature. It included tasks like *feature matching* and *image stitching* to build the panorama from scratch. (Link)

Certificates

Coursera	Machine Learning (Certificate)
Coursera	Deep Learning (Certificates: 1, 2, 3, 4, 5)
Coursera	Mathematics for Machine Learning (Certificate)
Stanford	CS224n: NLP with Deep Learning (Audited)
Stanford	CS224W: Machine Learning with Graphs (Audited)
Stanford	CS236: Deep Generative Models (Audited)