

Amin Karimi Monsefi

PH.D. STUDENT OF COMPUTER SCIENCE.

Columbus, Ohio, USA

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“Be the change that you want to see in the world.”

Summary

Amin Karimi Monsefi is a dedicated Ph.D. student in Computer Science at The Ohio State University, specializing in **Computer Vision, Generative Models, Self-Supervised Learning, and Diffusion Models** under the guidance of Professor Rajiv Ramnath. His research advances the field through innovative **image and video generation** methods, including projects like Multi-Guided Image Inpainting and Multi-Modal Conditional Video Generation. Amin explores how the creativity of Large Language Models (LLMs) can be leveraged in video generation using diffusion models. He also designs self-supervised learning approaches to extract meaningful representations from unlabeled data, applying these techniques to both general vision tasks and medical image analysis—where he developed Masked LoGoNet for efficient 3D image segmentation. With **18 papers accepted or under review** at prestigious conferences such as ICLR and SIGKDD, he is also a **reviewer for conferences like SIGKDD (2024–2025), ICLR 2025, and WACV 2025**, reflecting his commitment to advancing computer vision and contributing significantly to image and video generation technologies.

Education

PhD. in Computer Science

Columbus, Ohio, USA

THE OHIO STATE UNIVERSITY

Jan. 2022 - Exp. Present

- **Supervisor:** Prof. Rajiv Ramnath
- **Image and Video Generation:** Developing innovative methods for generating high-quality images and videos. Projects include Multi-Guided Image Inpainting and Multi-Modal Conditional Video Generation. Exploring how the creativity of Large Language Models (LLMs) can be utilized in video generation with diffusion models.
- **Multi-Modal Conditional Video Generation:** Focused on harnessing diverse conditions to enhance visual synthesis, this project aims to generate videos that are not only visually appealing but also contextually rich and dynamic. By incorporating various modalities and conditions, the project seeks to create more immersive and informative video content.
- **Self-Supervised Approach for General Images:** This project involves the exploration of a self-supervised approach tailored for general images. It leverages multimodal architectures such as CLIP to enhance the image encoder and employs Data-centric AI approaches to build a better encoder. The aim is to establish robust foundation models for various vision-related tasks, including image generation and classification.
- **Medical Image Analysis:** Focused on addressing the challenge of limited labeled data, this project adopts a self-supervised learning approach. By leveraging this technique, it trains models using unlabeled medical images, allowing them to learn meaningful representations and extract valuable features from the data, thus enhancing the analysis and interpretation of medical images.
- **Smart Mobility Research:** This project centers on employing deep learning methods for time series analysis within the field of smart mobility. The focus is crafting models to forecast and analyze the likelihood of accidents and road construction in designated zones. The project introduces a multi-source dataset and a multimodal architecture, harnessing diverse data streams such as historical records, weather data, satellite and map imagery, and demographic details to advance the field.

M.Sc. in Computer Engineering with focus on Software

Tehran, Iran

SHAHID BEHESHTI UNIVERSITY

Sep. 2015 - Exp. Sep. 2017

- **Thesis:** An Approach for Automatic Software Test Data Generation Using Machine Learning and Program Static Structure
- **Supervisor:** Prof. H.Haghighi
- I achieved **Ranked 1st**, National M.Sc Entrance Exam of Computer Engineering, Among More Than 20,000 Students

B.Sc. in Computer Engineering with focus on Hardware

Tehran, Iran

SHAHID BEHESHTI UNIVERSITY

Sep. 2011 - Exp. Sep. 2015

- **Thesis:** Applying Reinforcement Learning on Multi-Agent Environments
- **Supervisor:** Prof. M. Abdoos

Papers

Enhancing Open Vocabulary Segmentation through Semantic Attention and Path-Aligned Contrastive Learning

Under Submission

AMIN KARIMI MONSEFI, KISHORE PRAKASH SAILAJA, WEI-LUN (HARRY) CHAO, RAJIV RAMNATH

2025

Contrastive Generation: A Cutting-Edge Approach to Image Generation

Under Submission

AMIN KARIMI MONSEFI, KISHORE PRAKASH SAILAJA, RAJIV RAMNATH, SER-NAM LIM

2025

TaxaDiffusion: Progressively Trained Diffusion Model for Fine-Grained Generation and Trait Discovery

AMIN KARIMI MONSEFI, MRIDUL KHURANA, RAJIV RAMNATH, ANUJ KARPATNE, WEI-LUN (HARRY) CHAO, CHENG ZHANG

Under Review - CVPR

2025

KnobGen: Controlling the Sophistication of Artwork in Sketch-Based Diffusion Models

AMIN KARIMI MONSEFI, POUYAN BORESHNAVAR, MENGXI ZHOU, WEI-LUN (HARRY) CHAO, ALPER YILMAZ, RAJIV RAMNATH

Under Review - CVPR

2025

DetailCLIP: Detail-Oriented CLIP for Fine-Grained Tasks

AMIN KARIMI MONSEFI, KISHORE PRAKASH SAILAJA, ALI ALILOOEE, SER-NAM LIM, RAJIV RAMNATH

Under Review - CVPR

2025

Frequency-Guided Masking for Enhanced Vision Self-Supervised Learning

AMIN KARIMI MONSEFI, MENGXI ZHOU, NASTARAN KARIMI MONSEFI, SERNAM LIM, WEI-LUN (HARRY) CHAO, RAJIV RAMNATH

Under Review - ICLR

2025

Masked LoGoNet: Fast and Accurate 3D Image Analysis for Medical Domain

AMIN KARIMI MONSEFI, PAYAM KARISANI, MENGXI ZHOU, STACEY CHOI, NATHAN DOBLE, HENG JI, SRINIVASAN

30TH ACM SIGKDD - KDD

PARTHASARATHY, RAJIV RAMNATH

2024

- Conference On Knowledge Discovery And Data Mining
- Barcelona, Spain

CrashFormer: A Multimodal Architecture to Predict the Risk of Crash

AMIN KARIMI MONSEFI, POUYA SHIRI, AHMAD MOHAMMADSHIRAZI, NASTARAN KARIMI MONSEFI, RON DAVIES, SOBHAN

31st ACM SIGSPATIAL

MOOSAVI, RAJIV RAMNATH

2023

- UrbanAI '23: Proceedings of the 1st ACM SIGSPATIAL
- Hamburg, Germany

Novel Physics-Based Machine-Learning Models for Indoor Air Quality Approximations

AHMAD MOHAMMADSHIRAZI, AIDA NADAFIAN, AMIN KARIMI MONSEFI, MOHAMMAD H RAFIEI, RAJIV RAMNATH

29TH ACM SIGKDD - KDD

2023

- Conference On Knowledge Discovery And Data Mining
- Long Beach, California, USA

Smart and collaborative industrial IoT: A federated learning and data space approach

BAHAR FARAHANI AND AMIN KARIMI MONSEFI

Elsevier - Journal - Impact Factor 7.5

2023

- Journal: Digital Communications and Networks

Will there be a construction? Predicting road constructions based on heterogeneous spatiotemporal data

AMIN KARIMI MONSEFI, SOBHAN MOOSAVI AND RAJIV RAMNATH

30th ACM SIGSPATIAL

2022

- Conference: International Conference on Advances in Geographic Information Systems
- Seattle, Washington, USA

Professional Experiences

Higharc

North Carolina, USA

MACHINE LEARNING INTERN

May 2024 - Aug 2024

- Conducting research on semantic and panoptic segmentation tasks.
- Utilizing unlabeled data to pre-train a DETR-based model and addressing challenges of limited labeled data with Self-Supervised learning.
- Implementing domain adaptation approaches to generalize models across multiple datasets with distinct distributions. Also, developing strategies to transfer a trained model from one domain to another effectively.

JIBB

San Francisco, USA

SENIOR MACHINE LEARNING ENGINEER

Dec 2020 - Dec 2021

- Detected and removed unwanted objects from images and videos using advanced object detection techniques.
- Implemented methods to detect colors, remove shadows, and eliminate reflections from images and videos.
- Developed and optimized various U-Net-based architectures to enhance image and video processing tasks.
- Utilized machine learning algorithms and computer vision techniques for real-time image and video enhancement.

BlueBitSoft

Tehran, Iran

CTO

Dec 2018 - Dec 2021

- Served as the technical consultant, providing strategic guidance and oversight for technical projects.
- Designed high-level architecture for pharmacy software solutions, ensuring scalability, reliability, and efficiency.
- Collaborated with cross-functional teams, including software developers and business experts, to align technical strategies with business goals.
- Implemented best practices in software engineering, including agile methodologies and continuous integration/continuous deployment (CI/CD) pipelines.
- Led efforts to enhance software performance and security, ensuring compliance with industry standards and regulations.

TAPSI (Online Taxi)

Tehran, Iran

SENIOR DATA SCIENTIST & BACK-END DEVELOPER

Mar. 2018 - Dec 2020

- Designed and implemented pricing micro-services using Python, communicating through event messaging with RabbitMQ.
- Developed a fake GPS detection algorithm to prevent fraud and have a safe and secure system.
- Created intelligent backend features based on passengers' data, including origin suggestion, destination suggestion, favorite location suggestion, and ride suggestion using unsupervised.
- Implemented a micro-service for estimated arrival time (ETA) using drivers' GPS information. Introduced a new algorithm for ETA based on GPS data and published a paper on this work. I also published a paper in this manner.
- Developed a smart map for predicting locations with higher ride demand rates in cities.
- Utilized Python and Node.js for back-end development, Spark, Kafka, and R for analytical purposes, and PostgreSQL, MongoDB, and Redis.

Honors & Awards

ACM-ICPC COACH AND TEAM LEAD

Apr 2018	Coach , 42nd Annual World Finals	Beijing, China
Dec 2017	Coach , 7th and 17th teams, Regional Contest	Tehran, Iran
Nov 2017	Coach , 10th and 16th teams, Internet Programming Contest	Tehran, Iran
Oct 2017	Coach , The 1st team, Regional Contest	Kabul, Afghanistan
Oct 2017	Coach , The 1st team, Online Programming Contest	Kabul, Afghanistan
Oct 2015	Coach , The 11th team, Iran-Internet-PC-IU Online Programming Contest	Tehran, Iran
Oct 2015	Coach , The 23rd team, Iran-Internet-PC-SBU Online Programming Contest	Tehran, Iran
Nov 2014	Coach , The 12th, 53rd, and 131st teams, Internet Programming Contest	Tehran, Iran

ACM-ICPC CONTESTANT

Dec 2014	10th Place , Asia Regional Contest	Tehran, Iran
Oct 2014	2nd Place , Qualification Contest, Shahid Beheshti University	Tehran, Iran
Dec 2013	3rd Place , Asia Regional Contest	Tehran, Iran
Oct 2013	1st Place , Qualification Contest, Shahid Beheshti University	Tehran, Iran
May 2013	5th Place , The 5th ACM National Collegiate Programming Contest, University of Kashan	Kashan, Iran
Apr 2013	8th Place , The 1st ACM National Collegiate Programming Contest, University of Shahrood	Shahrood, Iran
Dec 2012	25th Place , Asia Regional Contest	Tehran, Iran
Nov 2012	16th Place , The 3rd ACM National Collegiate Programming Contest, Amir Kabir University of Technology	Tehran, Iran
Oct 2012	2nd Place , Qualification Contest, Shahid Beheshti University	Tehran, Iran

OTHER

June 2015	Ranked 1st , National M.Sc Entrance Exam of Computer Engineering, Among More Than 10.000 Students	Iran
June 2011	Ranked Top 1% , National B.Sc Entrance Exam of Mathematics, Among More Than 256,000 Students	Iran
Mar 2009	Bronze Medal , Mathematics Olympiad of Waterloo University	Tehran - Waterloo

Teaching Experiences

TEACHING ASSISTANT

4 times **Modeling and Problem Solving with Spreadsheets and Databases**, Fall 22/23 and Spring 23/24
 Spr 2012 **Introduction to Programming**, Teacher: Dr. A. M. Aznaveh
 Fall 2012 **Introduction to Programming**, Teacher: Dr. A. M. Aznaveh
 Spr 2013 **Introduction to Programming**, Teacher: Dr. M. H. Moayeri
 Spr 2013 **Discrete Mathematics**, Teacher: Dr. F. Safaie
 Fall 2013 **Discrete Mathematics**, Teacher: Dr. H. Haghighi
 Spr 2014 **Discrete Mathematics**, Teacher: Dr. F. Safaie
 Spr 2015 **Introduction to Algorithm**, Teacher: Dr. E. Bavafaye
 Fall 2015 **Data Structure**, Teacher: Dr. M. E. Moghadam
 Fall 2015 **Artificial Intelligence**, Teacher: Dr. M. Shamsfard
 Fall 2015 **Introduction to Algorithm**, Teacher: Dr. R. Ghavamizade
 Fall 2016 **Data Structure**, Teacher: Dr. M. E. Moghadam
 Fall 2016 **Artificial Intelligence**, Teacher: Dr. M. Shamsfard
 Spr 2017 **Discrete Mathematics**, Teacher: Dr. H. Haghighi
 Spr 2018 **Discrete Mathematics**, Teacher: Dr. H. Haghighi

Ohio State Uni
Shahid Beheshti Uni
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