Amirhossein **Kazerouni**

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Education

Iran University of Science and Technology (IUST) *Tehran, Iran*

B.S. in Electrical Engineering *Sep. 2017 - Feb. 2022*

- **GPA:** 17.95/20 (3.85/4)
- **Thesis topic:** Design, Simulation, and Construction of an Autonomous Vehicle with Environment Perception, Planning, and Control Capabilities. **(Thesis Grade: 20/20)** — **Supervisor:** Dr. Saeed Shamaghdari, associate professor at IUST

Publications

Moein Heidari*, **Amirhossein Kazerouni***, Milad Soltany*, Reza Azad, Ehsan Khodapanah Aghdam, Julien Cohen-Adad, and Dorit Merhof (2022). **HiFormer: Hierarchical multi-scale representations using transformers for medical image segmentation**. ***Accepted*** *in* ***WACV 2023*** (**Paper**, **GitHub**)

Amirhossein Kazerouni, Amirhossein Heydarian, Milad Soltany, Aida Mohammadshahi, Abbas Omidi, and Saeed Ebadollahi (2022a). **An Intelligent Modular Real-Time Vision-Based System for Environment Perception**. ***Accepted*** *in* ***NeurIPS 2022 Workshop*** *on Machine Learning for Autonomous Driving* (**Paper**, **GitHub**, **Workshop Page**)

Amirhossein Kazerouni, Ehsan Khodapanah Aghdam, Moein Heidari, Reza Azad, Mohsen Fayyaz, Ilker Hacihaliloglu, and Dorit Merhof (2022b). **Diffusion Models for Medical Image Analysis: A Comprehensive Survey**. *Submitted to* ***Medical Image Analysis Journal*** (**Paper**, **GitHub**)

Milad Soltany Kadarvish*, Hesam Mojtahedi*, Hossein Entezari Zarch*, **Amirhossein Kazerouni***, Alireza Morsali, Azra Abtahi, and Farokh Marvasti (2021). **Ensemble Neural Representation Networks**. *arXiv preprint arXiv:2110.04124* (**Paper**, **GitHub**)

Reza Azad, **Amirhossein Kazerouni**, Moein Heidari, Abin Jose, Ehsan Khodapanah Aghdam, Yiwei Jia, Amirali Molaei, Rijo Roy, Johannes Stegmaier, Ehsan Adeli, and Dorit Merhof (2022). **Medical Image Analysis with Transformers: A Review**. *Prepared for submission* (**GitHub**)

***** *denotes equal contribution.*

Research Interests

- Computer Vision
- Deep Learning
- Machine Learning
- Computer Graphics
- Medical Image Processing
- Diffusion Models
- Transformers
- Autonomous Driving

Honors & Awards

2022	**Ranked 3rd** among 41 students who chose Control as a subfield	*IUST, Iran*
2022	**Ranked 4th** among 127 Electrical Engineering students	*IUST, Iran*
2021	**Ranked 1st** team in the national Rahneshan competitions for autonomous vehicles	*INEF, Iran*
2021	**Ranked 2nd** team in FIRA World Cup Competitions in Autonomous Cars League	*FIRA, Iran*
2015	**Ranked 1st** team in the A-lympiad National Mathematical Competition	*Iran*
2016	**Hold a diploma** from the A-lympiad World Mathematical Competition	*Utrecht University, Netherlands*
2017	**Ranked within the top 1%** among approximately 148,000 participants in the National University Entrance Exam	*Iran*

Skills

Programming	Python, MATLAB, C/C++, Latex, Familiar with HTML, CSS, PHP
AI Tools/ Libraries	PyTorch, TensorFlow, OpenCV, NPM (NumPy - Pandas - Matplotlib), etc.
Tools	Linux, Git

Research Experience

Research Assistant *Aachen, Germany*

RWTH Aachen University — Supervisor: Dr. Dorit Merhof and Reza Azad *2022 - Present*

- Worked on Transformer and Diffusion models, which resulted in one conference paper and two survey papers.
- Currently, I am working on using Diffusion Models in the medical field.

Machine Learning and Computer Vision Researcher
Montreal, Canada

DGSculptor
2021 - Present

- Worked on the "Ensemble Neural Representation Networks" paper and proposed a novel suboptimal ensemble architecture for Implicit Neural Representation (INR).
- Currently, I am working on using Transformers for Super-Resolution.

AI Researcher
IUST, Iran

AI and Control Lab — Supervisor: Dr. Saeed Shamaghdari
2019 - 2021

- Worked on "Fusion-Based 3D Shape Analysis in a Noisy Environment" project.

Computer vision Researcher
INEF, University of Tehran, Tehran

University of Tehran — Supervisor: Dr. Mohammad Ali Akhaee, Associate Professor at the University of Tehran
2019 - 2020

- Worked on "Statistical and Semantic Analysis of Football Game" project.

Teaching Experience

Teaching Assistant of "Principles of Mechatronics"
IUST, Iran

Instructor: Dr. Saeed Shamaghdari
Spring 2021

Working Experience

CEO and Co-founder
IUST, Iran

AIR (Artificial Intelligence and Robotics) Center
2020 - Present

- Teaching and mentoring Deep Learning, Machine Learning, and Python courses.

Major Projects

Autonomous Vehicle Environment Perception (Link, GitHub)
INEF, Iran

National Rahneshan Competitions
2021

- Designed and coded an environmental perception system for autonomous vehicles.

Automatic Parallel Parking (Link, GitHub)
INEF, Iran

National Rahneshan Competitions
2021

- Implemented a parallel parking system that includes path planning, path tracking, and parallel parking.

Statistical and Semantic Analysis of Football Game (Link, GitHub, Website)
INEF, Iran

Supervisor: Dr. Mohammad Ali Akhaee
2019 - 2020

- Created the bird's eye view of the soccer field by predicting the homography matrix using GANs.
- Created a Telegram bot with PHP to collect voice data to create a voice spotting dataset.

Fusion-Based 3D Shape Analysis in a Noisy Environment Using Stereo Camera (Link)
IUST, Iran

Supervisor: Dr. Saeed Shamaghdari
2019 - 2021

- Proposed a fusion-based multi-stage approach that performs 3D shape analysis on vehicles to measure the amount of load protrusion.

Design, Simulation, and Construction of an Autonomous Vehicle with Environment Perception, Planning, and Control Capabilities (Link)
IUST, Iran

Supervisor: Dr. Saeed Shamaghdari
Sep. 2021

- Designed and built a toy self-driving car from scratch.

Autonomous Car Simulation Based on AVIS Engine (Link, GitHub)
FIRA, Iran

FIRA World Cup Competitions
Summer 2021

- Developed an autonomous car having control and environment perception capabilities.

Persian-OCR (Link, GitHub)
Iran

Personal project
Mar. 2021 - Jun. 2021

- Developed software in Python that lets you label your desired language words with AI.

Languages

English **IELTS (Academic):** (Listening: 8, Reading:7, Speaking:6.5, Writing:6.5, **Overall:7**), **C1 Proficiency**

Persian **Native**