

# 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

1. Moein Heidari\*, Amirhossein Kazerouni\*, Milad Soltany\*, Reza Azad, Ehsan Khodapanah Aghdam, Julien Cohen-Adad, and Dorit Merhof (2023). **HiFormer: Hierarchical multi-scale representations using transformers for medical image segmentation**. In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, pages 6202–6212 ([Paper](#), [GitHub](#))
2. Amirhossein Kazerouni, Amirhossein Heydarian, Milad Soltany, Aida Mohammadshahi, Abbas Omid, and Saeed Ebadollahi (2022). **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](#))
3. Amirhossein Kazerouni, Ehsan Khodapanah Aghdam, Moein Heidari, Reza Azad, Mohsen Fayyaz, Ilker Hacihaliloglu, and Dorit Merhof (2023). **Diffusion models in medical imaging: A comprehensive survey**. *Accepted in Medical Image Analysis Journal*, page 102846 ([Paper](#), [GitHub](#))
4. Sanaz Karimijafarbigloo, Reza Azad, Amirhossein Kazerouni, and Dorit Merhof (2023a). **MMCFFormer: Missing Modality Compensation Transformer for Brain Tumor Segmentation**. *Accepted in MIDL 2023 Conference* ([Paper](#))
5. Sanaz Karimijafarbigloo, Reza Azad, Amirhossein Kazerouni, and Dorit Merhof (2023b). **MS-Former: Multi-scale Self-guided Transformer for Medical Image Segmentation**. *Accepted in MIDL 2023 Conference* ([Paper](#))
6. Reza Azad, Amirhossein Kazerouni, Moein Heidari, Ehsan Khodapanah Aghdam, Amirali Molaei, Yiwei Jia, Abin Jose, Rijo Roy, and Dorit Merhof (2023b). **Advances in Medical Image Analysis with Vision Transformers: A Comprehensive Review**. *Submitted to Medical Image Analysis Journal* ([Paper](#), [GitHub](#))
7. Reza Azad, Rene Arimond, Ehsan Khodapanah Aghdam, Amirhossein Kazerouni, and Dorit Merhof (2023a). **DAE-Former: Dual Attention-guided Efficient Transformer for Medical Image Segmentation**. *arXiv preprint arXiv:2212.13504* ([Paper](#), [GitHub](#))
8. Milad Soltany Kadarvish\*, Hesam Mojtahedi\*, Hossein Entezari Zarch\*, Amirhossein Kazerouni\*, Alireza Morsali, Azra Abtahi, and Farokh Marvasti (2021). **Ensemble Neural Representation Networks**. *Submitted to Neural Processing Letters Journal* ([Paper](#), [GitHub](#))

\* denotes equal contribution.

## Research Interests

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

## Honors & Awards

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

## Skills

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

## Research Experience

### Remote Research Assistant

Aachen, Germany

RWTH AACHEN UNIVERSITY — SUPERVISOR: PROF. DORIT MERHOF AND REZA AZAD

2022 - Present

- Worked on Transformers and Diffusion models, which resulted in four conference papers and two survey papers.

### Remote Machine Learning and Computer Vision Researcher

Montreal, Canada

DGSCULPTOR

2021 - 2023

- Worked on the “Ensemble Neural Representation Networks” paper and proposed a novel suboptimal ensemble architecture for Implicit Neural Representations (INRs).
- Worked on using Transformers for the image super-resolution task.

### AI Researcher

IUST, Iran

AI AND CONTROL LAB — SUPERVISOR: PROF. SAEED SHAMAGHDARI

2019 - 2021

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

### Computer vision Researcher

Tehran, Iran

UNIVERSITY OF TEHRAN, IRAN’S NATIONAL ELITES FOUNDATION— SUPERVISOR: PROF. MOHAMMAD ALI AKHAEI, ASSOCIATE

2019 - 2020

PROFESSOR AT THE UNIVERSITY OF TEHRAN

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

## Teaching Experience

### Teaching Assistant of “Principles of Mechatronics”

IUST, Iran

INSTRUCTOR: PROF. SAEED SHAMAGHDARI

Spring 2021

## Working Experience

### CEO and Co-founder

IUST, Iran

AIR (ARTIFICIAL INTELLIGENCE AND ROBOTICS) CENTER

2020 - 2022

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

## Major Projects

### 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](#))

Tehran, Iran

SUPERVISOR: PROF. MOHAMMAD ALI AKHAEI

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: PROF. 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: PROF. 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