# 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

## 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**. *arXiv preprint arXiv:2207.08518* (**Link**, **PDF**)

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* (**Link**, **PDF**)

**Amirhossein Kazerouni**, Amirhossein Heydarian, Milad Kadarvish, Aida Mohammadshahi, Abbas Omidi, and Saeed Ebadollahi (2022). **An Intelligent Modular Real-Time Vision-Based System for Environment Perception**. *Under review*

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* (**Paper list**)

***** *denotes equal contribution.*

## Research Interests

- Computer Vision
- Deep Learning
- Machine Learning
- Computer Graphics
- Medical Image Processing
- Autonomous Vehicles
- Transformers
- Neural Representations

## Honors & Awards

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|---|---|---|
| 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 models which resulted in one conference paper and one survey paper.
- 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)**                                 *IUST, 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