Mohammad Javad Ahmadi

Ph.D. Candidate, AI & Data Engineer, Tehran, IRAN
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BIOGRAPHY

This is Mohammad Javad Ahmadi, born on December 5, 1996, in Sari, northern Iran. I graduated from NODET in 2015 with a Diploma GPA of 4.0/4.0. I received my B.Sc. in Electrical & Control Engineering from Amirkabir University of Technology in 2019, with a GPA of 3.9/4.0. Since 2019, I have been part of ARAS under the supervision of Prof. Hamid D. Taghirad, completing my M.Sc. with a GPA of 4.0/4.0. I am currently pursuing my Ph.D. in the same group, maintaining a GPA of 4.0/4.0. My primary research interests are Robotics, Artificial Intelligence, and Computer Vision. I lead the ARAS-Farabi AI and VR in Medical Robotics group, a collaboration between ARAS and Farabi Hospital.

HIGHLIGHTS

- Head of ARAS AI and VR in Medical Robotics (AVMR) Group, focusing on advancing surgical education, improving patient outcomes, analyzing surgeries, and medical image diagnosis.
- Technical Manager at SmarTeeth, specializing in dental imaging.
- AI and data engineer with 5+ years of professional experience in designing, developing, and deploying deep learning pipelines.
- Expertise in computer vision and data analysis with extensive research and practical experience.
- Led technical client engagements, presenting AI-based products and exploratory data analysis results.
- Team-player with strong communication and leadership skills.
- Mentor to AI Developers to help with their career goals with 4+ years of teaching experience in Python, Machine Learning, Deep Learning, Computer Vision, AI in Robotics, etc.

EDUCATION

- **Ph.D. Candidate: Electrical and Control Engineering** Sep., 2022–Present
  K. N. Toosi University of Technology *Tehran-IRAN*
  - Thesis: Advancing Surgical Video Analysis: Context-Aware Computer-Assisted Surgical Training.
  - Supervisor: Prof. Hamid D. Taghirad GPA: 4/4 (20/20)

- **Master's Degree: Electrical and Control Engineering** 2019–2022
  K. N. Toosi University of Technology *Tehran-IRAN*
  - Thesis: Development and implementation of eye surgery skill assessment techniques with emphasis on video data and its feedback.
  - Supervisor: Prof. Hamid D. Taghirad GPA: 4/4

- **Bachelor's Degree: Electrical and Control Engineering** 2015–2019
  Amirkabir University of Technology *Tehran-IRAN*
  - Thesis: Design and Implementation of an indoor positioning system for a four-wheeled robot.
  - Advisor & Supervisor: Dr. Mohammad A. Khosravi & Dr. Hajar Atrianfar GPA: 3.9/4

- **Diploma's Degree: Mathematics and Physics** 2011–2015
  National Organization for Development of Exceptional Talents (Sampad) GPA: 4/4 (20/20)

SKILLS

Programming/Scripting

- Python/OpenCV
  - PyTorch/CUDA
  - Tensorflow
  - Sklearn
- C/C++/MATLAB
- Django & SQL
- Qt & Flutter
- LaTeX & WordPress

Domain Knowledge

- AI & Computer Vision
- Deep Learning
- Machine Learning
- Data Science
- Natural Language Processing (NLP)
- Robotics
- Control Engineering

More information on My LinkedIn Page (click here).

WORK EXPERIENCES

- ARAS AI & VR | Farabi Eye Hospital — 2019–Present
  Computer Vision Engineer & Roboticist Head of ARAS AI and VR in Medical Robotics (AVMR) Group. 5+ years in development and deployment of AI & Robotics products.
- Robotics Society of Iran (RSI) | ICRoM & IEEE Conferences — 2019–Present
  IT Engineer, Publication, Information Technology & Student Committee Member
- SmarTeeth Startup | Smartory Startup — 2023–Present
  Technical Manager (AI, Computer Vision & Software Development)
- Mobtakeran Company — 2023–Present
  IT Engineer
- IWPCO, Iran Water & Power Resources Development Company — 2017–2019
  Control & Instrumentation Engineer
- Amirkabir Think Tank — 2017–2019
  Researcher (Electricity and Economy)

ACADEMIC EXPERIENCES

- Teaching Assistant:
  - Modern Control, Prof. Hamid D. Taghirad — Spring 2024 ()
  - AI in Robotics, Dr. Iman Sharifi — Spring 2024 ()
  - Machine Learning, Dr. Mahdi Aliyari-Shoorehdeli — Spring 2024 ()
  - Machine Learning, Dr. Mahdi Aliyari-Shoorehdeli — Fall 2023 ()
  - Fundamental of Intellogent Systems, Dr. Mahdi Aliyari-Shoorehdeli — Fall 2023 ()
  - Fault Detection and Diagnosis, Dr. Mahdi Aliyari-Shoorehdeli — Spring 2023 ()
  - Industrial Control, Prof. Hamid D. Taghirad — Spring 2023 ()
  - Robotics, Prof. Hamid D. Taghirad — Spring 2022 ()
- Reviewer:
  - IEEE Transactions on Control Systems Technology — 2023 – Present
  - IEEE Transactions on Medical Robotics and Bionics — 2023 – Present
  - Journal Of Control — 2023 – Present
  - International Conference on Robotics and Mechatronics — 2022 – Present
- Books:

- Contributing to the development of educational content related to the An Introduction to Robotics Book by Prof. Hamid D. Taghirad & Dr. MohammadAzam Khosravi. 2023

- Research Grants:
  - Joint grant of INSF (#4002766) and NIMAD (#4001190) funding agencies. 2022
    - Title: AI-based surgical skill assessment of capsulorhexis surgery by development of a comprehensive video dataset

SELECTED PROJECTS

- ARAS Surgical Analysis Software & Video-Guided Surgery System
- Video Understanding: Surgical Analysis, Skill Assessment and Transfer
- Computer-Aided Detection and Diagnosis in Medical Imaging
- Smart Surgical Training: Phantom, Gamification, and VR/MR approaches
- Selected Deep Learning Projects
  Image Captioning, Estimating Cryptocurrency Prices, Extractive Question Answering System, Intent Classification, Object Detection and Counting, Medical Imaging, Analysis of Satellite Images.

More information on My GitHub Page (click here).

SELECTED PUBLICATIONS

Resilient Consensus in Double-Integrator Systems with Switching Networks Facing Smart Attacks, 2019.
ARAS-Farabi Experimental Framework for Skill Assessment in Capsulorhexis Surgery, 2021.
Adaptive Robust Impedance Control of Haptic Systems for Skill Transfer, 2021.
Closed-form Inverse kinematics Equations of a Robotic Finger Mechanism, 2021.
An Observer-Based Responsive Variable Impedance Control for Dual-User Haptic Training System, 2022.
Surgical Instrument Tracking for Capsulorhexis Eye Surgery Based on Siamese Networks, 2022.
Video-based Surgical Skill Assessment using Tree-based Gaussian Process Classifier, 2023.
Advanced Deep Learning-Based Approach for Tooth Detection, and Dental Cavity and Restoration Segmentation in X-Ray Images, 2023.
AI-Driven Keratoconus Detection: Integrating Medical Insights for Enhanced Diagnosis, 2023.
Toward Keratoconus Diagnosis: Dataset Creation and AI Network Examination, 2023.
Image Processing and Machine Vision in Surgery and Its Training, 2023.
AugmenTory: A Fast and Flexible Polygon Augmentation Library, 2024.

More information on Google Scholar (click here).

HONORS

- Ranked 9th (National (IRAN) Rank) in the Entrance Exam for PhD Admission in Control Engineering [Summer 2022].
- Ranked 1st in The 6th festival of selected seminars in electrical and computer engineering [Feb. 2021].
- Among the top 10 projects in the Bachelor's degree program at Amirkabir University of Technology [Summer 2019].
- Ranked among Top 0.1% in Iran's National University Entrance Exam (over 180,000 participants)

[Summer 2015].

LANGUAGE SKILLS

- Persian Native
- English Fluent
  - MSRT Score: 80

Certificates

- Structuring Machine Learning Projects
- Neural Networks and Deep Learning

More information on My Personal Website (click here).

SELECTED COURSE GRADES

Graduate

- Deep Learning: 20.0/20
- Soft Computing: 20.0/20
- Model Predictive Control: 20.0/20
- Bio-Mechatronic Systems: 20.0/20
- Parallel Robots: 19.5/20
- Advanced Robotics: 18.0/20
- Optimal Control: 19.5/20
- Large-Scale Systems: 19.0/20
- Nonlinear Control Systems: 18.5/20
- Fault Detection and Diagnosis: 18.5/20
- Industrial Internet of Things (IIoT): 18.5/20

Undergraduate

- Instrumentation: 20.0/20
- Linear Algebra: 20.0/20
- Modern Control: 19.5/20
- Numerical Analysis: 19.5/20
- Computational Intelligence: 19.0/20
- Industrial Control: 18.0/20
- Linear Control Systems: 18.0/20
- Electronic (III): 20.0/20
- Logic Circuits: 18.5/20
- Power Systems Analysis: 19.0/20
- Electrical Machines: 18.0/20

References, Further information, and Proofs are available upon Request.