Mohammad Javad Ahmadi

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

Mohammad Javad Ahmadi was born in December 5, 1996 in Sari near the Caspian Sea in northern Iran. He graduated from NODET in 2015 with a Diploma GPA of 4/4 (20/20). He received his B.Sc. in Electrical & Control Engineering from Amirkabir University of Technology (Tehran Polytechnic) in 2019 with a GPA of 3.9/4. Since 2019, he has been a part of ARAS under the supervision of Prof. Taghirad and completed his M.Sc. with a GPA of 4/4. He is currently pursuing his Ph.D. in this group with a GPA of 4/4 (20/20). Robotics, Artificial Intelligence, and Computer Vision are his main favorite research topics. As a result of ARAS and Farabi Hospital's cooperation, he directs ARAS-Farabi AI and VR in Medical Robotics group.

HIGHLIGHTS

- Artificial intelligence and data engineer with 5+ years of professional experience in design, development, and deployment of deep learning pipelines.
- Highly experienced in Computer Vision and Data Analysis with 5+ years of research and practical experience.
- Lead technical engagement with clients in presenting AI-based products and exploratory data analysis results.
- Team-player with strong communication and leadership skills.
- Head of ARAS AI and VR in Medical Robotics (AVMR) Group, focusing on advancing surgical education, improving patient outcomes, analyzing surgeries, and diagnosing medical images.
- SmarTeeth startup's Technical Manager specializing in dental imaging.
- Mentor to AI Developers to help with their career goals with 3+ 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)

WORK EXPERIENCES

- ARAS | AI & VR 2019–Present
  Computer Vision Engineer & Roboticist
  3+ years in development and deployment of AI & Robotics products. Head of ARAS AI and VR in Medical Robotics (AVMR) Group.

- Farabi Eye Hospital 2020–Present
  AI & Data Engineer

- Robotics Society of Iran (RSI) 2021–Present
  IT Engineer

- SmarTeeth Startup 2023–Present
  Technical Manager (AI, Computer Vision & Software Development)

- Smartory Startup 2023–Present
  Technical Manager (AI, Computer Vision & Software Development)

- Mobtakeran Company 2023–Present
  IT Engineer

- ICRoM & IEEE Conferences 2019–Present
  IT Engineer, Publication, Information Technology & Student Committee Member

- 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

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).

SELECTED PROJECTS

- ARAS Surgical Analysis Software & Video-Guided Surgery System ARAS Page
- Video Understanding: Surgical Analysis, Skill Assessment and Transfer ARAS Page
- Computer-Aided Detection and Diagnosis in Medical Imaging ARAS Page
- Smart Surgical Training: Phantom, Gamification, and VR/MR approaches ARAS Page
- Selected Deep Learning Projects GitHub Page
  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 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

Certificates

- Structuring Machine Learning Projects
- Neural Networks and Deep Learning

More information on My Personal Website (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

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