Arman Asgharpoor Golroudbari

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Research Interest

Machine Learning: Using AI in **State Estimation** and **Sensor Fusion**
Computer Vision: **Vision-Based Autonomous Robot Navigation**
Navigation: **Spacecraft Navigation**, Machine Learning, and Computer Vision Approach

Education

University of Tehran — M.Sc. Space Engineering *Sep. 2019 – Sep. 2022*
- **School Ranking**: 1st in Iranian Universities (U.S, News) *GPA:4.0/4.0*
- **Oxford** Machine Learning Summer School (**OxML 2022**)
- **Thesis:** AI Application in Inertial Navigation
  - Sensor fusion algorithms were combined with Deep Learning to improve inertial attitude estimation accuracy
  - Ray and Sherpa were used for Hyperparameter Optimization (PBT, Grid & Random Search) in Python (Keras & Pytorch)
    - *End-to-End ANN Frameworks were developed for Inertial Odometry (6DoF & 9DoF)*
    - *End-to-End ANN Frameworks were developed for Attitude Estimation (2DoF & 3DoF)*

Academic Center for Education, Culture and Research — Healthcare MBA *Apr. 2019 – Apr. 2020*
- **Projects:** *GPA:4.0/4.0*
  - *Elderly tourism*
  - *Application of AI in personalized medicine*

Aviation Industry Training Center— B. Eng. Avionics *Sep. 2016 – Jun. 2019*
GPA:3.8/4.0

Civil Aviation Technology College — A.E.T Avionics *Jan. 2013 – Sep. 2016*

Research Experience

Summer Project, *University College London* *Jul.2022 – Present*
Use **Generative Adversarial Imitation Learning** and **Reinforcement Learning**
- Created path planning of a ground robot via Python in the ROS environment.

Former of Fuzzy Logic Lab *Nov. 2020*
Universal Scientific Education & Research Network Interest Group
- Aimed to do research on Multi-Criteria Decision Making

ShadX Team Leader, *AIAA Aircraft Design Competition* *Aug. 2020*
- As a Graduate Team Aircraft Design, designed a modern regional jet family

Referee of Research Council, *Students' Scientific Research Center* *Apr. 2019 – Present*
- Evaluated research proposals

CNC Milling Machine Design and Fabrication, *Aviation Industry Training Center* *Jul. 2019 – Jan. 2020*
- Used embedded systems to control CNC
- Used SolidWorks and Inventor to design the structure

CanSat Competition Design and Fabrication, *University of Tehran* *Sep. 2019 – Mar. 2020*
- Used Raspberry Pi for Computer Vision and Pattern Detection
- Sensor Fusion implemented for Navigation and State Estimation (KF Family)

Wireless Power Transmission (WPT) for Medical Purposes *Sep. 2018 – Jul. 2019*
Circuit Designer and Analyzer
- Used ANSYS, ADS, CST, and Altium Designer to design and analyze the circuit

Publications

1. **A. Asgharpoor**, M. H. Sabour, **A Receding Horizon Iterative Learning (RHILC) Approach to Formation Control of Multi-Agent Non-Holonomic System**, *Aeronautical Journal*, Under Review
2. **A. Asgharpoor** and M. H. Sabour, **End-to-End Deep Learning for State Estimation: Attitude and Heading Estimation Approach**, *Sensors*, Drafting
3. **A. Asgharpoor** and M. H. Sabour, **Deep Neural Network based Inertial Attitude Estimation using Low-Cost IMU**, *IEEE Transactions on Mobile Computing*, Drafting
4. **A. Asgharpoor** and M. H. Sabour, **6-Axis Deep Neural Network Inertial Odometry,** *Expert Systems with Applications*, Drafting
5. **A. Asgharpoor** and M. H. Sabour, "**Deep Learning based 9-DoF Inertial Odometry for Autonomous Aerial Robots,**" *Drones*, Drafting
6. **Asgharpoor** and M. H. Sabour, **Neural Network-Based Estimation: A Review**, *Neural Computing and Applications*, Drafting

Skills

Language	English (*Fluent*), Persian (*Native*)
Programming	Python (*Matplotlib*, *NumPy*, *Pandas*, *TensorFlow*, *Keras*), MATLAB, Simulink, Arduino, C++, LaTeX
CAD-CAM	CATIA, SolidWorks, Inventor, Proteus, Altium Designer, AutoCAD
CAE	CST, ADS, ANSYS Workbench, Abaqus, COMSOL
AI	Fuzzy Inference System, Deep Learning (*LSTM*, *CNN*, *TCN*, *etc.*), PBT Hyperparameter Optimization

Internships

IranAir, *Aircraft Avionics* *Sep. 2018 – Nov. 2018*

Used ATR-72 and Airbus A-320 Aircraft Maintenance Manual (AMM) and Aircraft Illustrated Parts Catalog (IPC) for checking the aircraft's Engine and Avionics Instruments

Civil Aviation Technology College, *Avionics* *Sep. 2015 – Jun. 2016*

Used AMM to overhaul Aero Commander 690

Lab Experience

Space Lab, *University of Tehran* *Sep. 2019 – Sep. 2022*

- Used 3-DoF experimental test bed for integrated attitude dynamics and control
- Used LabView and ARM development boards

Fuzzy Logic Lab, *University of Tehran*, and *USERN* *Nov. 2019 – Present*

Done research on Fuzzy Inference Systems based projects, such as Fuzzy tuned complementary filters for IMU-based attitude estimation. *Advisor: Dr. M. H. Sabour*

Websites

- *University of Tehran Fuzzy Logic Lab*
- *USERN Fuzzy Logic Lab Interest Group*
- *ResearchGate*

Avionics Lab, *Aviation Industry Training Center* *Sep. 2018 – Sep. 2020*

Worked with Aircraft Instrument Panels and different flight instruments

- Altimeter, Attitude, Airspeed, Vertical Speed, and Heading Indicator

Electronics Lab, *Aviation Industry Training Center* *Sep. 2018 – Sep. 2020*

- Designed and assembled PCBs: *Fire extinguisher, Flight Management System (FMS) simulator and etc.*
- Used various measuring tools: *Function Generator, Oscilloscope, LCR meter, etc.*

Aircraft Instruments Lab, *Civil Aviation Technology College* *Oct. 2015 – Aug. 2016*

- Lab redesigned, and inventory management was done to improve student performance
- Repaired different flight instruments

Teaching Experience

Instructor – Lecturer, *Aviation Industry Training Center*

A total of 11 courses related to *electronics*, *navigation*, and *aviation* were taught

Internship Tutor

- B.Eng., Avionics Technology *Fall 2019 – Fall 2020*
- B.Eng., Aircraft Maintenance *Fall 2019 – Fall 2020*
- A.E.T., Avionics Technology *Fall 2018 – Fall 2020*
- A.E.T., Aircraft Maintenance *Fall 2018 – Fall 2020*

Lab Tutor

- Electronics I *Fall 2018 – Fall 2020*
- Electronics II *Fall 2018 – Fall 2020*
- Electronics III *Fall 2018 – Fall 2020*
- Electronic Circuits I *Fall 2018 – Fall 2020*
- Electronic Circuits II *Fall 2018 – Fall 2020*
- Microprocessors *Fall 2018 – Fall 2020*
- Aircraft Instruments *Fall 2018 – Fall 2020*

Mentor, *Space Generation Advisory Council* *Nov. 2020 – Present*

SGAC Mentoring Program

- Provide guidance, give personalized advice, and support to mentees

Research Assistant, *Aviation Industry Training Center* *Oct. 2018 – Sep. 2020*

Supervised undergraduate students working on the research project by

- Conducted literature reviews; collected, managed, and analyzed data
- Provided ready access to all experimental data for the faculty researcher and supervisor

Thesis Advisor, *Aviation Industry Training Center* *Sep. 2018 – Sep. 2020*

Supervised B. Eng. theses

- Design and Implementation of A 3 Axis CNC Machine
- Design and Implementation of A CNC Hot Wire
- Design and Implementation of Pulse Circuits Training Board
- Design, Simulate and Build an Aircraft Fire Extinguishing System
- Design and Implementation of Retractable Landing Gear

Work Experience

Martial Arts Instructor, *Iran Martial Arts Federation* *Mar. 2016 – Present*
Black Belt Dan II
- Improve communication skills by teaching students from various backgrounds

Manager, *Arman Imen Passargad* *Jan. 2013 – Present*
- Improve leadership and management skills by working with different people in harsh work environments

Leadership Experience

Universal Scientific Education & Research Network *Jan. 2021 – Jan 2022*
- ***6th* International USERN Congress & Prize Awarding Festival,** *Executive Member*
- **Research Weak,** *Executive Member*
- **Lab Techniques School,** *Executive Member*
- **Minatare Talk,** *Executive Member*
- **USERN Health & Art**, *7th International Festival of Paintings for Pediatric Patients, Executive Member*
- **R&D**, **Publicity**, **Media**, and ***IT*,** *Team Member*

Tehran University of Medical Sciences *Jan. 2014 – Dec. 2021*
- ***4th* Student Education Development Festival,** *Executive Member*
- ***20th*, *21st*,** and ***23rd* Conference of Annual General Meeting,** *Executive Member*

University of Tehran *Sep. 2019 – Jul. 2020*
- **Cultural Society KARA**, *Former*
- **Climate Change Conference,** *Organizer*

Night Sky Institute *Mar. 2017*
- **World Astronomy Week**, *Executive Member*

Civil Aviation Technology College *Jan. 2012 – Sep. 2015*
- **WaterRocket Competition,** *Organizer*
- **Road & Urban Development & The Related Industries Exhibition**, *Executive Member*
- ***3rd*, *4th*,** and ***5th* International Aviation & Space Industries Exhibition of Iran,** *Executive Member*

Pest Control – *Volunteer Work* *Jan.2013 – Present*
- Kahrizak Nursing Home
- Sarai Ehsan Social Victims Center
- Vardavard Welfare

Certificates

USERN
- *Submission & Peer Reviewing*
- *Data Analysis in SPSS*
- *Systematic Review*
- *Scientific Writing*
- *Meta-analysis*

University of Toronto (*Coursera*)
- *State Estimation and Localization for Self-Driving Cars*

DeepLearning.AI (*Coursera*)
- *Neural Networks and Deep Learning*

National Society of Professional Engineers
- *Bridging the Gap to Leadership*

MathWorks
- *MATLAB Onramp*

Membership & Affiliations

- University of Oxford Responsible Technology Institute Student Network
- Student Chapter of the European Low Gravity Research Association
- Space & Satellite Professionals International
- Educational Development Center, TUMS
- University of Tehran Chess Club
- Astronomers Without Borders
- Royal Aeronautical Society
- Space Generation Advisory Council

Awards & Honors

USERN Miniature Talk, *Appreciated Presenter* *Aug. 2021*

National University Entrance Exam, *Ranked top 10% in M.Sc. Aerospace Engineering* *2019*

University of Tehran, Dept. Aerospace, *Ranked 1st in Class 2019*

Iran Martial Arts Federation, *National Competitions*
- *Gold Medalist* *2011, 2012, 2018, 2019*
- *Silver Medalist* *2015*
- *Bronze Medalist* *2016, 2019*

Nearu Martial Arts, *Black Belt Dan II* *2015*