

Seyed Ahmad Hosseini Miangoleh

CONTROL ENGINEER · AI, REINFORCEMENT LEARNING & ROBOTICS

Amirkabir University of Technology (Tehran Polytechnic)

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Education

Amirkabir University of Technology (Tehran Polytechnic)

Tehran, Iran

B.Sc. IN ELECTRICAL ENGINEERING (CONTROL SYSTEMS)

Sept. 2021 – Present

- Minor in Robotics and Intelligent Systems.
- GPA: 3.18 / 4.00 (15.85/20.00)
- Last two years GPA: 3.45 / 4.00 (16.65/20.00)

Abu Taleb Bagheri High School, NODET

Neka, Mazandaran, Iran

HIGH SCHOOL DIPLOMA IN MATHEMATICS AND PHYSICS

Sept. 2018 – July 2021

- Member of NODET (National Organization for Development of Exceptional Talents).
- High School GPA: 4.00/4.00 (19.28/20.00)

Technical Skills

Programming Languages	Python, C++, C, MATLAB, JavaScript
ML & Deep Learning Frameworks	PyTorch, TensorFlow, Hugging Face, OpenAI Gym, Scikit-learn, Keras, Pandas
Robotics & Simulation	Webots, CARLA, Simulink
Development Tools	Linux, Git, VS Code
Hardware Platforms	Raspberry Pi, Arduino
Industrial Automation & PLC	Siemens SIMATIC STEP 7 (TIA Portal), PLC Programming (Ladder Logic), Factory I/O Simulation

Publications and Ongoing Research

BLIP-FusePPO: Vision-Language Model Enhanced Multimodal Reinforcement Learning for Autonomous Lane-Keeping

IEEE Transactions on Intelligent Vehicles

SEYED AHMAD HOSSEINI MIANGOLEH, AMIN JALAL AGHDASIAN, FARZANEH ABDOLLAHI

Under Review, 2025

- Developed a multimodal RL framework that fuses semantic embeddings from BLIP with geometric states, LiDAR data, and control feedback for autonomous driving.
- Designed a lightweight state representation preserving semantic awareness while eliminating on-the-fly VLM inference, enabling real-time deployment.
- Achieved a **54.5% RMSE reduction** compared to DDPG and a **44.4% performance improvement** over VL-SAFE across diverse driving scenarios.
- Validated policy stability and adaptability through extensive simulations.

A Hybrid Adaptive Imitation-Reinforcement-Inverse Reinforcement Learning Approach to Vision-Based Autonomous Driving

Ongoing Project

LEAD RESEARCHER

Jan. 2025 – Present

- Integrated *Behavioral Cloning* for imitation learning from expert vision-LiDAR trajectories with adaptive training frequency.
- Applied PPO in the mixed phase with prioritized replay and safety-aware rewards for stable reinforcement learning.
- Employed a discriminator-based IRL module to generate reward signals, guiding policy refinement toward expert-like behavior.
- Designed a phased training pipeline (Imitation → Mixed) with deviation-limited control, achieving safe navigation in Webots simulations.

Work Experiences

Tavan Resan Co.

Tehran, Iran

COMPUTER VISION & ROBOTICS INTERN

Jun 2024 – Sep 2024

- Developed a vision-based system for object measurement and 3D localization using OpenCV with full intrinsic/extrinsic camera calibration.
- Integrated the pipeline with a 6-DOF robotic arm for autonomous pick-and-place operations based on spatial data.
- Validated performance, achieving sub-centimeter positioning accuracy for industrial automation.

Honors & Awards

- 2021 **Ranked 270th**, Top 0.8% among 35,000+ Region 3 participants in the Iranian University Entrance Exam (Konkour) for B.Sc. in Engineering
- 2018 **Admitted to**, Abu Taleb Bagheri High School, Member of NODET (National Organization for Development of Exceptional Talents)

Selected Academic Projects

Multimodal RL for Autonomous Driving in Webots

Amirkabir University of Technology

REINFORCEMENT LEARNING – AUTONOMOUS DRIVING

2025

- Designed a deep RL framework integrating BLIP vision-language embeddings with LiDAR, control feedback, and geometric states, enabling robust lane-keeping in Webots simulations.
- Optimized state representation to maintain semantic awareness while removing runtime VLM inference overhead, achieving real-time performance.

A* Path Planning for Obstacle Avoidance with Computer Vision in Webots

Amirkabir University of Technology

COMPUTER VISION – PATH PLANNING

2025

- Developed an A* -based path planning system for real-time obstacle avoidance in Webots simulations.
- Applied computer vision for dynamic environment perception, improving autonomous navigation decisions.

End-to-End Generative AI Systems for Multilingual Alignment (RLHF)

Amirkabir University of Technology

LARGE LANGUAGE MODELS – MULTILINGUAL NLP

2025

- Built an end-to-end RLHF pipeline with FLAN-T5, leveraging PPO, DPO, and GRPO to improve coherence and human-preference alignment.
- Fine-tuned English–Persian translation models using LoRA and QLoRA, achieving competitive BLEU/ROUGE scores while minimizing computational cost.

Multimodal Speech Processing with Wav2Vec2

Amirkabir University of Technology

DEEP LEARNING – SPEECH PROCESSING

2025

- Developed a multimodal pipeline for 8-class Speech Emotion Recognition and ASR, processing raw audio and corresponding text transcriptions.
- Fine-tuned Wav2Vec2 models ([facebook/wav2vec2-large-xlsr-53](#) for SER, [facebook/wav2vec2-large-960h](#) for ASR) on CREMA-D, RAVDESS, TESS, and SAVEE datasets with enhanced preprocessing, augmentation, and class mapping.

Transformer for Twitter Emotion Detection

Amirkabir University of Technology

DEEP LEARNING – NATURAL LANGUAGE PROCESSING

2025

- Designed a Transformer in PyTorch for multi-class tweet emotion detection, leveraging GloVe embeddings and customized preprocessing.
- Integrated trainable positional encoding, oversampling for class balance, and dynamic learning-rate scheduling, enhancing model accuracy and generalization.

Self-Balancing Two-Wheeled Robot

Amirkabir University of Technology

ROBOTICS – AUTONOMOUS SYSTEMS

2025

- Built a modular two-wheeled self-balancing robot with Arduino UNO and L298N motor driver, using dual 25GA 330RPM DC motors and MPU6050 IMU for real-time tilt correction and stable motion under disturbances.

Autonomous Navigation Algorithms in Webots

Amirkabir University of Technology

ROBOTICS – AUTONOMOUS SYSTEMS

2025

- Developed a proportional controller for line-following robots in Webots, diagnosing control limitations and proposing PID with intersection detection to improve stability and accuracy.
- Built a maze-solving robot using iterative DFS in Webots and validated successful navigation; proposed BFS for shortest-path optimization.

RISC-V Single-Cycle Processor

Amirkabir University of Technology

COMPUTER ARCHITECTURE – DIGITAL DESIGN

2025

- Implemented a modular single-cycle RISC-V CPU in VHDL supporting R-type (ADD, SUB, AND, OR) and I-type (ADDI, ANDI, ORI, LW, SW) instructions, including PC, memory units, register file, ALU, immediate generator, and control unit.
- Validated CPU functionality via comprehensive testbenches across arithmetic, logical, immediate, and memory operations, ensuring hazard-free execution and correct control signaling.

TA and Workshop Experiences

Intensive MATLAB Programming Workshop

Amirkabir University of Technology

INSTRUCTOR & ORGANIZER

Jun. 2023

- Designed and taught an intensive MATLAB workshop focused on control system implementation.
- Led hands-on exercises and interactive problem-solving sessions for undergraduate engineering students.

Electronics II — Prof. Mehran

Amirkabir University of Technology

TEACHING ASSISTANT (LEAD TA)

Sep. 2024 – Dec. 2024

- Led problem-solving sessions during lectures and supported grading.
- Assisted students with circuit design and analysis.

Linear Control Systems — Prof. I. Sharifi

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING)

Sep. 2024 – Dec. 2024

- Supported tutorials and grading, provided guidance to students.

Instrumentation — Prof. I. Sharifi

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING)

Jan. 2025 – Jul. 2025

- Assisted in coursework and student support.

Introduction to Computational Intelligence — Prof. Abdollahi

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING, LABORATORY ASSISTANT)

Sep. 2025 – Dec. 2025

- Supported tutorials and coursework on fuzzy systems and neural networks.
- Assisted in laboratory sessions, guiding students through practical experiments and implementations.

Artificial Intelligence and Digital Transformation — Prof. Abdollahi

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING)

Sep. 2025 – Dec. 2025

- Assisted in coursework and student support.

Modern Control Systems — Prof. Atrianfar

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING)

Sep. 2025 – Dec. 2025

- Assisted in coursework and student support.

Industrial Control — Prof. Khosravi

Amirkabir University of Technology

TEACHING ASSISTANT (SUPPORTING)

Sep. 2025 – Dec. 2025

- Assisted in coursework and student support.

Passed Courses_____

Linear Algebra · Probability & Statistics · Linear Control Systems · Modern Control · Digital Control Systems · Introduction to Computational Intelligence · Introduction to Robotics · Machine Learning

Language Skills_____

Persian Native Proficiency
English TOEFL: Preparing to take the test

Hobbies_____

Martial Arts (Ninjutsu) — 3rd place nationally · Football · Volleyball · Photography · Swimming