

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)

B.Sc. IN ELECTRICAL ENGINEERING (CONTROL SYSTEMS)

- 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)

Tehran, Iran

Sept. 2021 – Present

Abu Taleb Bagheri High School, NODET

HIGH SCHOOL DIPLOMA IN MATHEMATICS AND PHYSICS

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

Neka, Mazandaran, Iran

Sept. 2018 – July 2021

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, L^AT_EX

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.

IRL-DAL: Hybrid RL with a Safety-Aware Diffusion Planner for Autonomous Driving

Ongoing Project

LEAD RESEARCHER

Jan. 2025 – Present

- Architected a novel hybrid framework (IRL-DAL) by synergizing IL, IRL, and PPO, achieving a **50% reward increase** over baselines.
- Engineered a safety-aware *Diffusion Planner* as a fallback, generating feasible actions to significantly reduce collision rates.
- Designed a *Learnable Adaptive Mask (LAM)* for dynamic visual attention, leading to a precise lateral deviation of only **0.105m**.
- Implemented a two-phase curriculum (Imitation → Mixed RL) with prioritized replay, ensuring stable policy convergence in Webots.

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 270 th , Top 0.8% among 35,000+ Region 3 participants in the Iranian University Entrance Exam (Konkoor) 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

- 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.

2025

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

Amirkabir University of Technology

LARGE LANGUAGE MODELS – MULTILINGUAL NLP

- 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.

2025

Multimodal Speech Processing with Wav2Vec2

Amirkabir University of Technology

DEEP LEARNING – SPEECH PROCESSING

- 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.

2025

Transformer for Twitter Emotion Detection

Amirkabir University of Technology

DEEP LEARNING – NATURAL LANGUAGE PROCESSING

- 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.

2025

Self-Balancing Two-Wheeled Robot

Amirkabir University of Technology

ROBOTICS – AUTONOMOUS SYSTEMS

- 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.

2025

Autonomous Navigation Algorithms in Webots

Amirkabir University of Technology

ROBOTICS – AUTONOMOUS SYSTEMS

- 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.

2025

RISC-V Single-Cycle Processor

Amirkabir University of Technology

COMPUTER ARCHITECTURE – DIGITAL DESIGN

- 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.

2025

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.

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.

Computer Vision — Prof. Shariatmadar

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