Seyed Ahmad **Hosseini Miangoleh**

CONTROL ENGINEER · ARTIFICIAL INTELLIGENCE & DEEP LEARNING SPECIALIST

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Professional Summary

Control Engineer with advanced expertise in Artificial Intelligence and Machine Learning, specializing in the design and deployment of intelligent systems for robotics, NLP, and computer vision. Combines a strong theoretical foundation from Amirkabir University of Technology with hands-on experience leading full-cycle projects from algorithmic research to real-world hardware/software implementation and optimization.

Research Interests

Core Focus	Reinforcement Learning (Safe RL, Multi-Agent Systems, Sim-to-Real Transfer), Autonomous Robotics
ML & Perception	Large Language Models for NLP & Dialogue, Computer Vision (3D Scene Understanding, Segmentation)
Intelligent Control	AI-Driven Control Strategies, System Integration, Human-Robot Interaction

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: ? /4.00 (15.85/20.00)
- Last two years GPA: ? /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** (Proficient), C++, C, MATLAB, JavaScript
ML & Deep Learning Frameworks	PyTorch, TensorFlow, Hugging Face, OpenAI Gym, Scikit-learn, Keras, Pandas, NumPy
Robotics & Simulation	Webots, CARLA, Simulink
Development Tools	Linux, Git, LaTeX
Hardware Platforms	Raspberry Pi, Arduino
Industrial Automation & PLC	Siemens SIMATIC STEP 7 (TIA Portal), PLC Programming (Ladder Logic), Factory I/O Simulation

Publications

BLIP-FusePPO: Vision-Language Model Enhanced Multimodal Reinforcement Learning for Autonomous Lane-Keeping — *IEEE Transactions on Intelligent Vehicles*

FIRST AUTHOR — *Under Review*

2025

- Developed a multimodal RL framework integrating semantic embeddings from BLIP with geometric states, LiDAR data, and control feedback for autonomous driving.
- Designed a lightweight state representation that retains semantic awareness while removing runtime VLM inference, enabling real-time deployment.
- Achieved a **54.5% RMSE reduction** over DDPG and **44.4% improvement** over VL-SAFE in varied driving scenarios.
- Conducted extensive simulations validating policy stability and adaptability.

Active Research & Paper Writing

Hybrid Imitation–Reinforcement Learning for Autonomous Navigation — *Amirkabir University of Technology*

Lead Researcher — *Tehran, Iran*

Jan. 2025 – Present

- Proposed an IL–RL fusion architecture combining Behavioral Cloning with PPO for lane-keeping and obstacle avoidance.
- Built a vision-based expert policy using camera lane detection and LiDAR obstacle data within a state-machine logic.
- Engineered a prioritized experience replay mechanism and dynamic action blending for robust policy transfer.
- Designed a phased training process (Imitation → Mixed → RL) with adaptive deviation control, achieving robust navigation in Webots simulations.

Internship

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 (Konkoor) for B.Sc. in Engineering

2018 **Admitted to,** Abu Taleb Bagheri High School, Member of NODET (National Organization for Development of Exceptional Talents)

Certifications

2024 **Image Processing and Computer Vision with OpenCV,** Maktabkhooneh — *Online*

2024 **Mastering Raspberry Pi Pico Programming with MicroPython,** FaraDars — *Online*

2024 **Mastering Git, GitHub, and GitLab: Your Ultimate Guide to Version Control,** FaraDars — *Online*

Academic Selected 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.

More Projects on GitHub

Github

Additional Projects — *Remote*

- For more projects, visit: github.com/Seyed07

Workshops

Intensive MATLAB Programming Workshop

Amirkabir University of Technology, Tehran, Iran

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.

Teaching Experience

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) — *Sep. 2025 – Dec. 2025*

- Supported tutorials and coursework on fuzzy systems and neural networks.

Passed Courses

- **Linear Algebra** — Prof. Shafiei
- **Differential Equations** — Prof. Vaezi Pour
- **Probability & Statistics** — Prof. Omidvar
- **Numerical Analysis** — Prof. Shakeri
- **Engineering Mathematics** — Prof. Moradi
- **Signals & Systems** — Prof. Aghaeinia
- **Linear Control Systems** — Prof. Sharifi
- **Modern Control** — Prof. Atrianfar
- **Digital Control Systems** — Prof. Talebi
- **Instrumentation** — Prof. Afshar
- **Machine Learning** — Prof. Seyedin
- **Computational Intelligence** — Prof. Abdollahi
- **Robotics** — Prof. Talebi
- **Communication Systems** — Prof. Mohammadi

Language Skills

Persian Native Proficiency

English TOEFL: Preparing to take the test)