Hossein Mosaffa

M.Sc. Control Systems | AI Researcher

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Education

M.Sc. in Electrical Engineering – Control Systems — Oct 2018 – Sep 2021
K. N. Toosi University of Technology - Tehran, Iran
Thesis title: Fault Detection and Isolation from Cyber-Attack in SCADA Systems Based on Network Parameters

B.Sc. in Electrical Engineering — Oct 2014 – Sep 2018
Amirkabir University of Technology (Tehran Polytechnic) - Tehran, Iran
Final Project: Irrigation Control System using IoT

High School Diploma — 2010 – 2014
Shahid Mofatteh High School - Jahrom, Fars, Iran

Research Interests

Learning-based control and reinforcement learning for robotic systems
Deep learning for safe and reliable control of cyber-physical and medical robotic systems
Artificial intelligence and machine learning for robotics
Combining model-based control theory (stability, robustness, fault detection) with data-driven methods for trustworthy decision-making

Honours & Achievements

Ranked 4th top student BSc Amirkabir in Control

Ranked 272nd among 83,262 participants in the Konkur (Iranian National University Entrance Exam) for Engineering - Summer 2014

Presented two talks at the 8th International Conference on Control, Instrumentation and Automation (ICCIA), March 2022

Top student among all students of Jahrom in the third grade of high school - Summer 2013

Projects

Fault Detection and Isolation from Cyber-Attack in SCADA Systems Based on Network Parameters *(M.Sc. thesis project)* - Designed a method to tell physical faults apart from cyber-attacks in a networked control system, combining fault-detection-filter residuals with network parameters such as delay and traffic, and tested it in OMNeT++ simulations.

Irrigation Control System using IoT *(B.Sc. final project)* - IoT-based automated irrigation with soil-moisture sensors and solenoid valves on ESP32 nodes, connected over MQTT to a Raspberry Pi server with a web dashboard for real-time monitoring and manual or automatic valve control.

BLDC Motor Control with Sliding Mode Controller - Speed/torque control of brushless DC motors using sliding mode technique.

Least Squares Iterative System Identification (MATLAB) - Implemented LSI parameter-estimation algorithms for multivariable CARMA, Box-Jenkins and Wiener nonlinear systems and compared them with recursive least squares in simulation.

IT Ticketing System (Python & SQL) - Web-based system for creating, tracking, and managing IT support tickets.

Laboratory Visit Report Logging System (Python & SQL) - Database application to record and store lab visit reports.

UGV Robot Control via Web (Arduino + Raspberry Pi) - Remote web interface for controlling an unmanned ground vehicle.

Traffic Control Simulation using Simulink - Model and simulate traffic signal and flow control systems.

Basic Controllers for Hybrid Vehicles (Matlab) - Design of fundamental control strategies for hybrid electric vehicles.

PID Controller for DC Motor (Simulink + Arduino) - Real-time PID speed control of a DC motor with Arduino and Simulink.

Publications

[1] H. Mosaffa and H. Khaloozadeh, "Detection and isolation of fault from cyber attack in SCADA systems using network parameters", *Tabriz Journal of Electrical Engineering*, vol. 51, no. 4, pp. 423–430, 2021.

[2] H. Mosaffa and H. Atrianfar, "Use of IoT in building an irrigation control system", poster presented at the 3rd International Conference on Internet of Things and Applications, University of Isfahan, Isfahan, Iran, 2019.

[3] H. Mosaffa and H. Khaloozadeh, "Detection and isolation of faults in a two-tank fluid system using the Beard Fault Detection Filter (BFDF)", oral presentation at the 8th International Conference on Control, Instrumentation and Automation (ICCIA), virtual, 2-3 March 2022.

[4] H. Mosaffa and H. Khaloozadeh, "Investigating the effect of cyber attack on network parameters in SCADA systems", oral presentation at the 8th ICCIA, virtual, 2-3 March 2022.

Work Experience

IT Specialist at National Standards Organization of Iran (INSO) Dec 2022 – Oct 2024

- Designed and implemented an IT ticketing system using Python and SQL
- Developed a laboratory visit report logging system using Python and SQL
- Managed internal information and communication technology infrastructure

Technical Skills

Control, modelling, and simulation: Control systems; dynamic-system modelling; fault detection and isolation; cyber-physical systems; MATLAB/Simulink; OMNeT++; networked control systems.

Machine learning and deep learning: Supervised learning; model evaluation; neural networks; CNNs for visual recognition; RNNs, GRUs, and LSTMs for sequential data; Transformers; transfer learning; hyperparameter tuning; regularization; optimization methods including Adam and RMSprop; TensorFlow/Keras.

Generative AI and LLM engineering: LLM application development; prompt design; frontier and open-source models; Hugging Face; LangChain; Gradio; retrieval-augmented generation (RAG); embeddings and vector databases; LoRA/QLoRA fine-tuning; multimodal LLM applications; function calling and agentic workflows.

Programming and software: Python; SQL; Git; Linux; web application development; data processing; Jupyter notebooks.

Embedded Systems & Hardware: Arduino, ESP32, Raspberry Pi, PLC (Programmable Logic Controllers)

Languages

English - IELTS Academic: 6.5 (Overall)

Taken: October 2025