Nevò **MIRZAI HAMADANI**

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EDUCATION

EPFL | *Master in Robotics (2nd year)* **Sep 2024 – July 2026**
- Minor in Data Science

EPFL | *Bachelor in Mechanical Engineering* **Sep 2021 – July 2024**
- 1 year exchange at the Chinese University of Hong Kong (CUHK)

SKILLS

Technical Python, ROS2 RL, DL, C++, C, Computer Vision, OpenCV, Git, Genesis, IsaacSim, IsaacLab, MATLAB, OpenAI gym, Pytorch, Optimization, Unity, IK

Laboratory Soldering, electrical circuits, CAD, 3D Printing

RESEARCH PROJECTS

Hand Gesture Control for Drone Swarms with VR
- Developed an intuitive system for controlling a swarm of drones using hand gestures.
- Translating hand movements captured by a Meta Quest 3s into commands through dimensionality reduction.
- Used Swarming algorithms, such as a modified Olfati Saber version.

Aerial Additive Manufacturing Physics-Based Simulation
- Developed Simulation framework for Aerial Additive Manufacturing using the Genesis physics engine.
- Brought together interactions between fluid dynamics and printing drones.
- Modeled viscoelastic curing and expanding fluids using the Material Point Method.

PROJECTS

Eye Tracking Headlamp (This semester)
- Developing a headlamp that follows the user's gaze.
- Using a Rasperry pi 5, an optical camera, an infrared camera and servomotors.
- The system uses closed loop control with an optical camera to check if the headlamp is pointing where the person is looking.

Data Augmentation Box (This semester)
- Automating the process of taking pictures used for data augmentation in object recognition models.
- Created a structure that changes it's environment (background, lighting etc) in order to get diversified pictures of the same object.
- Fine-tuned the object detection model on these images (YOLO v12s-obb).

Reinforcement Learning for Quadruped Robot Locomotion
- Trained a SAC Reinforcement Learning policy to achieve quadruped robot locomotion, including high/low velocity gait control and stair climbing.
- Analyzed and implemented movement algorithms (e.g., Central Pattern Generators (CPG), Cartesian PID) for quadruped robot control in an OpenAI Gym simulation environment.

AI model training for Hate Speech prediction
- Fine-tuned GPT-2 and BERT to predict the probability that hate speech will be used in a phrase given the context, then compared the results.
- Multi-Modal model training, using Fusion layer.

Clickbait data analysis: is clickbait recognizable from data
- Analyzed metadata from YouTube and developed ML algorithms to find indicators of clickbait videos.

Inverse RL research
- Deep academic research into the limitations and possible solutions of current IRL methods.

Chocolate recognition with Deep Learning
- Trained a NN to recognize and count the number of different chocolates in multiple images with different backgrounds.

Computer Vision Navigation for a Robot
- Implemented vision, Kalman filter, and path planning for a Thymio robot.
- Developed the vision system utilizing OpenCV.

Autonomous Vehicle Navigation System Using MPC
- Developed a simplified autonomous vehicle navigation system in simulation (MPC).

Autonomous drone racing
- Programmed a Crazyflie drone to race a given trajectory autonomously.
- Path planning, Optimization, Computer Vision (used in simulation).

Billiard Game Analysis through Computer Vision
- Analyzed billiard game dynamics using MATLAB, C, and LabVIEW.
- Developed an analysis method to study game mechanics and recognize the winner.

Robotic Arm Simulation for Scaffolding Applications
- Simulated inverse kinematics for a robotic arm to assist in scaffolding construction in Hong Kong.

Quadcopter Design and Stabilization
- Programmed PID stabilization from scratch using an MPU and an Arduino.
- Designed and 3D printed drone parts, soldered electronics.

EXPERIENCE

Student Mentor **Sep 2022 – January 2026**
- Supporting 1st year students during their academic year with advice and practical help.

EPFL Rocket Team **Sep 2022 – June 2024**
Vertical landing rocket research project (Icarus)
- Developed the Gimbal design to move the engine freely in 2 DOF.
- In charge of choosing the Ball Bearings used in the structure.

AWARDS - INTERESTS - LANGUAGES

Guinness World Record (2017): Most drones built and flown simultaneously (U18)

Judo (18 years experience, pre-professional level)

English C1, French C1, Italian C2, German B1

Swiss, Italian | CH | 30.10.2001