Nevò **MIRZAI HAMADANI**

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EDUCATION

EPFL | *1st Year Robotics Master* **Sep 2024 – (July 2026)**
- Minor in Data Science
- Semester project in VR hand control of a drone swarm

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

SKILLS

Technical Python, C++, C, MATLAB, LabVIEW, CAD, LaTeX, Git, IsaacGym, OpenAI gym, ROS2, Pytorch, Optimization, Reinforcement Learning, Computer Vision, OpenCV, Unity

Laboratory Soldering, electrical circuits, CAD, Arduino

PROJECTS

AI Text-Audio model training for Hate Speech prediction
- Deep learning course project.
- Fine-tuned a Hate Speech detection model specifically to predict whether Hate Speech is going to be used given the context.
- Multi-Modal model training, using Fusion layer.

Reinforcement Learning training for a Quadruped Robot
- Legged Robots Course Project
- Analyzed and developed basic movement algorithms (e.g. CPG, Cartesian PID) for a quadruped robot in simulation with OpenAI gym.
- Selected and optimized training parameters, including learning algorithms and environment configurations.
- Designed and refined reward functions.

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

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

Computer Vision Navigation for a Robot
- Mobile Robotics Course Project using Thymio robots
- Implemented vision, filtering, and path planning to reach designated goals.
- Developed the vision system utilizing OpenCV.

Autonomous Vehicle Navigation System Using MPC
- MPC Course Project
- Analyzed existing Model Predictive Control (MPC) methods.
- Developed and implemented a simplified autonomous vehicle navigation system.

Autonomous drone racing
- Programmed a Crazyflie drone to race a given trajectory autonomously
- Computer Vision used in the simulation before testing on the real drone.
- Path planning, obstacle avoidance

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

Hand Gesture Control for Drone Swarms with VR
- Developing an intuitive system for controlling swarms of drones using hand gestures.
- Translating hand movements into commands through dimensionality reduction techniques.
- Using the Meta Quest 3s VR headset
- Integrating vision systems and machine learning

Robotic Arm Simulation for Scaffolding Applications
- Introduction to Robotics Course Project
- Simulated inverse kinematics for a robotic arm to assist in scaffolding construction in Hong Kong.
- Executed real-time computations for practical scaffolding scenarios.

Quadcopter Design and Stabilization
- Designed and 3D printed the drone structure using CAD.
- Programmed stabilization using C++ with a 6-axis accelerometer and gyroscope.
- Assembled electronic circuits and implemented PID control to achieve drone stability.

Clickbait data analysis: is clickbait recognizable from data (This semester)
- Using the Youniverse dataset
- Analysed metadata from Youtube and developed ML algorithms to find clickbait videos

Data Augmentation Box (This semester)
- Automated the process of taking pictures used for data augmentation in object recognition models
- Created a machine using a changing and rotating background, lights, cameras, in order to get different pictures.
- Developed the object detection model (YOLO v12) and implemented systematic training for every new object.

Eye Tracker Headlamp (This semester)
- Developed a system that uses cameras and servomotor in order to make the headlamp beam parallel to the user's gaze
- Using Rasperry pi 5, an optic camera, an infrared camera and two servomotors (+ power supply etc)
- The system uses a closed loop control using the optic camera to see if the headlamp is pointing where the person is looking

EXPERIENCE

EPFL Rocket Team **Sep 2022 – June 2023**

Vertical landing rocket research project (Icarus)

- Made the draft for the mobile structure holding the engine.
- Was in charge of the bearings used in the structure.
- Regularly reported on product quality using review portal.

AWARDS - INTERESTS - LANGUAGES

Guinness World Record (2019): Most drones built and piloted at the same time by minors

Judo (18 years experience, pre-professional level)

English C1, French C1, Italian C2, German B1