Arturo Flores Alvarez

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EDUCATION

University of California, Los Angeles (UCLA)   **California, USA**
Candidate in PhD Mechanical Engineering (Systems & Control + Robotics) – MS conferred in S24   *Sep 2022 – Jun,2027*
- *Teacher Assistant:* Introduction to MATLAB (undergrad) and Kinematics of Robotics Systems (grad)

Swiss Federal Institute of Technology, Zurich (ETH)   **Zurich, Switzerland**
Worldwide Scholarship - (Acceptance ratio: 8.9%) + Visiting Researcher in S24   *Jul 2023 – Aug, 2023*

RESEARCH EXPERIENCE

ETH, Zurich – Deep Reinforcement Learning   **Zurich, Switzerland**
RobotX Fellowship - Computational Robotics Laboratory (CRL)   *July 2023 - Ongoing*
- Developed a Deep Reinforcement Learning (RL) solution to teach a simulated Robotis OP3/OP2 humanoid robot how to kick a ball in a Soccer Environment (Demo). Simulated and Implemented on Hardware.
- Utilized Legged Gym library, and Pytorch for simulation and training, and libtorch for hardware implementation.

Visiting Researcher - Computational Robotics Laboratory (CRL)   *May 2023 - Ongoing*
- Developed multi-skill policies for a humanoid using Generative Adversarial Motion Priors to achieve human-like motion in diverse, dynamic real-world conditions; ongoing implementation leverages C++ onnxruntime (sim)

University of California, Los Angeles – Humanoid Robotics   **California, USA**
Graduate Research Experience – Robotics and Mechanisms Laboratory (RoMeLa)   *Jan, 2023 – Ongoing*
*Computer Vision for Soccer Humanoids – RoboCup **(Winner, Adult Size Humanoid Soccer, RoboCup 2024 Eindhoven)***
- Implemented a customized Yolov5/Yolov8 neural network in the robot Artemis (demo) for real-time detection and depth-sensing of soccer-field landmarks (RoboCup 2023 – Bordeaux, France).
- Developed and implemented a real-time ball tracking system on a humanoid robot's neck mechanism to enhance performance during soccer matches of Artemis using ROS2, Pytorch, TensorRT an PyBEAR.
- Enhanced a public dataset for custom object detection in robotics using semi-supervised labeling and Roboflow augmentation, enabling fast on-site model fine-tuning for the competition.

Humanoids for Entertainment Industry – Netflix
- Developed a Python/C++ software stack for upper-body control of a medium-sized humanoid (demo), incorporating a finite state machine for lifelike movement and safe interaction and transitions, using Gazebo, ROS1/2, Moveit, and OMPL, deployed in Docker for real-time operation and global exhibitions (Comic Con New York, London, Lucca 2024).
- Developed a C++ ONNX sim2real pipeline to deploy imitation learning for robot balancing and walking policy.

University of Rhode Island – Artificial Intelligence   **Rhode Island, USA**
Undergraduate Research Experience – Research Intern   *Dec, 2021– Mar, 2022*
- Carried a deep study of MLP-Mixer's representations using Centered Kernel Alignment as a similarity measure.
- Demonstrated that this Google AI architecture had recurrent ill-condition patterns in their last layers and presented the results during an AI workshop.
- Worked under the framework of TensorFlow with GPU acceleration, CKA Google library, Scipy, and Matplotlib.

Universidade Estadual de Campinas – Control Scientist   **Campinas, Brazil**
Undergraduate Research Experience – Research Intern   *Aug, 2019– Dec, 2019*
- Created a switched cooperative control technique for networked systems using a time-varying Lyapunov function and linear matrix inequalities.
- Demonstrated that this approach was less computationally expensive to solve than state-of-art techniques.
- Implemented this technique in real-time in an Inverted Pendulum and an Active Suspension of Quanser, using MATLAB and Simulink, and wrote a scientific article.

WORK EXPERIENCE

AGP eGlass Group – Glazing Technology for Luxury Automotive Industry   **Lima, Peru**
Professional Experience – Research & Development Intern   *Oct, 2020 – Jun, 2021*
- Designed several innovative prototypes for a glass connector with embedded photovoltaics technology and its manufacturing process for an awarded program with the Swedish car manufacturer Volvo.
- Validated experimental solutions for the technologic line of Lux Fractal – ambient car lightning systems –using glass-embedded electronic light sources and microcontrollers for ambient lighting of Tesla cars.
- Showcased AGP's prototypes during its worldwide exhibitions.

EXTRACURRICULAR EXPERIENCE

NASA L'SPACE - Proposal writing & evaluation experience
Academy – Completed   *May, 2023 – Aug, 2023*
- Gain experience in writing, reviewing, and scoring proposals through the lens of a NASA reviewer

Undergraduate Thesis: "Cooperative Control of Dynamical Systems Based on a Time-Varying Lyapunov Function: Experimental Implementation in an Inverted Pendulum and an Active Suspension" UNICAMP, 2019 (link)