Emanuel Muñoz

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Main languages: Python, Matlab, C++
Frameworks: Torch, Scikit, TF, OpenCV
Familiar: Golang, TS, JS, CSS, HTML

Senior Electrical Engineering student at UTEC, Peru. Interested in **AI, Computer Vision**, and **Robotics** for global or social issues. Worked on projects related to surgical robotics, autonomous vehicles, machine learning, and control such that they resulted on six *IEEE* indexed publications (available here). Accepted into selective AI and Robotics program (RISS) at **Carnegie Mellon University (CMU)**. Currently, I am working on **Deep Reinforcement Learning** applied on mobile robots for exploration tasks and **Safe Learning** applied on autonomous robots.

EDUCATION

Universidad de Ingeniería y Tecnología - UTEC | Electrical Engineering

March 2016 - Expected December 2021 | Lima, Perú

Senior Undergraduate Student | **Awarded with Full Academic Scholarship**

Cum. GPA: 4.00 | GPA in Peruvian scale: 15.86/20.00 | **Thesis project: AI-curiosity-driven exploration** in mobile robots.

EXPERIENCE

Carnegie Mellon University - Argo AI Center, RISS Program | Robotics Researcher

May 2021 – Present | Lima, Perú

- Working under the supervision of mentors Qin Lin and John Dolan on research program.
- Designing and implementing a **safe learning** framework for controlling autonomous mobile robots based on **Control Barrier Function** and **learning approaches**. One pending publication.

UTEC - CONCYTEC | Robotics Research Assistant

March 2020 – April 2021 | Lima, Perú

- Collaborated in a **two-year government-funded project** to implement a nonlinear controller in a surgical robot platform based on haptic control. | Published **two indexed papers**, one pending. | **Tech:** ROS, Python, Gazebo.
- Implemented a **hybrid learning controller** for torque-position transformation in manipulator robots
- Designed and implemented a camera framework for feedback sensing using **computer vision** and filtering techniques.

Yale University - Schroers Lab | Research Assistant

Jan - March 2020 | New Haven, CT, US

- Sponsored by Research Experience for Peruvian Undergraduates | Supervised by Jan Schroers and Sungwoo Sohn.
- Designed and developed two new alloys with potential mechanical properties for industrial applications.

ISA REP | Digital Image Processing Intern

Jun – Dec 2019 | Lima, Perú

- Designed and developed two methods for corrosion detection based on **computer vision and NN** for decision making.
- Launched the first phase of automatic supervision of **+1000 km powerlines** using **drones** and **supervised learning**.
- Developed framework for **semantic labeling**, classifier training, and GUI prototype. | **Tech:** scikit, Keras, OpenCV

SELECTED PROJECTS

Autonomous Mobile Robotics | Code

- Designed and implemented algorithms for **autonomous** motion planning and exploration on mobile robots in real and simulated environments. | **Tech:** ROS, Gazebo
- Built complete frameworks for mobile robotic applications and **published four papers** showing results.

End-to-end navigation and exploration robotics | Code, Link

- Developed an actor-critic agent applied on a mobile robot for exploration and navigation tasks. | **Tech:** Gym, Torch

Image Enhancer | Code

- Built a model architecture to automate beauty-enhancing of photos using image manipulation. | **Tech:** TF, scikit .

HONORS AND AWARDS

2021 Selected out of 700+ applicants to participate in **CMU's Robotics Institute Summer Scholars (RISS) program 2021**
2021 Accepted to participate on **Eastern European Machine Learning Summer School 2021**
2020 Selected out of 300+ students by **REPU** to work on nano science research internship at **Yale University**
2019 Accepted with financial support in the **International Summer School on Deep Learning for Robot Vision** at Chile