Jose E. Hernandez Cancino

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EDUCATION

MSc in Artificial Intelligence **2024 – 2026 (Expected)**

Erasmus Mundus Joint Master's Degree

- Universitat Pompeu Fabra (Completed) – Foundations of Artificial Intelligence Sep. 2024 – Dic. 2024
- Sapienza University (Ongoing) – Artificial Intelligence for Robotics Jan. 2025 – Jun. 2025
- University of Ljubljana (Expected) – Specialization in Data Science Sep. 2025 – Jun. 2026

BSc in Robotics and Digital Systems Engineering **2021 - 2024**

Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico GPA *96 /100*

Minor-like:

BSc in Physics Engineering – Completed 2 out of 4 years of the program (2019 – 2021)

LAB EXPERIENCE

Robotics Internship at Lydia Kavraki's Lab – Rice University ***Houston, USA. | Jan. 2024 – Feb. 2024***

- Design and implementation of a ROS system for an UR5 robot, integrating it with motion planning frameworks and Samsung Labs' SceneGrasp model or multi-object 3D shape reconstruction and grasp pose estimation using RGB-D data.
- Developed a ROS package for the robot to perform pick-and-place task identifying cube objects via ArUco markers, using a camera placed in an external position.

WORK EXPERIENCE

Machine Learning Engineer – Toolmaster Mx ***Monterrey, Mexico. | Mar. 2022 – Present***

- Developed regression models (Support Vector Regression and Neural Network) to estimate the duration of semi-trailer truck loading maneuvers for a tissue paper warehouse.
- Designed and implemented an automated data processing system to analyze weekly operations, generate efficiency metrics and provide performance reports. Built and tested scripts for catalog generation to estimate operation costs and handled workload.

Business Automation Intern – Steelcase Inc. ***Monterrey, Mexico. | Mar. 2022 – Oct. 2023***

- Developed and implemented process automation solutions using Agile methodology and technologies such as Robotic Process Automation in UiPath, Excel Visual Basic, Power Automate, and Python.
- Maximize efficiency by automating over 5000 annual hours of business processes, leading to enhanced productivity and error reduction for internal clients across diverse functional areas such as operations, sustainability, finance, and business services.

Machine Learning freelance – Polímeros Ópticos de México. ***Monterrey, Mexico. | Feb. 2023 – Mar. 2023***

- Development of a product demand forecast application for Supply Chain Management use.
- Implemented a Recurrent Neural Network (LSTM) and statistic model SARIMA to estimate product demand on lens frames up to 24 months in advance, with accuracy of up to 88%.

RELEVANT PROJECTS

Autonomous Localization and Navigation System for Differential Drive Robot **2024**

Developed a robotic system for real-time localization and navigation, leveraging sensor fusion and advanced motion control strategies.

- Implemented odometry fusion with landmark detection using an Extended Kalman Filter for localization and drift correction.
- Applied Image-Based Visual Servoing to navigate the robot toward ArUco-marked blocks for precise positioning and grasping.
- Implemented a nonlinear control strategy for point-to-point navigation and integrated reactive collision avoidance algorithms using 1D LiDAR sensor data.

Deep Reinforcement Learning for trajectory planning of a robotic arm **2023**

Research project focused on developing a RL-based control strategy for a 6-DOF robotic manipulator to achieve precise target positioning while maintaining the end-effector's horizontal orientation throughout the motion.

- Implemented Deep Deterministic Policy Gradient (DDPG) and Hindsight Experience Replay (HER) in Gym to deal with a continuous environment with sparse rewards.
- Implementation of the model in simulation with MuJoCo and in a real UFactory xArm6 robot using ROS.

Autonomous vehicle navigation challenge **2023**

As a challenge by Manchester Robotics, developed an autonomous mobile robot, using ROS and Nvidia Jet Bot kit.

- Implemented strategies of linear control for vision-based line following.
- Utilized YOLOv5 real-time object detection model for visual identification of transit signs.

Xarm6 manipulator visual servoing **2023**

Development of a program able to make a robotic arm follow an object identified with a camera and a QR code by estimating the target's coordinates relative to the arm's end effector.

- Utilized Robotics Operating System (ROS) and OpenCV in python, as well as Move It motion planning framework.

Intelligent air pressure control system (John Deere Partner Program) **2022**

Build and programmed a prototype for an intelligent air pressure control system for tires in agricultural equipment.

- Used the ARM cortex processor in a dual core STM32 board, a Node MCU, as well as CAN, I2C and UART communication protocols and multithreading programming.
- The device had internet connectivity to receive commands and send information to a visualization panel.

Music Recognition Algorithm in MATLAB **2020**

Developed a music recognition algorithm in MATLAB able to identify a playing song from microphone input.

- Applied the Fourier Transform to perform a time-frequency analysis of song files and microphone input, containing up to a dozen million data points.

COURSES AND CERTIFICATIONS

- Machine Learning Specialization – DeepLearning.AI (Coursera) **2024**
  Certificate ID: XH2FMWUHU5Y6
- CS50's Introduction to Artificial Intelligence with Python – HarvardX (edX) **2024**
  Certificate ID: 19bc0f7ea0e745a5923f29a596d4ad71

PROGRAMMING LANGUAGES

- Python
- C/C++
- MATLAB

TECHNOLOGIES

- **DS/ML:** PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy
- **Robotics:** ROS, Gym, OpenCV
- **Deployment:** Docker, AWS
- **Others:** Git, SQL, MQTT, ASP (Clingo)

CONTACT INFORMATION (SPECIFICS)

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