Adán Flores Ramírez | Robotics Engineer

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EDUCATION

Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)　　**Aug 2021 - Jun 2025**

B.S. in Mechatronics Engineering　　*GPA: 3.7*

- **Relevant Coursework:** Data Structures and Algorithms, Multi-Agent Systems with Computer Graphics, Industrial Automation, Design and Development of Robots, Dynamics and Control Systems, Linear Algebra.

WORK EXPERIENCE

ITESM - Smart Factory (Research Lab)　　**Jan 2023 - Present**

Robotics Engineer Intern　　*Monterrey, Mexico*

- Created digital twins of a cyber-physical factory in a Unity VR application (**C#**), communication through Modbus.
- Fine-tuning **Gemma** model inside an embedded Nvidia Jetson using JAX for Human-Robot Interaction purposes and the robot's task management. Explored **Llama** and **Mixtral** with PyTorch.
- Integration of the cyber-physical factory with **industrial robots** and a production line controlled with a **PLC.**
- Defined the **CI/CD** workflow using Docker for containerization following rigorous documentation.

Ixmatix Robotics　　**Aug 2023 - Mar 2024**

Software Engineer - AI Integration　　*Remote*

- Developed a voice assistant in **Elixir** using LLM response generation and speech processing. Optimized response time with chunked transfer encoding and multithreading increasing user engagement by 60%

MAJOR PROJECTS

RoboCup @HOME - Robot Research & Development　　**Nov 2022 - Present**

- Developing an autonomous service robot to participate in the RoboCup @Home competition.
- Utilizing ROS framework (**C++**) on **Linux** Ubuntu 22.04 and Docker. Working on:
- *1) Integration:* Implementing CI/CD with **Docker**, merging submodules in a Python script for adaptive behaviors.
- *2) Manipulation/Object detection:* Using **OMPL** planning and **MoveIt** (C++), and developing **RL** for a 6-DOF robotic arm with a depth camera to achieve dynamic grasping with **collision avoidance**. YoloV8 for detections.
- *3) Human-Robot interaction:* Fine-tuning of a local LLM model to transform voice commands into robot actions.

Manchester Robotics - Mobile robotics challenges　　**Feb 2024 - Mar 2024**

- Completed courses on various robotics topics and implemented them in ROS as challenges, including:
- SLAM using Kalman filters and **sensor fusion** with vision markers, encoder odometry, and lidar.
- PID and MPC control implementations using kinematic and dynamic models, with simulations in **Gazebo**.

IEEE LARC Open Challenge - Robot Development　　**Jan 2023 - Oct 2023**

- Autonomous robot for warehouse operations on scale for the Latin American Robotics Competition.
- Implemented a Visual SLAM and computer vision processing with a stereo camera for localization (**Python**).
- Developed a **C++ Dijkstra** algorithm to optimize for the most efficient path for the task.

SKILLS

Programming Languages

6 years	C/C++, Python
3 years	Java, C#, JavaScript, SQL
1 year	Matlab, Go, Elixir

Technologies

Linux/Windows, Git, Docker, TensorFlow, ROS, CUDA, PyTorch, JAX, Gazebo, OMPL, MoveIt

AWARDS

- Qualification to RoboCup at Home 2024
- 1st place - IEEE LARC Open Challenge 2023
- 4th place - Mexico Robocup @Home 2023
- 5th - First Robotics Competition 2022 Championship Division
- 3rd - Hackathon ChezyCode 2021
- 8th - Selective for International Olympiad in Informatics 2020
- Autonomous Award - FRC Monterrey Regional 20', 21' and 22'
- Gold medal - Mexican Olympiad in Informatics 2019