

Miguel A. Cabrera

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SUMMARY OF QUALIFICATIONS

Graduate student pursuing a Master's degree in Computer Science with a concentration in robotics with a background in Mechanical Engineering. Graduate Research Assistant at the Motion, Robotics, and Automation (MoRA) Laboratory and software engineering intern at Cutting Edge AI (Toren AI). Extensive knowledge on various technologies for the use of modeling, programming, simulation data visualization, and manufacturing.

EDUCATION

Florida International University

Masters in Computer Science

Miami, Florida
January 2022 - December 2023

Florida International University

Bachelor of Science in Mechanical Engineering, Honors College

Miami, Florida
August 2018 - December 2021

- **Honors:** Cum Laude (GPA: 3.52/4.00)
- **Concentration:** Mechatronics

SKILLS

- **CAD Design:** NX, SolidWorks, Fusion360
- **Simulation:** ANSYS Workbench, OpenFOAM
- **Data Visualization:** MATLAB, Scipy, Matplotlib
- **Embedded Systems:** Arduino, Raspberry Pi, Navio2
- **Relevant Robot Technologies:** ROS/ROS2, Gazebo
- **Computer Vision:** OpenCV, YOLOv8
- **Programming Language:** Python, C++, JavaScript (React), Java, Ruby, \LaTeX
- **Spoken Language:** Native English Proficiency, Native Spanish Proficiency, Conversational Portuguese Proficiency
- **Manufacturing:** 3D Printing, Circuit Design
- **Operating System:** Linux, Windows, Mac
- **Development Tools:** Git, Docker

WORK EXPERIENCE

MoRA Lab

Graduate Research Assistant

Miami, Florida
May 2022 - Present

- Developing a bio-logging suction cup device for small cetaceans. Involves the use of modeling on SolidWorks, performing computer fluid dynamic simulations on OpenFoam, and implementing validation techniques.

Cutting Edge AI (Toren AI)

Software Engineering Intern

Miami, Florida
June 2023 - Present

- Designed and integrated a state-of-the-art lightweight multi-stream YOLO-based object detection system capable of handling multiple RTSP streams simultaneously with high precision. Uses ByteTrack to maintain consistent object IDs across video frames, enhancing detection robustness and tracking continuity.
- Trained and optimized custom computer vision models as per the requirements of the marketing lead, ensuring tailored demonstrations to potential clients that highlighted the solution's capabilities and versatility.
- Implemented real-time data logging and transmission using Kafka to stream YOLO object detection inferences, optimizing data flow to a specialized data manipulation architecture.
- Utilized rclone for efficient screenshot management, ensuring seamless data integration with cloud storage solutions.

- Developed within a Dockerized environment using Visual Studio Code, streamlining build and deploy cycles for a more consistent and reliable development workflow.

BOSCH Florida Heat Pump

Fort Lauderdale, Florida

CAD Engineering Intern

February 2023 - May 2023

- Utilized NX to address Engineering Change Requests which consisted of updating parts and generating precise drawings for legacy AC units.
- Facilitated the release of supplier drawings and collaborated in creating and maintaining the BOM for new product launches.
- Worked cross-functionally to ensure accurate product information dissemination to stakeholders, strengthening supply chain collaborations.

Math Lab @ FIU

Miami, Florida

Learning Assistant for College Algebra, Pre-Calculus, and Calculus 1

August 2019 - April 2022

- Worked with a high influx of 70-100 students at any given time at the Math Lab, where students would work on their homework and study for their exams
- Facilitated individual and group (of 15-20) work to help students better develop core concepts

PROJECTS

Personal Portfolio Website

Design and development of a responsive web application to showcase my professional background, achievements, and projects.

- Developed using React.js framework with React-Bootstrap for a responsive design, ensuring compatibility across various devices and screen sizes.
- Utilized modern JavaScript ES6+ features and React hooks for efficient state management and rendering.
- Deployed and maintained the website ensuring uptime and regular content updates.

Object Locator Using GPS Input

Development of a device that is able to locate and track objects using only GPS input.

- Ability to work with both hardware and software components to develop innovative solutions
- Strong problem-solving skills, as demonstrated by the development of a functional prototype within a tight deadline

Development of a Solar Powered Pesticide Spraying Robot

Design and development of a prototype for a remote controlled solar powered pesticide spraying robot intended to reduce human exposure to pesticides and extreme weather conditions.

- Used a mechanical design process to develop multiple iterations to improve performance and efficiency
- Modeled CAD drawings on SolidWorks, utilized rapid prototyping services, and assisted with the manufacturing process

Collaborative Dexterous Manipulation

Worked with an industrial robot, UR3, to accomplish the goal of gripping on to a ball and sorting it by color. This was done by implementing ROS nodes to help the depth camera communicate with the robot arm.

- Used OpenCV library to pinpoint the centroids of the balls