INGRID NAVARRO

Graduate Student in Robotics at Carnegie Mellon University

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WORK EXPERIENCE

Robotics Software Engineer

Stealth Mode Startup

January 2020 – August 2020

Designed a collision detection framework for a surgical robot manipulator. Implemented:

- Algorithms and simulations to perform Hand-Eye calibration.
- A DDS-based service to acquire and process the environment as point clouds using RGB-D cameras.
- Algorithms to detect robot self-collision and collisions with the environment.

Computer Vision Engineer

X-LAB Protexa R&D

November 2019 – July 2020

Project 1: Used Deep Learning algorithms to design a prototype of a visual inspection system to detect paint defects on vehicles.

Project 2: Used ROS to design a prototype of the navigation stack for an autonomous warehouse robot.

Computer Vision Intern

Carbon Robotics

July 2019 – September 2019

Design of a scheme to evaluate the accuracy of a camera calibration system using an OptiTrack motion capture system and plane estimation techniques.

RESEARCH

Graduate Student Researcher

BIG at Carnegie Mellon University

August 2020 – Present

Performing research on Embodied AI tasks and simulation frameworks.

Robotics Institute Summer Scholar

Navlab at Carnegie Mellon University

June 2018 – Aug 2018

Performed research on semantic segmentation of 3D point clouds from low-end sensors using Deep Learning and plane-fitting techniques.

Robotics Institute Summer Scholar

Navlab at Carnegie Mellon University

June 2017 – Aug 2017

Performed research on Deep Learning-based object detection systems to perform wheelchair detection in cluttered environments.

EDUCATION

M.S. in Robotics

Carnegie Mellon University, USA

Aug 2020 – present

B.S. in Computer Engineering

Tecnológico de Monterrey, México

Aug 2014 – May 2019

Computer Engineering Exchange Student

École Polytechnique de Montréal, Canada

Aug 2017 – Dic 2017

CERTIFICATIONS

Robotics Software Engineer
Udacity Nanodegree (April 2020)

Neural Networks
DeepLearning.ai at Coursera (Jan 2018)

ACHIEVEMENTS

Top student of the School of Engineering
Tecnológico de Monterrey (Apr 2018)

RoboCup Platform Soccer League Competition, 1st place.
Mexican Robotics Tournament (Mar 2018)

Emerging Leaders in the Americas Program (ELAP) Scholarship Recipient
Government of Canada (Aug 2017)

Hackathon MTY, Junior Category, 1st Place
Major League Hacking (Mar 2016)

TECHNICAL SKILLS

C++ Python

Pytorch Habitat AI

OpenCV VTK ROS Protobuf OpenRAVE

Git Bitbucket Jira

Ubuntu Windows

LANGUAGES

Spanish French English

MAIN PROJECTS

Reward Learning in Navigation

16-811 Math fundamentals for robotics
Carnegie Mellon University

December 2020

Implemented reinforcement learning algorithms to teach an agent to navigate in an indoor environment using Pytorch and Habitat AI simulator.

Home Service Robot

Robotics Software Engineer
Udacity Nanodegree

April 2020

Designed a simulation of a home service robot that can perform SLAM and path planning to navigate room-to-room and transport objects using ROS.

Perception System of Autonomous Boat

IA-95012 Intelligent Systems
Tecnológico de Monterrey

Jan 2018 – May 2019

Lead the research and development of the vision system of an autonomous boat which participated in the International RoboBoat Competition hosted by RoboNation.

- Designed the prototype of the software stack used on the robot.
- Used Computer Vision and Deep Learning to perform obstacle detection on the water.
- Implemented algorithms for path finding.

PUBLICATIONS

Poster Presentations

- Navarro, I. and L. Navarro-Serment (2018). "Real-Time Semantic Segmentation System of Sparse LiDAR Point Clouds using Lightweight CNNs and Recurrent CRF". in: *RISS Working Papers Journal* Vol. 6, pp. 105–111.
- Navarro, I. and L. E. Navarro-Serment (2017). "A Faster RCNN-Based Wheelchair Recognition System". In: *RISS Working Papers Journal* Vol. 5, pp. 125–132.

Conference Proceedings

- Navarro, I., A. Herrera, et al. (2018). "Data Augmentation in Deep Learning-based Obstacle Detection for Autonomous Navigation on Aquatic Surfaces". In: *Advances in Computational Intelligence. 17th Mexican International Conference on Artificial Intelligence, MICAI 2018, Guadalajara, Mexico, Proceedings, Part II*. vol. 11289. Springer International Publishing, pp. 342–353.