

Iqui Balam Heredia Marin

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EDUCATION

Monterrey Institute of Technology and Higher Education, Campus Monterrey, Mexico Expected Graduation: June 2022
Bachelor's Degree in Mechatronics Engineering (9th. Semester). Cumulative GPA: 98.21/100

RELEVANT EXPERIENCE

Harvard Medical School, Research Intern (Boston, MA, USA) *Python* August 2021 – Present

- Trained a novel deep learning architecture to segment regions of a fetal brain given by Magnetic Resonance Imaging (MRI).
- This automatic segmentation saves up to 20 hours of human job. Developing in Linux System.

Carnegie Mellon University, Robotics Institute Summer Scholar (RISS) - (Pittsburgh, PA, USA) *Python* May – August 2021

- Interactive Algebra Interface.
- Created a platform where students can learn algebra while interacting with mathematical functions using a pair of gloves.
- The processing is done using OpenCV for filtering and image processing and PyGame for rendering.

DeAcero, Research and Development Intern (Monterrey, NL, Mexico) *Python / R* February – July 2021

- Developed solutions to have a better performance in a wire galvanizing processes.
- Implemented data acquisition and analysis in real-time using a Raspberry Pi connected to a PLC of a galvanized wire production line.
- Proposed a Six Sigma analysis in R and data processing using some python libraries such as Pandas and scikit learn.

Monterrey Institute of Technology, Research Intern (Monterrey, NL, Mexico) *Python* August 2020 – July 2021

- Enriched PiBOT, an autonomous robot to help secure safe social distance between people on campus focused on the current COVID pandemic.
- Developed the computer vision algorithm based on multiple Deep Neural Networks using TensorFlow as a framework; and YoloV4 and Res10 as architectures.

National Instruments, Engineering Intern (Monterrey, NL, Mexico) *C / MATLAB / Simulink* February – June 2020

- Automotive embedded project to develop the GG-AWES technology based on wind energy generated with an autonomous drone connected to a motor on the ground.
- Worked on Simulink-MATLAB simulations of the drone flight, developing a 3-DOF nonlinear analysis, testing it with multiple possible scenarios, and C code deployment in a MATEK F765 flight computer.

Qualtia Alimentos, Digital Transformation Intern (Monterrey, NL, Mexico) *C++* January – February 2020

- Quality control of meat pieces before and after a process.
- To track the efficiency and well performance of the process I designed a volume measurement algorithm using a 3D camera.
- Promoted a useful prototype for future in-plant implementation.

Mitacs Globalink Research Intern at McMaster University (Hamilton, ON, Canada) *C++* May – August 2019

- Collaborative Robot Arm Software Development. Point cloud processing using Point Cloud Library (PCL) and OpenCV to segment a hand for gesture recognition for human-robot interaction.
- Trained a Machine Learning model with features from the hand (volume, area, convexity, circularity). Accuracy: 90%

PUBLICATIONS

Heredia-Marin I.B., Tijerina-Berzosa A., Vazquez-Badillo P.E., Elizondo-Valladares M.A., Vazquez-Hurtado C. (Accepted). *Design of a Human-Machine Interface Supplied by Cobots as a Technology to Support Teaching*. EDUNINE 2022.

Heredia-Marin I.B., Prado-Chapa D.A., Elizondo-Valladares M.A., Segovia-Gómez S., Garza-Martínez A.L., Vazquez-Hurtado C. (Accepted). *Developing Competencies by Designing an Adaptive Automated Storage And Retrieval System Using ROS*. EDUNINE 2022.

Osorio-Oliveros R., Martínez, S., Rodríguez S., **Heredia-Marin, I.B.**, Vazquez-Hurtado, C., (Accepted). *Lean Manufacturing in a Collaborative Smart Factory*. EDUNINE 2022.

Osorio-Oliveros R., Tijerina-Berzosa A., Gonzalez-Aguirre J.A., **Heredia-Marin I.B.**, Ramirez-Moreno M.A., de Jesús Lozoya-Santos J. (2022) *PIBOT: Design and Development of a Mobile Robotic Platform for COVID-19 Response*. In: Moreno H.A., Carrera I.G., Ramirez-Mendoza R.A., Baca J., Banfield I.A. (eds) *Advances in Automation and Robotics Research*. LACAR 2021. Lecture Notes in Networks and Systems, vol 347. Springer, Cham. https://doi.org/10.1007/978-3-030-90033-5_27

Heredia-Marin I.B., Orta-Martinez M., (2021) *AlgeGloves: An Interactive Algebra Interface That Allows Students to Mold Algebraic Functions*. RISS Working Paper Journal. [\[PDF\]](#)

Elizondo M., Espinoza G., **Heredia I.**, Medina Y., Osorio R. (2019) *TDP for IEEE Open – Roborregos Bravo*. LARC 2019 Competition. [\[PDF\]](#)

PROJECTS AND COMPETITIONS

- Robocup @Home League** *C++ / Python* October 2019 – Present
- Research team of 17 undergraduate students developing a service and assistive robot technology for personal domestic applications.
 - Coded the vision algorithm for objects segmentation and pose detection using ROS and PCL with RGB-D camera information, and a collision avoidance method using complementing with a 3D LIDAR sensor.
- LARC IEEE Open – International competition (Rio Grande, Brazil)** *Python* October 2019 – Present
- An autonomous robot that simulates cargo operations.
 - Worked as captain and I did the vision algorithm for the detection of blocks by their colors and designed the mechanism to handle and position the blocks in their corresponding places.
- Robocup 2018 Competition (Montreal, ON, Canada)** *C++ / Arduino* January - June 2018
- International robotics contest that consists of an autonomous couple of robots added a PID controller (control loop feedback mechanism) to improve movements, that play soccer against another pair of robots.
 - Formulated the mechanical design and analysis of the parts to ensure the robot stability against strikes from opponents.

STUDENT LEADERSHIP AND ACCOMPLISHMENTS

- Sustaining Tec, President (Monterrey, NL, Mexico)** November 2018 – November 2019
- Student engineering team with 15 members that designs, develops, and deploys sustainable technology solutions for renewable energy applications in remote and developing communities.
 - Designed an intelligent charge controller MPPT for higher energy efficiency.
- Active member of RoBorregos at ITESM, Campus Monterrey.** November 2017 – Present
- School team with active participation in Robotics national and international competitions. Contributing to our community by improving technological development.
 - Participated in different robotics competitions inside and outside Mexico.
- Awarded with Gallagher Scholarship** May 2017 - Present
- This prestigious scholarship gives the opportunity to 5 students all over Mexico, each year, to access a full tuition scholarship at ITESM, Campus Monterrey.

SOFTWARE SKILLS	LANGUAGES	COURSES
2 years: C++, SolidWorks (in CSWA certification process) Python	Spanish native speaker. English: TOEFL IBT Score 99.	Deep Learning specialization by deeplearning.ai
1 year: Tensorflow, Keras, CUDA GPU computing Arduino IDLE, NX11, LabView (Core 1-2).	German: A2 course.	Applied Data Science with Python by U. of Michigan
6 months: C#, Matlab, PCL, OpenCV		