Ricardo Abonce

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Education

Tecnologico de Monterrey, Monterrey, Mexico – B.S. in Robotics and Digital Systems | 9.47 / 10 CGPA — June 2024
Las Positas College, Livermore, California – A.A. Computer Information Systems — Expected June 2026
UC Berkeley, Berkeley, California – Semester Abroad
Coursework: Artificial Intelligence, Data Science, Internet of Things — Aug 2023 – Dec 2023

Skills

Languages: Python, C++, C, VHDL, MATLAB, R, HTML, CSS, JavaScript
Libraries: OpenCV, NumPy, TensorFlow, Keras, Scikit-learn, Mediapipe
Robotics: ROS, ROS2, Extended Kalman Filter (EKF), SLAM, ArUco, path planning (A*, BFS, DFS)
Hardware & Tools: Jetson Nano, Dobot CR3, Raspberry Pi, Arduino, Git, Firebase, Figma

Projects

Customer Engagement System – in collaboration with Decathlon https://tinyurl.com/abonce-p4

- Developed a full-body motion tracking system using Python, OpenCV, MediaPipe, and Tkinter to detect swim strokes with an accuracy of over 75% and dynamically recommend swimming gear based on user performance.
- Conducted extensive testing across lighting conditions and body types to enhance robustness and ensure inclusivity, enabling reliable operation regardless of environment or user physique.
- Completed the project on time and under budget, reducing expected cost from 2350 USD to 765 USD, leading to a 35% increase in foot traffic and a 5% rise in average customer time spent in-store.

Autonomous Sorting Robotic Arm with Dobot CR3 https://tinyurl.com/abonce-p2

- Designed and built a real-time object classification system using a Dobot CR3 and Kinect sensor, achieving 99% detection accuracy and 97% classification reliability across diverse object sets.
- Programmed ROS-based vision, control, and planning algorithms for autonomous sorting resilient to lighting variation.
- Integrated all subsystems under a unified ROS stack, enabling live object tracking and dynamic motion execution.
- Validated performance through extensive testing in variable conditions, ensuring fully unattended operation.

Autonomous Navigation System – in collaboration with Nvidia & Manchester Robotics https://tinyurl.com/abonce-p1

- In Phase 1, developed an autonomous robot in ROS with traffic sign and light detection using convolutional neural networks, achieving 85%+ classification accuracy.
- Implemented real-time lane detection with OpenCV and PID-based lane following, reaching over 90% accuracy.
- In Phase 2, added LIDAR and Extended Kalman Filter for sensor fusion and SLAM, reducing localization error by 64%.
- Designed navigation for obstacle-rich environments using Bug 0, ArUco localization, and LIDAR-vision fusion.

Infotainment System – in collaboration with Intel https://tinyurl.com/abonce-p3

- Co-developed a smart car infotainment system using Raspberry Pi 4 and Arduinos (UNO + Mega), integrating a touchscreen GUI for audio playback, map display, and interactive control of lights, doors, and trunk.
- Engineered UART communication across devices for synchronized operation and implemented safety features including reverse sensor alerts and automatic brake activation at a safe distance.

Extracurriculars

Robotics Learning Content Creator - Elementary Robotics Access Initiative Jan 2023 – June 2023

- Created Minecraft-based content to teach actuators, sensors, and logic gates in an engaging, kid-friendly format.
- Achieved over 90% topic comprehension and inspired over 40% of students to continue experimenting on their own.

STEM Robotics Educator – YMCA Atizapan Jan 2022 – June 2022

- Created educational material to introduce robotics to children from underserved communities.
- Delivered lessons that led to 70% student comprehension and sparked lasting interest in 30% of participants.