Nikolas Xarles Gamarra

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Education: **Worcester Polytechnic Institute (WPI)**, Worcester, MA *Class of 2019*
B.S. Robotics Engineering (*RBE*) with minors in Computer Science (*CS*) & Mechanical Engineering (*ME*) GPA 3.2

Skills: **Software:** ***ME:*** SolidWorks**,** Autodesk Inventor, AutoCAD ***CS:*** JetBrains, Visual Studio/VS Code, Vim, Git/Bitbucket, Jira, ROS
Fabrication: 3D printing, laser cutting, soldering, manual/CNC mills/lathes, ESPRIT CAM
Languages: ***Spoken*** English (*native*) Spanish (*intermediate*), ***Programming:*** C/C++, Python, Bash, C#, JavaScript, Matlab

Employment & Experience

Progress Rail, A Caterpillar Company - Software Development Engineer **Nov 2023 - Present**

Architecting, programming, and testing of embedded software deployed on QNX Neutrino Real-Time Operating System. Knowledge of intricate relationships between electrical, mechanical, and software systems on locomotives. Reading electrical diagrams of locomotives. Rigorous testing and peer review of software. Automating software builds with bash scripts in a Unix shell. Detailed and traceable documentation of software changes in compliance with EN 50716 and MISRA for safety certifications. Use of Jira and command line Git.

Robotic Systems Integration (RSI) - Robotics Engineer / Application and Software Engineer **June 2019 – Oct 2023**

Design and implementation of an API and G-Code Parser for 3D trajectory planning on arbitrary kinematics. Utilization of EtherCAT for real time motion control. Backend motion controller software development. Collaborative programming. Design and implementation of automated software and hardware tests. Design (Solidworks) of industrial automation workcells and drive/motor demonstration units. Selection of sensors, motors, and servo drives for industrial automation projects. Front end user interface design in C# WPF.

SAIC Motor - Vehicle Software & Intelligence Center - Summer Intern **May 2018 – July 2018**

Developed software in C++/ROS(Robot Operating System) with the aid of Point Cloud Library to interpret Lidar point cloud data.

Individual Projects

Kerbal Space Program Custom Controller Board

Laser etched acrylic control panel for space simulation video game. Used Arduino and C programming concepts to communicate user inputs with the game. Built out of many reused components from vintage electronics. Demonstrated project at World Maker Faire.

Team Projects

Automatic Vehicle Recharging Station (Undergraduate Degree Capstone Project) **Aug 2018 – May 2019**

Design of complex end effector, control & sensor fusion software to automatically plug in an autonomous electric vehicle for charging. Use of: ABB IRB 1600 industrial robotic arm, ROS-Industrial, ROS SMACH (*State Machine*), OpenCV, PCL (*Point Cloud Library*), C/C++, Python, Microsoft Kinect, kinematic and pose transformations using linear algebra.

Robotic Drawing of Pointillism Style Images (Industrial Robotics Course Project) ***Oct 2018 – Dec 2018***

Designed and manufactured end of arm tooling for industrial robotic arm to hold three colored markers, image dithering algorithm to generate drawable images, industrial arm control program in ROS for planning movements to draw images

Autonomous Room Mapping (Robotics Navigation Course Project) ***Oct 2017 – Dec 2017***

Implementation of A* pathfinding algorithm in ROS/Python based on occupancy map on a TurtleBot running ROS/Ubuntu. Working in distributed ROS architecture. Collaborative programming using Git.

Robot Kinematics (Robotics Manipulation Course Project) ***Aug 2017 – Oct 2017***

Control of three degree of freedom Robot arm using forward and inverse kinematics for position and velocity control. Programming in C++ for firmware and Matlab for high level kinematics control loops. Using computer vision and torque sensing to determine control state machine logic.

Relevant Courses

Intro to Artificial Intelligence, Robotics Mechanical Applications, Robotics Sensing and Perception, Computer Networks, Systems Programming Concepts, Object Oriented Design, Algorithms, Embedded Systems Programming,