Joseph Lynch

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Portfolio website: jlynchpitt.github.io

SKILLS:

Computer Skills: ROS, Linux, Trajectory Optimization, Simulation (Gazebo), C/C++, Python, Matlab, Git, Solidworks

EDUCATION:

Northeastern University, Boston, MA — Expected May 2020

College of Engineering, Candidate for MS in Robotics

Cumulative GPA: 3.917

Relevant Coursework: Robotics Sensing & Navigation, Mobile Robotics, Assistive Robotics

University of Pittsburgh, Pittsburgh, PA — April 2018

Swanson School of Engineering, BS in Computer Engineering, Minor in Mechanical Engineering

Cumulative GPA: 3.871

Relevant Coursework: Intro to Embedded System Design, Programming System Design on a Mobile Robot Platform, Intro to Image Processing, Intro to Mechanical Engineering Design

Senior Design Project – Swarm Robotics — Completed December 2017

- Demonstrated swarm intelligence in an application that simulated detection of and response to a forest fire
- Used the Particle Swarm Optimization algorithm to define the local behavior of each individual robot
- Developed a computer vision system to simulate a GPS satellite and provide location data to each robot
- Used the Robot Operating System (ROS) as the basis for communication between each robot

WORK EXPERIENCE:

Robotics and Intelligent Vehicles Research Lab, Boston, MA – *Graduate Research Assistant* — September 2018 – present

Integrated robotic arms into seafood processing plants for use in sorting and processing seafood

- Wrote motion planning software for robotic arms using MoveIt and Trajopt using ROS and C++
- Optimized costs and penalties for the trajectory optimization algorithm to balance the optimal path along with safety concerns inherent with human robot collaboration
- Tested motion planning code in simulation (gazebo) and on real collaborative robots (Universal Robots UR3 + Rethink Robotics Sawyer)
- Integrated several commercially available soft grippers into the motion planning algorithm to pick up delicate fish

Used Fanuc industrial robot arm to print 3D parts using the cold spray additive manufacturing process

- Configured Fanuc robotic arm to work with ROS
- Wrote motion planning software using Trajopt with ROS and C++ to control robot motions and deposit material

Center for Space High-performance, and Resilient Computing (SHREC), Pittsburgh, PA — November 2017-April 2018

- Created a low-memory version of existing image conversion app that reduced memory usage by up to 93%
- Developed a python GUI for the labeling/classification of satellite images

Human Engineering Research Labs, Pittsburgh, PA – *Embedded Systems Co-op* — January 2016 - April 2016, August 2016 – June 2018

Developed a Physical Activity Monitoring System (PAMS) for wheel chair users

- Developed main firmware for PAMS using C code compiled for TI's MSP430 and CC2650 microcontrollers
- Used I^2C, SPI and Bluetooth protocols in development of firmware
- Designed a case for PAMS PCB using CAD software (SolidWorks)

Adapted several controllers to control a Jaco robotic arm using ROS

Hydroid Inc, Pocasset, MA - *Software Engineering Intern* — May 2016 – August 2016

Developed software for the Vehicle Interface Program (VIP) for Autonomous Underwater Vehicles (AUVs) using C++

- Developed a remote-control interface based on provided documentation that included PID control
- Developed a test program to demonstrate a 3rd party software interface to potential customers
- Revamped/developed multiple GUIs to simplify the job of the user when operating the AUVs
- Wrote and carried out detailed software test plans
- Performed code reviews for other members of the software team

Follett Software Corporation, Hingham, MA - *Software Development Intern* May 2015 – December 2015
Developed software for the web-based Aspen Student Information System primarily using Java

- Maintained unit test infrastructure for the Aspen product – wrote new tests while fixing and updating existing tests
- Created web-based feature to automatically monitor server health and allow for simple restarting of servers
- Worked within a 5-person product development team

CONFERENCES ATTENDED

Amazon re:MARS June 2019
Conference on Machine Learning, Artificial Intelligence, Robotics and Space

- Invited by Amazon to represent current robotics research at Northeastern
- Presented a demo of current research over three days of the conference as part of the tech showcase

LEADERSHIP ACTIVITIES

Pitt Robotics and Automation Society, University of Pittsburgh January 2015 – April 2018
Robotic Panther - *System Integration Team Lead* September 2015 – April 2018

- Designed CAD models of eyes, ears and head of the Panther for 3D printing
- Used facial recognition software in Python and Arduino to allow Panther head to track and follow the closest person

FRC FIRST Robotics, Norwell High School
Build Team Captain September 2012 - June 2013
Safety Captain September 2009 - June 2012