Zachary Alves

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EDUCATION

Northwestern University | Evanston, IL 09/2023 – 09/2024
M.S. Robotics*, expected December 2024*
- Relevant Coursework: Mechatronics, ROS2, SLAM, C++, Python

Colorado State University | Fort Collins, CO 08/2017 – 05/2022
B.S. Mechanical Engineering
- Minor in Computer Science

SKILLS

Software: C++, ROS/ROS2, Python, Jekyll, SOLIDWORKS, C#, RobotStudio
CAD: SOLIDWORKS (9 years)

WORK EXPERIENCE

Shirley Ryan Ability Center | Chicago, Il 03/2024 – 10/2024

Intern

- Programmed a controller for a lower-body exoskeleton using ROS Noetic
- Collaborated with physical therapists to align software development with user and patient requirements
- Designed and integrated sensor fusion algorithms to combine IMU and EMG data, enhancing the exoskeleton's responsiveness and stability
- Implemented EMG-based muscle activation algorithms to enhance the responsiveness of the exoskeleton's controller

Lincoln Electric Automation | Fort Collins, CO 01/2021 – 06/2023

Project Engineer 06/2022 – 06/2023

- Demonstrated system features and effectiveness to customers for systems ranging up to $1 million
- Developed and program customer specific six axis robotic systems
- Customized welding robot control programs to meet or exceed unique performance metrics
- Validated operating conditions to meet safety requirements for end users
- Troubleshooted electrical, software, and mechanical components
- Coordinated with members of different engineering teams to optimize system efficacy
- Assisted production assembly of custom systems to support production needs

Intern – Mechanical Engineer 01/2021 – 06/2022

- Designed mechanical parts for automatic welding robotics systems
- Utilized Finite Element Analysis (FEA) to ensure design meet specifications
- Detailed CAD models for existing parts while ensuring proper GD&T
- Assisted assembly on manufacturing floor

Colorado State University | Fort Collins, CO 02/2018 – 12/2020

Lab Staff | Idea 2 Product 3D Printing Lab

- Created CAD models and printed 3D components for CSU events and clients of the Colorado State University Lab
- Conducted training sessions for new students and provided after hours access privileges for the lab
- Repaired 3D printers to improve performance and for regular maintenance

CERTIFICATIONS

Certified SOLIDWORKS Associate (CSWA) 2015

PROJECTS

SLAM | Robotic SLAM class 02/2024

- Programmed a SLAM algorithm from scratch using C++ and ROS2 Iron
- Modeled virtual environment for navigation
- Implemented virtual LiDAR sensor to object recognition method

Robotic Arm and Hand Project | Embedded System Class 12/2023

- Programmed large python project using Git along with four other students
- Created model hand for physics simulation to be controller by user actions
- Demonstrated project functionality to classmates and video crew

Heavy Lift UAV Drone | Senior Design Project 09/2021 – 05/2022

- Optimized gimbal system to hold a wireless camera
- 3D modeled and 3D printed gimbal, battery storage, and busbar components
- Obtained FAA Part 107 license to test drone

Modifications to Quadrupedal Robot | Personal Project 09/2020 – 11/2020

- Designed and 3D printed components with mounting modifications to accommodate printer limitations
- Modified pre-written code to adapt robot controls to an Xbox controller

Autonomous Egg Delivery Robot | Design II Class 12/2019

- Designed robot capable of carrying an egg over 5 meters without cracking the egg
- Programmed the robot using Python to autonomously perform task
- Performed 100% of all CAD models and engineering drawings

SolidWorks surface model of computer mouse | Design I Class 05/2019

- Utilized surface modeling techniques to model complete contour of mouse
- Generated engineering drawings using Solidworks models

Fabricated Machined Clock | Manufacturing Processes Class 05/2019

- Machined metal and acrylic components from bar stock and sheets to meet tight tolerances

ACTIVITIES AND LEADERSHIP

- CSU Marching Band 2017 – 2021
- CSU Basketball Pep Band 2018 – 2022