ZACH LOFQUIST

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EDUCATION

California Polytechnic State University, San Luis Obispo — ***June 2022***
Bachelor of Science — ***GPA: 3.57***
Majors: Aerospace Engineering and Computer Science

Chiang Mai University, Chiang Mai Thailand — ***Summer 2019***

SKILLS

Programming Languages: **Python, Java, C, C++, C#, MATLAB, HTML**
Applications: **Unity, Blender, SolidWorks, Simulink, Arduino, LabVIEW, Microsoft Office Suite**
Technical Skills: **Unix, Git, Unit Testing, Debugging, Object-Oriented Programming, Data Structures, Thermodynamics, Fluid Dynamics, Attitude Dynamics & Control, Statistics, Office 365, Microsoft Teams**

RELEVANT COURSEWORK

Computer Architecture, Systems Programming, Algorithm Design and Analysis, Discrete Structures, Artificial Intelligence, Spacecraft Design, Electric Circuit Theory and Lab, Statistical Methods for Engineers

LEADERSHIP

CPAMP Mentor Program: Serve as a mentor for first year aerospace engineering students

PROJECTS

Spacecraft Design

- Worked in a team of 70+ to design a spacecraft to meet customer solicitation. Developed spacecraft system to reach and identify interstellar objects akin to 1I/'Oumuamua and 2I/Borisov
- Operated within encounter strategy team tasked with designing the encounter phase of the mission
- Designed and developed image processing algorithm for centroid finding on interstellar object used for ephemeris updating. Implemented image pre-processing, edge detection and ellipse fitting methods to accurately determine center as necessitated by optical and autonomous navigation

File Pipeline

- Designed and developed program pipeline in C within Unix
- Utilized child processes from a parent program to launch arbitrarily long pipeline
- Program took in data, modified it, then wrote modified data to new file

Planetary Landing Artificial Intelligence

- Developed model-free reinforcement learning (Q-learning) algorithm. Utilized an ε-Greedy selection method to choose actions leading to successor states
- Program learned what actions to take given present circumstances
- Successfully simulated landing on numerous celestial bodies using algorithm

Virtual Reality Labyrinth Experience

- Built VR game in Unity Game Engine using C#. Created game assets using Blender
- Designed and developed Labyrinth within which player works to reach the end. Implemented game mechanics such as patrolling enemies, bow combat, and teleportation
- Video: https://www.youtube.com/watch?v=ALojZq6O8E0
- GitHub: https://github.com/ZachLofquist/VR-Telemakhos

Autonomous Car with Integrated Sensor System

- Programmed Arduino based sensor system to determine distance between car and object. Implemented C++ software with Arduino to carry out task, communicating between servos, sensors and motors.
- Applied Kalman filter to determine accurate distances. Used distance data to determine speed and path of vehicle as well as for performing obstacle avoidance.

Wind Tunnel Winglet Testing

- Designed winglets for testing using SolidWorks. Manufactured winglet sets via 3D printing
- Tested aerodynamic performance in terms of lift, drag and angle of attack, in a low-speed wind tunnel
- Gathered data using LabVIEW software. Created comprehensive report to communicate findings