Seth Nielsen

Software Engineer

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Education — Brigham Young University

Oct 2021 **Master of Science: Electrical and Computer Engineering** GPA: 3.5

- Thesis: "A Visually Realistic Simulator for Autonomous eVTOL Aircraft"
- Created a simulator that combines high-end graphics with real autopilot software to produce a high-fidelity SITL flight and camera simulation for UAVs, used by other students for research and adopted by a university course to teach vision-based quadrotor control
- Introduced a new eVTOL vehicle type for Microsoft AirSim, a simulator for multirotors, including dynamics model, control inputs, animated mesh, and PX4 autopilot integration in a realistic city environment powered by Unreal Engine (YouTube link, GitHub link)

Aug 2018 Bachelor of Science: Mechanical Engineering — Computer Science minor GPA: 3.6

Work Experience

Present – Sep 2022 **Software Engineer — Sensing and Automations | Zero Home** | Pleasant Grove, UT

- Engineered and launched from concept to completion the sensing and automation platform for a cutting-edge seed stage startup specializing in the complete design and implementation of smart homes
- Designed a people-tracking algorithm utilizing an array of 50+ radars and led the architectural design for their optimal placement throughout the home
- Developed the automation engine for real-time control of home systems, including lighting, sound, shades, and touchscreens based on human presence and movement (YouTube link)
- Deployed the tech in a live, full-scale house prototype that showcased real-time operations, leading to commitments from multiple investors totaling $4 million

Sep 2022 – Nov 2021 **Guidance, Navigation, and Control Engineer II | Northrop Grumman** | Chandler, AZ

- Developed autonomous flight safety system to detect anomalies and initiate auto-termination procedures
- Created a tool to convert telemetry messages into raw sensor data to play back into flight simulations
- Extended software for outputting sensor data to binary to work with a new IMU and made a tool to parse and visualize the binary data

Dec 2017 – May 2017 **Robotics Internship — Self-Parking Chair | Hall Labs** | Provo, UT

- Designed and built prototype of robotic self-parking chair capable of moving a person
- Designed the mechanical and electrical components, then manufactured them
- Wrote high-level and low-level software for onboard computer and microcontrollers
- Built and tested second prototype which satisfied company's goals for mobility, load capacity and stability

Skills

Programming C++, Python, Go, Rust
Tools Linux, Git, Unreal Engine, ROS, GDB
Experience Robotics, Machine Learning, Deep Learning, Project Management, Team Leadership, Codebase Management
ML/DL Parameter Fine-tuning, Image Classification, PyTorch, Courses: Machine Learning, Advanced Deep Learning

Projects

Jun 2018 – Jan 2017 **University Rover Challenge — 1st Place in Autonomous Traversal Task**

- Lead engineer of autonomous navigation for the BYU Mars Rover Team, a robotics team of 23 individuals
- Rover successfully traversed the final, fully autonomous stage of task; no other rover of the 35 international teams was able to do so (YouTube link)
- Programmed potential field algorithm for obstacle detection and avoidance using laser scanner
- Fine-tuned deep neural network to detect goal markers and adapted it for real-time inference on rover; achieved nearly perfect accuracy during competition
- Implemented GPS waypoint following and vision-based controllers to fulfill requirement of arriving within 2-meter radius of goal marker