

Jacob Knaup

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Research Interests

Robotics and autonomous systems, engineering design tools and simulation, machine vision, artificial intelligence

Education

Bachelor of Science in Engineering, Robotics Engineering
Arizona State University, Mesa, AZ
Barrett, The Honors College

Expected: May 2019
GPA: 4.0

Research Experience

ASU Integrated Design, Engineering, & Analysis Lab

December 2016-Present

- Developed and tested robotic mechanism position and force control software
- Optimized systems using simulations written in Python, MATLAB, and C#
- Devised test setups, performed experiments, and analyzed results using Python
- Documented and presented simulation and software validation results
- Communicated research outcomes to nontechnical individuals in funding proposals

Presentations

- “Developing an Educational Robotic Platform,” presented at the Fulton Undergraduate Research Symposium, Arizona State University, Tempe, AZ, Apr-2018.
- “Design of a Hopping Platform using Laminate Construction,” presented at the Southwest Robotics Symposium, Arizona State University, Tempe, AZ, Jan-2018.

Honors

- Fellowship Recipient, KEEN Student Research Grant *Spring 2018*
- Fellowship Recipient, Fulton Undergraduate Research Initiative *Fall 2017*
- Fellowship Recipient, Fulton Undergraduate Research Initiative *Spring 2017*

Technical Work Experience

Benchmark Electronics Inc.—Software Engineering Intern

May 2018-Present

- Implemented MQTT communication for IoT platform in Python and JavaScript
- Integrated local IoT data services with AWS and Microsoft Azure cloud storage
- Redesigned gateway stack to use multithreading, improving performance & modularity
- Upgrade ultra-wideband MAC in embedded C to increase number of supported nodes
- Planned, executed, and tracked agile development sprints and issues using Git and JIRA

Academic Projects

Robotic Systems Projects

Fall 2017-Spring 2018

- Programmed color subtraction and image segmentation algorithms using OpenCV

- Tested and improved object detection algorithm performance and repeatability
- Formulated and simulated depth-first and A* artificial intelligence algorithms in Python
- Implemented deep learning neural network using Python to perform object sorting
- Programmed manipulator in C to move to specified coordinates using inverse kinematics

Embedded Systems Design Projects

Fall 2017-Spring 2018

- Architected and programmed system firmware in embedded C
- Tested and debugged electrical systems using benchtop electrical tools
- Integrated electro-mechanical hardware with software in an interdisciplinary team

VEXU Robotics Competition

Fall 2015-Spring 2018

- Programmed Linux computer to perform object recognition using OpenCV and Python
- Programmed autonomous robots using object oriented, real time, parallel programming

Service and Outreach

- Member of Barrett Honors Writing Colloquium
- Student Leader with Christian Challenge
- Mentor of Campo Verde High School Robotics Team

Fall 2016-Present

Fall 2017-Present

Fall 2015-Spring 2018

Technical Skills

Programming (C, C++, C#, Python, MATLAB), Git, Linux, OpenCV, Microsoft Office, CAD (Solidworks, Cadence)