Curriculum Vitae
Jacob Knaup
Robotics PhD

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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 *Expected: May 2019*
Arizona State University, Mesa, AZ *GPA: 4.0*
Barrett, The Honors College

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 *Fall 2016-Present*
- Student Leader with Christian Challenge *Fall 2017-Present*
- Mentor of Campo Verde High School Robotics Team *Fall 2015-Spring 2018*

Technical Skills

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