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 *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)