

# AYBERK YARANERI

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## TECHNICAL COMPETENCIES

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**Languages:** (Proficient) C/C++, MIPS Assembly, Verilog, Python, MATLAB, (Familiar) Java, LaTeX  
**Tools:** Git, Vim, Conda, GDB, TensorFlow, Keras, OpenVino, Gazebo, Robot Operating System  
**Relevant Skills:** Linux CLI, Embedded Systems, PID Control, I<sup>2</sup>C, SPI, UART, Object Oriented Programming  
Data Structures, Machine Learning, Computer Vision, Board/Chip Bringup, Datasheet Sifting  
**Relevant Coursework:** CS225 Data Structures, CS233 Computer Architecture, CS357 Numerical Methods

## EXPERIENCE

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### Illinois Applied Research Institute

February 2019 - September 2019

*Full Time Robotics Developer*

- Assisted in the development of autonomous multirotor UAVs intended for a simulated reconnaissance mission utilizing convolutional neural networks for detection and tracking of ground agents.
- Conducted transfer learning on various object detection networks such as Faster R-CNN, SSD, and YOLO.
- Optimized trained neural networks using the OpenVino toolkit to run on an Intel Movidius Neural Computer Stick for accelerated on-board inference.
- Configured Raspberry Pi computers to work with the Movidius NCS and transmit observations as Mavlink messages through the Pixhawk flight controller's telemetry connection.
- Wrote code to automate data collection and labelling which expedited the training process.

## LEADERSHIP AND PROJECTS

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### NASA Student Launch Rocketry Competition

September 2019 - April 2020

*Chief Engineer of Payload*

- Collaborated with Project Manager in leading the development of an air deployed autonomous quadrotor intended to deploy from a rocket during descent. Aircraft is tasked to execute a simulated ice sample retrieval mission.
- Employed the Navio2 platform for hard real time IO coupled with a Raspberry Pi running the open source Ardupilot flight stack for autonomous guidance navigation and control.
- Implemented computer vision algorithms in C++ to run on the Raspberry Pi which to detect and guide the UAV's descent towards the ice retrieval site.
- Applied software-in-the-loop methods using Ardupilot-SITL and Gazebo as a physics engine to thoroughly test corner cases and validate software reliability.

### NASA Midwest High Power Rocketry Competition

September 2018 - September 2019

*Avionics Sub-Team Lead*

- Lead an all-freshman team in developing an avionics package tasked to collect performance data of a supersonic high powered rocket using a variety of sensors.
- Embedded a Raspberry Pi Zero as the primary flight computer which utilized I<sup>2</sup>C, SPI, and UART communication protocols to acquire data from on-board sensors.
- Assigned and oversaw the development of flight software written in Python for all sub systems.
- Successfully incorporated Git as a version control and collaboration tool which significantly enhanced the team's work flow.
- Coordinated the development and assembly of a printed circuit board allowing for a more streamlined design.
- Placed 2<sup>nd</sup> overall in competition completing five flights, two of which were supersonic.

### Spaceport America Cup Rocketry Competition

September 2018 - June 2019

*Avionics Team Member*

- Developed an on-board flight computer to actuate external control surfaces for roll control and active drag manipulation.
- Embedded an Atmega328P microcontroller and wrote flight software implementing a closed loop PID controller.
- Designed and assembled a printed circuit board that served as the primary structural member of the flight computer.
- Assisted in the development of Wi-Fi enabled solid state switches using ESP8266 microcontrollers to wirelessly toggle power to onboard systems.

## EDUCATION

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### University of Illinois at Urbana Champaign

Bachelor of Science in Aerospace Engineering  
Minor in Computer Science

2018 - 2022

Technical GPA : 3.71/4.00

Overall GPA : 3.50/4.00