

Thomas "Case" Cutler

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onlycase.github.io

EDUCATION

Bachelor of Engineering in Aerospace Engineering
University of Surrey, UK
First Class Honors

Sep 2017 - Jun 2020

RESEARCH EXPERIENCE

Final Year Project

Sep 2019 - May 2020

University of Surrey, UK

Project: Abstractive Summarization of Technical Reports with Machine Learning

- Built in Python with Tensorflow a bidirectional LSTM encoder to encode the document and a modified RNN decoder designed to remember memories for longer durations, designed to produce a human-like abstract for any given document body.
- Trained the model on 215,913 papers scraped from arXiv on a NVIDIA Tegra X1 GPU, and evaluated with ROUGE.
- Conducted a literature review researching both extractive and abstractive automatic text summarization methods with a focus on machine learning.

Robotics Research Intern

Jun - Aug 2019

Space Robotics and Autonomous Systems Lab, University of York, UK

Project: Control of Bio-Inspired Adaptable Wheeled Tensegrity Rovers

- Designed and modeled in OpenSCAD an adaptable planetary rover with a tensegrity spine structure, combined with biologically-inspired control using twisted string actuators.
- Programmed teleoperation with C++ and ROS using Raspberry Pi's and microcontrollers, contributing to an existing codebase using Git and BitBucket.
- Participated in meetings with robotics researchers at the university, assisted with a workshop on modular and reconfigurable satellites.

SKILLS

Programming Languages	Python, C, C++, Rust, MATLAB, Bash, \LaTeX
ML & Robotics	TensorFlow, Keras, PyTorch, ROS, OpenCV
Software & Tools	MATLAB/Simulink, Git, KiCad, OpenSCAD, Fusion 360, Microsoft Office
OS	Linux (Ubuntu and Kali), macOS, Windows
Languages	English (native), Korean (elementary), Spanish (elementary)

AWARDS

University of York
YorRobotics Scholarship

Jun 2019

EXTRACURRICULARS AND TEAM PROJECTS

Avionics Engineer
Team Peryton Space

Dec 2019 - Jun 2020

- Worked as a student volunteer on a team of 19 to develop rockets with a 29mm 2-grain motor to compete in the UKSEDS National Rocketry Competition.
- Researched the avionics which would consist of a custom board with an STM32 processor and an Arduino HAL to interface with GPS, barometer, IMU, communications, and an external flash chip. The goal was to be able to log data and activate pyrotechnics for the parachute.

Flight Computer Engineer

Nov 2019 - Jun 2020

Team Peryton UAS

- Researched a design for a custom flight computer board with a Spartan-6 FPGA programmed in VHDL, synthesized in Xilinx ISE to replace the current PixHawk system. This was to allow more customization for unconventional aircraft configurations which would require more actuators and sensors.

Avionics Team Lead

Oct 2019 - Jun 2020

Third Year Group Design Project

- Built an image classification system in TensorFlow for identifying alphanumeric ground targets, deployed on a NVIDIA Jetson Nano coupled with a downward facing camera downlinking target coordinates over 868MHz to the GCS.
- Assisted in the development of the autonomous flight system for waypoint traversal using PixHawk and ArduPilot, the communication downlink to GCS, and the power management systems.
- Chaired avionics team meetings, worked on risk management, developed the fault tree analysis, and managed budget keeping overall costs below the £1000 limit.

Avionics Engineer

Oct 2018 - Jun 2019

Team Peryton UAS

- Assisted Masters students in designing the camera system, consisting of a single board camera mounted to an underslung 2-DOF gimbal with the pose controlled by the onboard flight computer.
- The system used a CNN for character classification trained off-board and deployed on an Intel Movidius Neural Compute Stick to minimize overhead and form factor.

Team Manager

Oct 2018 - Jun 2019

Second Year Group Design Project

- Designed and built the basic electronics system with power management for the LiPo, motor control, control surface actuation, and radio control.
- Used Gantt charts, developed risk assessments, produced a PDR and CDR, chaired bi-weekly meetings, and showed ability to both work in and manage a team professionally.

PERSONAL PROJECTS

Linear Quadratic Regulator — C++ LQR and CARE solver for Drake cartpole simulation

SPECTACLE — C++ Monocular SLAM

VIPER — single ball-wheel robot with auto stabilization and autonomy

EYE OF SAURON — autonomous UAV for overwatch with 3DOF gimbal camera

Adaptive Cruise Control — C++ ACC with PID control

Extended Kalman Filter — C++ EKF for fusing noisy LIDAR and radar measurements

Kalman Filter — C++ KF for noisy sinusoidal measurements

KANGAROO — Subdomain reconnaissance script in bash

STARFISH — Python orbital mechanics solver

comma10k — Segnet labeling for comma.ai's openpilot

ResNet-20 — Python model trained on the MNIST Sign Language dataset

ORACLE — Discord bot in Javascript