Fire Detecting Surveillance Drone

ME 102B

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Introduction

Wildfire Results in Tens of Billions of Damage

Analyzed Current Detection Systems for their Weaknesses

Satellites, Watchtowers, Onground Sensors

Designed an Automated Drone Fire Detection System to Address Vulnerabilities

Automated Flight and Path Planning, Image Processing, Predictions, Communication, Mitigation

Video Processing

Image preprocessing pipeline to conform to input specs

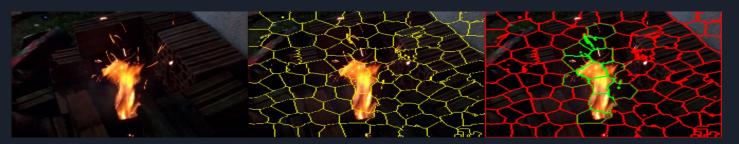
Experimentally defined, reduced complexity deep convolutional neural network (CNN) architectures (Credit to T. Breckon for architecture reference)

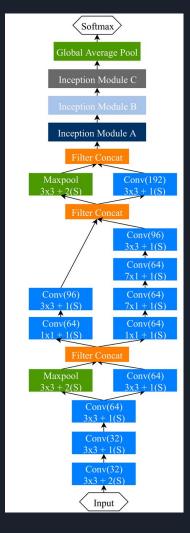
Automatic detection of fire pixel regions in video imagery within real-time bounds

Live fire localization in video using superpixel localization

Dependencies: Tensorflow and OpenCV in Python







Video Processing



Drone Controls

DJI Tello

Camera, IMU, Optical Flow, PIR, Barometer

Mixer to Reduce Noise for Stabilization

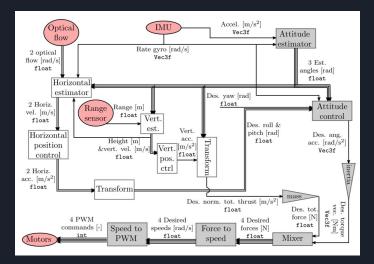
Location Tracking

Python

Wireless Communication







Drone Controls



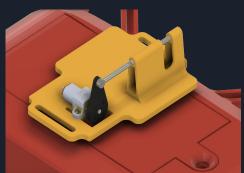
Release Mechanism



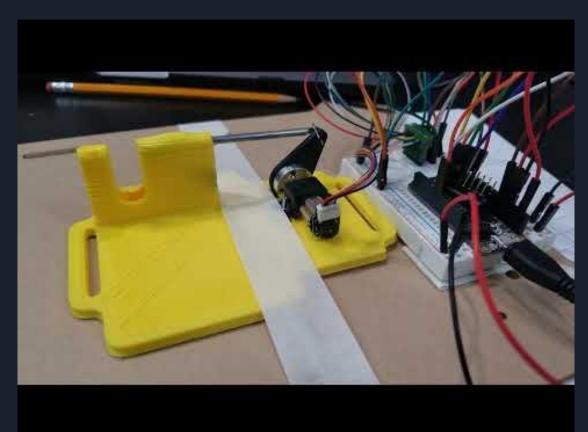








Release Mechanism



Future



California's \$536 Million Wildfire Prevention Package

Fire Prediction

- Data Analysis
- Borders, Wind Velocity, Data Acquisition, Smart Targeting

Controlled Burns

Full Size Model

- Commercial Quality
- Wireless Charging
- Heat Shield
- Upgrade Al



Questions?