TurtleTech

SPRINT 3 – FINAL DEMO

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TurtleTech Background

What is the benefit to society?

Provides insight into the sea turtle lifecycle from birth to maturity without disrupting habitat.

What is the problem?

The TurtleTech drone is unable to analyze the captured images of images of turtles in real time and currently only detects turtles

GOALS OF TURTLETECH

Sprint 1

- Create first drafts of all documentation
- Get a basic understanding of the Nvidia Jetson Nano
- Power on the Jetson Nano and accomplish initial steps for communication.
- See a test flight

Sprint 2

- Improve the current neural network
- Get the neural network working on the Jetson
- Troubleshoot the powering off issue
- Turtle Track images

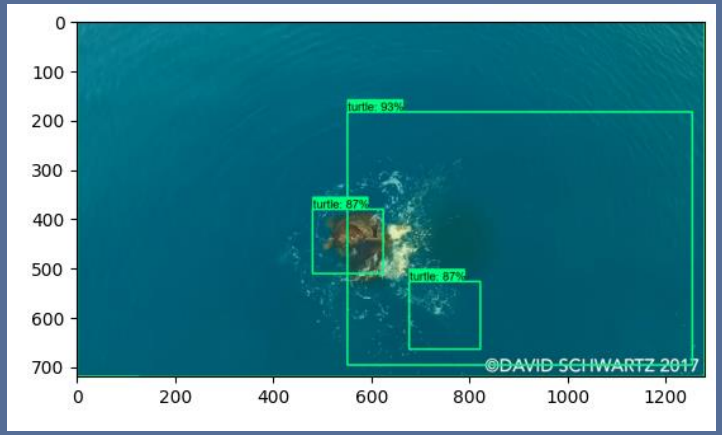
Sprint 3

- Produce a functioning neural network system on a Nvidia Jetson device that identifies aerial turtle images against non-turtle images in real-time.

The Jettson

Data Set

Neural Network

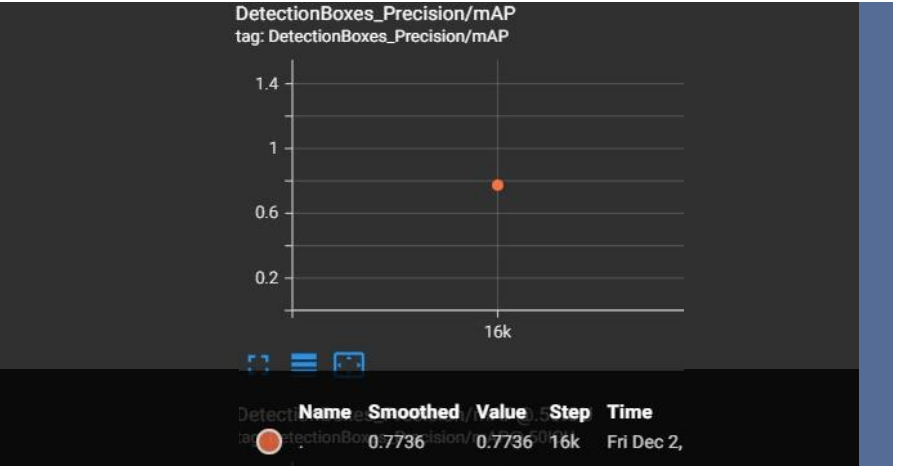


Timestamps

WHAT ARE WE WORKING ON?

Shutdown issue resolved

MILESTONES



Accuracy of the Model

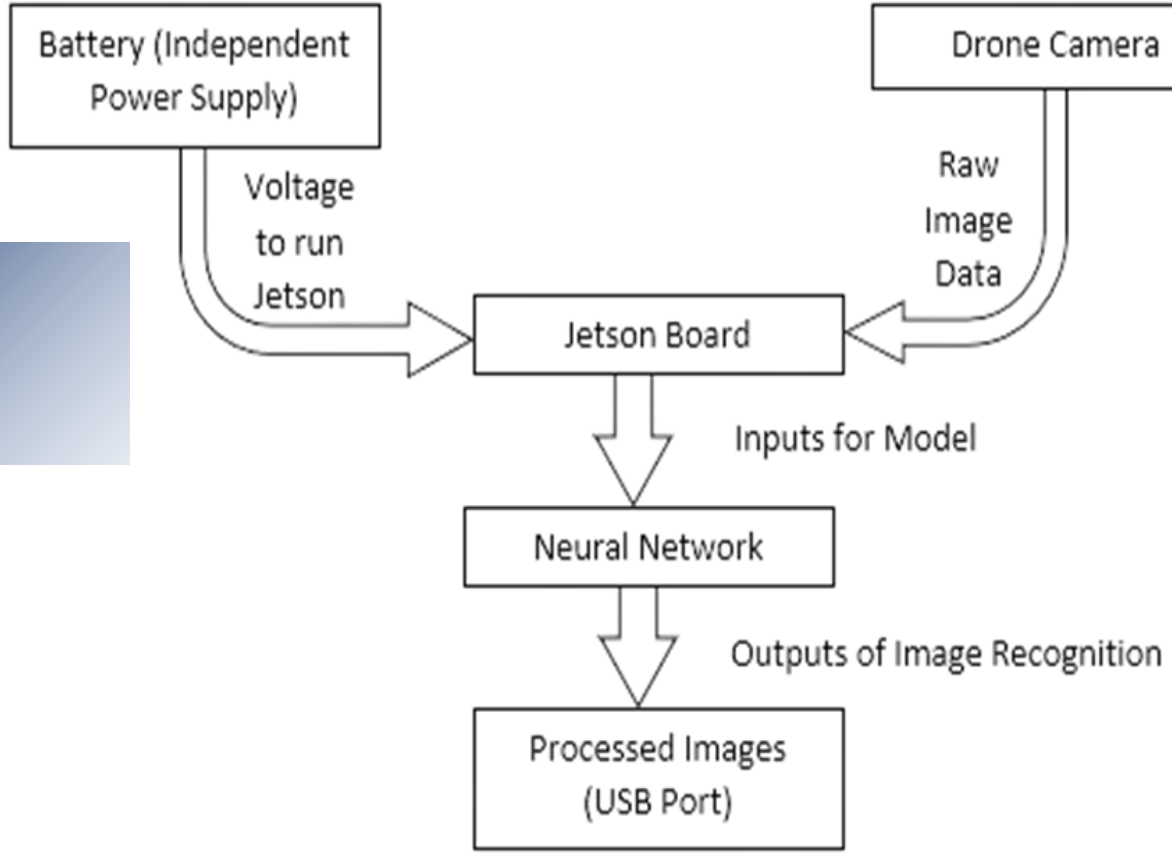
DESIGN CONSIDERATIONS

TIME

Time needed to train the neural network takes a long time

PLATFORM

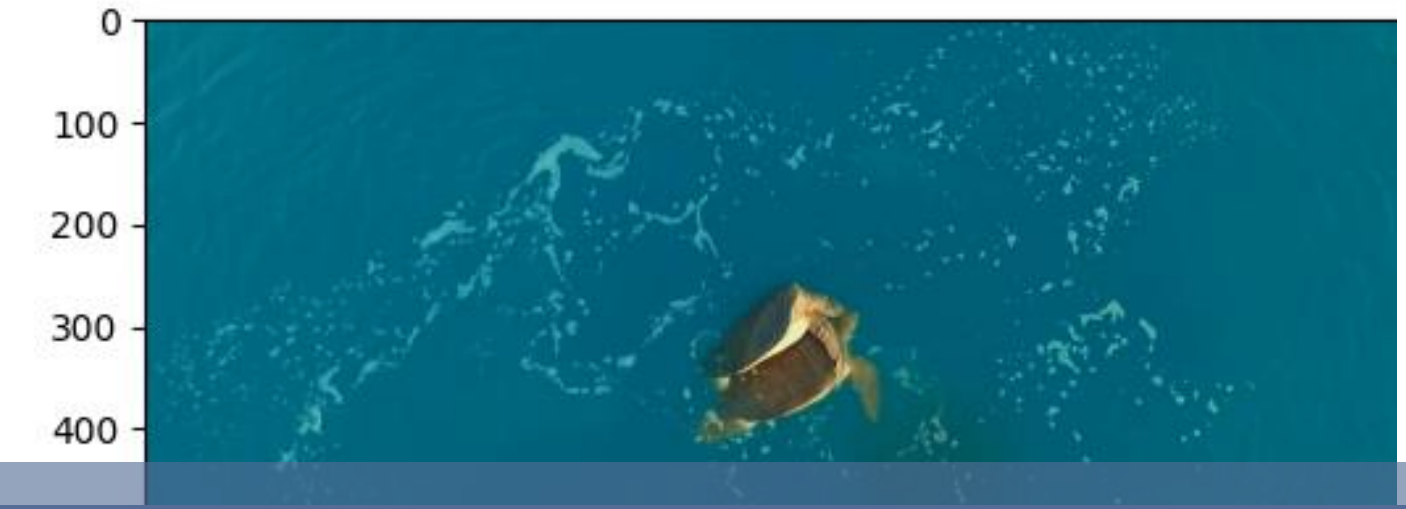
Need a better platform to train the neural network



SYSTEM ARCHITECTURE

The system is composed of the Jetson used to host the neural network, as well as all the sub-systems and components needed to support the Jetson and program.

SUB-SYSTEM



NEURAL NETWORK

- TensorFlow Framework
- Recognition Model
- Labeling Application

HARDWARE

- Image Capturing Camera
- Power Supply (New)
- Jetson Board

COMMUNICATION

- VM for simulation of Unix System
- Jetson Image SD Card
- Generated Images (Modified)

MODEL

Using prebuilt model from TensorFlow 2 Detection Model Zoo

- ssd_mobilenet_v2_fpnlite_640x640_coco17_tpu-8

MEAN AVERAGE PRECSION

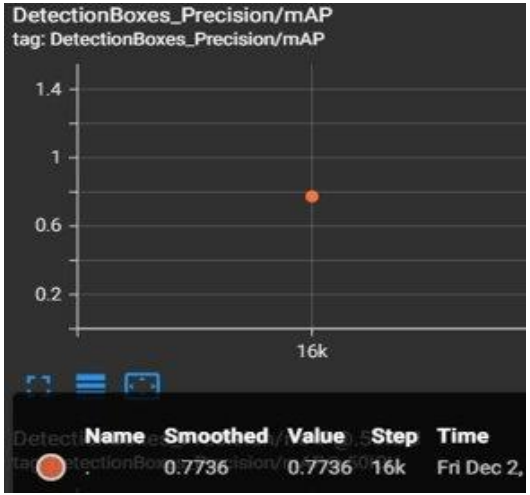
Old = 58%
New = 77%

CURRENT STATE – NEURAL NETWORK

NEW VERSION OF THE NEURAL NETWORK

Stepping away from pre-built model

- Only so many parameters we can tune ourselves



CURRENT STATE – DEPLOYING THE NEURAL NETWORK

JETSON NANO

Previous crashing issue has been resolved

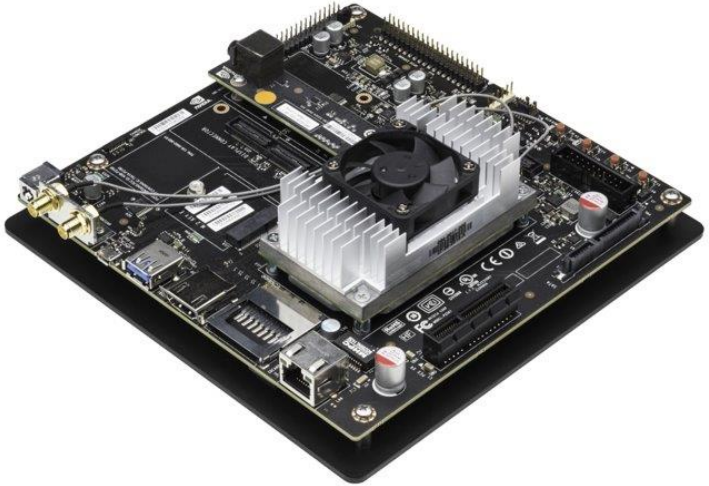
All code required is currently on the machine and ready

ISSUES

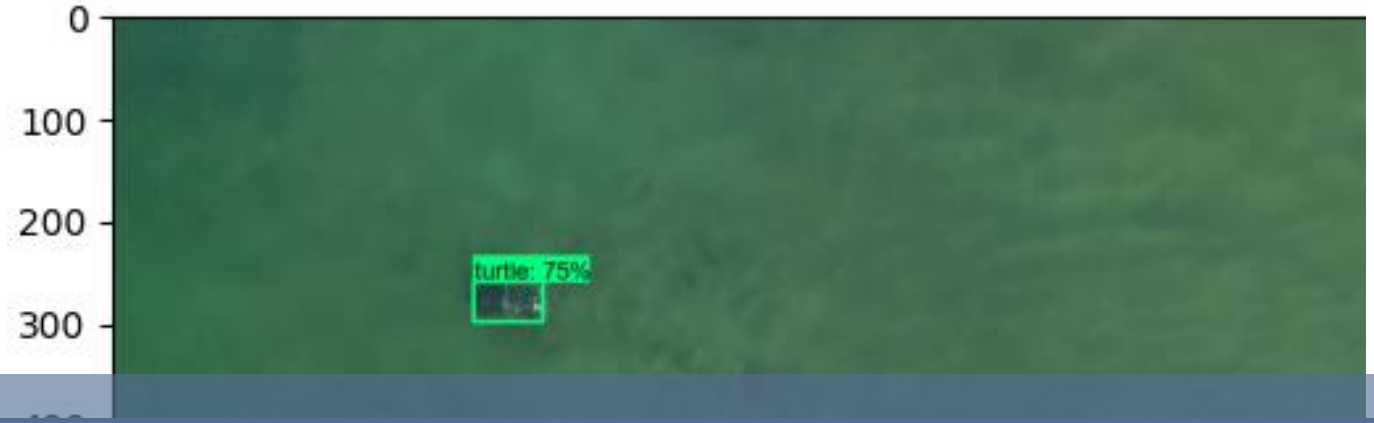
TensorFlow's object_detection API requires Protocol Buffers to be installed

Currently cannot find a successful ways to deploy these on the Jetson Nano

- More research on the topic is required



LESSONS LEARNED

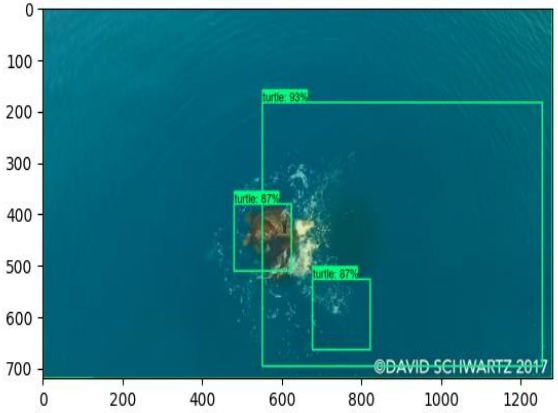


CODE

SMALL BATCH SIZE

PRECISION

TIMELINE



Sprint 1

- Completed Documentation
- Familriazed ourselves with the Jetson and TurtleTech operations

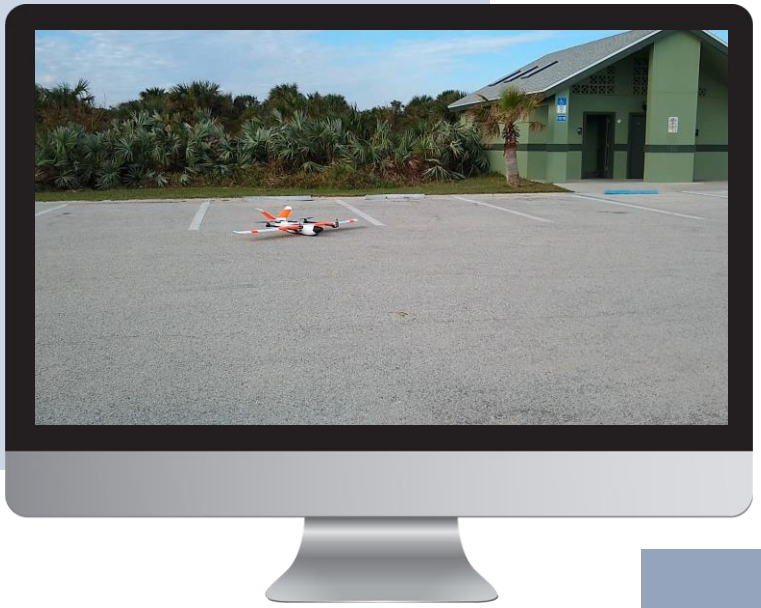
Sprint 2

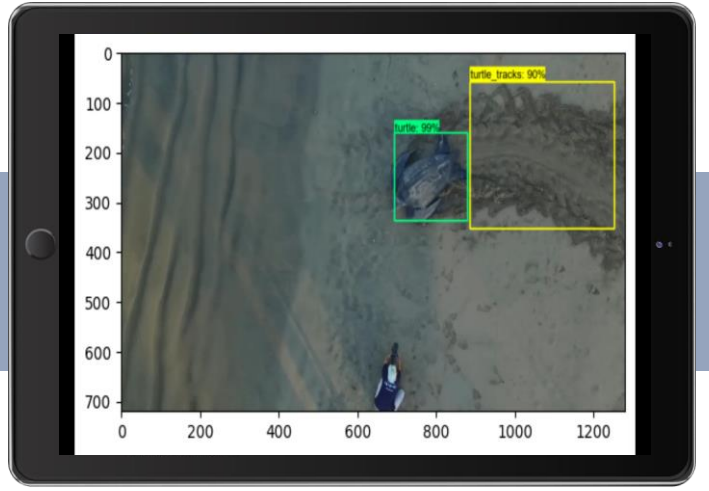
- Produce a functioning neural network

Sprint 3

- Fine tuned the neural network
- Completed final drafts of documentation

TURTLETECH IN ACTION






QUESTIONS?