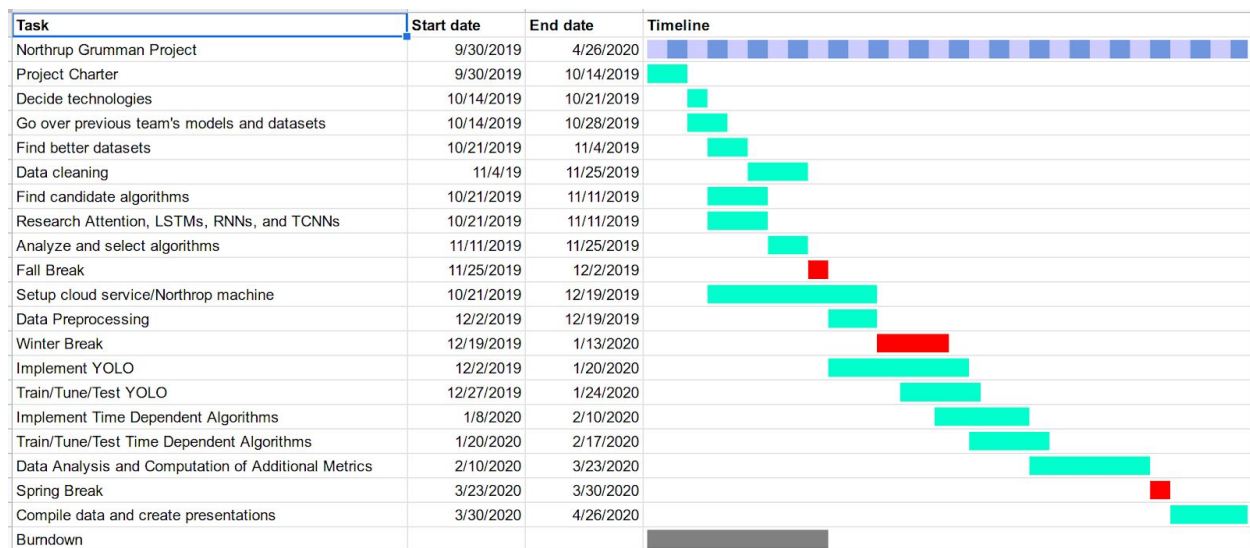


Project Plan

Project Scope

The goal of Northrop Grumman's project this year is to create a time dependent model to classify and track vehicles in video for use in real-time applications. Last year, students tested a variety of algorithms to perform this task, but the algorithms they tested treated each frame of video independently and thus had temporal instabilities in classification. This year's task is to test a variety of methods that are time dependent to see if we can improve the classification accuracy. At a minimum, Northrop Grumman would like us to investigate attention, long short-term memory (LSTM), recurrent neural networks (RNN), and temporal convolutional neural networks (TCNN), but they are also open to other methods we may find in the course of our research. Our project is primarily a research project and writing models intended for use in a production environment is out of scope.

Gantt Chart



Work Breakdown Structure

1.0 - YOLO/Faster-RCNN Baseline

- 1.1 - Trained YOLO Baseline Model
- 1.2 - Tuned/Optimized Baseline Model
- 1.3 - Metrics on Performance and Accuracy of Baseline Model

2.0 - RNN Time-Dependent Model

- 2.1 - Trained RNN Model
- 2.2 - Tuned/Optimized RNN Model
- 2.3 - Metrics on Performance and Accuracy of RNN Model

3.0 - LSTM Time-Dependent Model

3.1 - Trained LSTM Model

3.2 - Tuned/Optimized LSTM Model

3.3 - Metrics on Performance and Accuracy of LSTM Model

4.0 - TCNN Time-Dependent Model

4.1 - Trained TCNN Model

4.2 - Tuned/Optimized TCNN Model

4.3 - Metrics on Performance and Accuracy of TCNN Model

5.0 - Attention Time-Dependent Model

5.1 - Trained Attention Model

5.2 - Tuned/Optimized Attention Model

5.3 - Metrics on Performance and Accuracy of Attention Model

6.0 - Mask-scoring RCNN Time-Dependent Model

5.1 - Trained Mask-scoring RCNN Model

5.2 - Tuned/Optimized Mask-scoring RCNN Model

5.3 - Metrics on Performance and Accuracy of Mask-scoring RCNN Model

7.0 - Additional Metrics and Reports

7.1 - Additional metrics for time-dependent models

7.1.1 - Accuracy after “warming up” with incorrect data

7.2 - Research Paper on results

7.3 - Presentation on findings for Northrop Grumman