

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light greenish-blue. Both are tilted at an angle.

Vehicle Classification

Northrop Grumman



Team members

- Amari Hoogland - Architectural Lead
- Justin Davis - Communications Lead
- Kamen Shah -Deployment Lead
- Lei Teng -Testing/Analysis Lead
- Paris Dinh - Implementation Lead
- Sofie Lange - Documentation Lead
- Valliappan Chidambaram - Requirements Lead
- Zhengwu Yuan - Source Code Control Lead



Sponsor Information



Northrop Grumman

- “Northrop Grumman is a leading global security company providing innovative systems, products and solutions in autonomous systems, cyber, C4ISR, space, strike, and logistics and modernization to customers worldwide.”

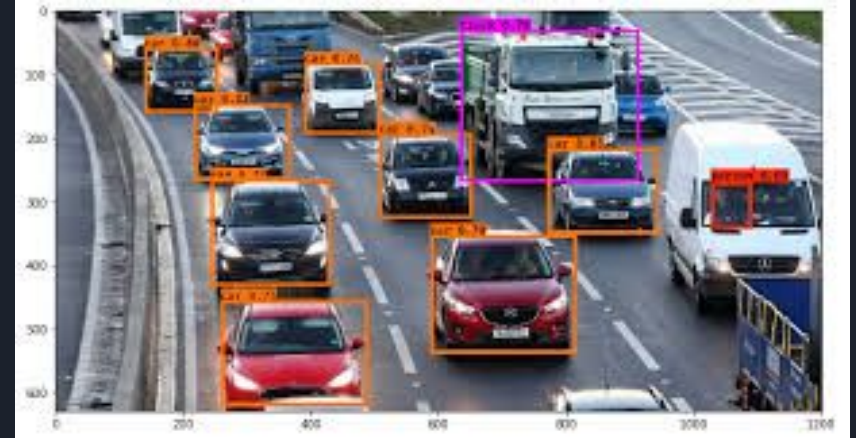
Mission

- Mission statement: “Our vision is to be the most trusted provider of systems and technologies that ensure the security and freedom of our nation and its allies. As the technology leader, we will define the future of defense - from undersea to outer space, and in cyberspace.”

Contact: David Motta, Sr. Principal Engineer Systems, Mission Systems Sector

Project Description & Scope

- Create a real-time model to track and classify vehicles
- Model should have time-dependency
- Investigate at least Attention, LSTM, RNN, and TCNN
 - Other models if time allows and they seem useful





Approach

- Waterfall scope / Agile implementation
- Python - Numpy, SciPy, Tensorflow, Keras, PyTorch
- Research phase
 - Datasets
 - Algorithms
- Implementation phase
 - Build models
 - Compare accuracies, efficiency, error rates

Approach

Task	Start date	End date	Timeline
Northrup Grumman Project	9/30/2019	4/26/2020	
Project Charter	9/30/2019	10/14/2019	
Decide technologies	10/14/2019	10/21/2019	
Go over previous team's models and datasets	10/14/2019	10/28/2019	
Find better datasets	10/21/2019	11/4/2019	
Data cleaning	11/4/19	11/25/2019	
Find candidate algorithms	10/21/2019	11/11/2019	
Research Attention, LSTMs, RNNs, and TCNNs	10/21/2019	11/11/2019	
Analyze and select algorithms	11/11/2019	11/25/2019	
Fall Break	11/25/2019	12/2/2019	
Setup cloud service/Northrop machine	10/21/2019	12/19/2019	
Create architecture/interface for model testing	12/2/2019	12/19/2019	
Winter Break	12/19/2019	1/13/2020	
Implement models	12/2/2019	2/24/2020	
Testing and data analysis	1/13/2020	3/23/2020	
Spring Break	3/23/2020	3/30/2020	
Compile data and create presentations	3/30/2020	4/26/2020	
Burndown			



Communication Plan

- Slack - Team members, TA, Sponsors
- Meet every Monday with TA
- Meet once/twice a month with sponsors



Risks/Mitigation Plans

- Finding quality data sets
 - Doing research to find best quality data possible
- Data is not cleaned/standardized
 - Get competition or research datasets
- Models don't perform as well as we expect
 - Tuning of parameters
- Model training/testing takes longer than expected
- Time complexity (to achieve real-time identification)
 - Doing sufficient previous work on each model



Project In Summary

- Research and implement at least four machine learning algorithms focused on real-time classification of dependent car tracking data.
- Improve final classification accuracies
- Compare efficiency of real-time classifications
- Provide recommendations to sponsor



Thank
You!