

# Charles Topliff

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## Education

### Georgia Institute of Technology | Atlanta, GA

August 2018 - Present

PhD in Machine Learning | GPA 4.0

Advised by Dr. Morris Cohen, Dr. Mark Davenport

Supported by the National Defense Science & Engineering Graduate (NDSEG) Fellowship

### University of Kansas | Lawrence, KS

August 2014 - May 2018

BS in Electrical Engineering | GPA 3.87

## Research Experience

### Graduate Research Assistant | Atlanta, GA

May 2019 - Present

Advised by Dr. Morris Cohen & Dr. Mark Davenport

- Applied canonical time-series methods and low-dimensional embedding techniques for pre-processing of non-stationary time series data
- Investigated the use of Long short-term memory networks for a time series prediction problem in forecasting geomagnetic substorms, improving the state of the art for substorm prediction
- Applied high performance computing resources to enable massively parallel training of neural networks for various hyperparameter searches

### Graduate Research Assistant | Atlanta, GA

August 2018 - May 2019

Advised by Dr. Douglas Williams & Dr. William Melvin

- Implemented value iteration algorithms utilizing fast linear programming optimizers to solve for the optimal decision making policy in high-dimensional scenarios
- Investigated the use of Partially-Observable Markov Decision Processes in adaptive control for sequential radar decision making

## Projects

### IMDB Semantic Classification

Spring 2019

#### ECE 6254 - Statistical Machine Learning

- Applied recurrent neural networks to the problem of classifying semantics of IMDB movie reviews using tokenized word representation
- Investigated the use of different classical classification models, such as logistic classification and kernelized support vector machines as a baseline comparison

### Semidefinite Programming for MAXCUT

Spring 2019

#### ECE 8823 - Convex Optimization

- Reviewed the use of semidefinite programming (SDP) for solving the classic MAXCUT problem, learned about relaxations of quadratically constrained quadratic integer programming problems

## Skills

**Programming / Software:** Python, R, MATLAB, C++, VSCode, Git, PBS, Slack, Vim

**Platforms:** Linux (Ubuntu, Red Hat), High Performance Computing

**Professional Organizations:** IEEE, HKN

## Publications / Conference Presentations

- C. Topliff, M. Cohen, B. Bristow, J. Bortnik, R. McGranaghan, "Recurrent Neural Networks for forecasting Geomagnetic Indices" *2019 American Geophysical Union Fall Meeting*, San Francisco, CA, 2019, *Presented*.
- C. Topliff, W.M. Melvin, D. Williams "Application of POMDPs to Cognitive Radar" *2019 53<sup>rd</sup> Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA, 2019, *Accepted*
- J. Kota, C. Topliff, R. Prasanth, G. Ushomirsky and S. Kogon, "Radar Waveform Design Using Lagrangian Dynamics for Co-Channel Interference Mitigation," *2019 IEEE Radar Conference (RadarConf)*, Boston, MA, USA, 2019, pp. 1-5.
- J. Kota, C. Topliff, R. Prasanth, G. Ushomirsky and S. Kogon, "RF Convergent Waveform Design Using Time-Modulated Phase Functions," *2018 52nd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, USA, 2018, pp. 409-413.

