Charles Topliff

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Education

Georgia Institute of Technology | Atlanta, GA *August 2018 – Present*
PhD in Machine Learning
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, Magna Cum Laude

Research Experience

Graduate Research Assistant | Atlanta, GA *May 2019 - Present*
Advised by Dr. Morris Cohen & Dr. Mark Davenport

- Applied statistical time-series methods and low-dimensional embedding techniques for pre-processing of non-stationary time series data
- Investigated the use of recurrent networks for time series prediction problems 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 networks to the problem of classifying semantics of IMDB movie reviews using n-gram word representations
- Compared model to different classical classification models such as logistic classification and kernelized support vector machines as a baseline

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

Coursework/Skills

Relevant Coursework: Statistical Machine Learning, Digital Signal Processing, Convex Optimization, Deep Learning, Theoretical Statistics, Stochastic Processes in Finance, Natural Language Processing
Programming / Software: Python, R, MATLAB, Vim, VSCode, Git, Slack
Platforms: Linux (Ubuntu, Red Hat), High Performance Computing (PBS)

Publications / Conference Presentations

- **C. Topliff**, M. Cohen, B. Bristow, J. Bortnik, R. McGranaghan, “Simultaneously forecasting global geomagnetic activity using recurrent networks” *Space Weather. Drafting.*
- **C. Topliff**, W.M. Melvin, D. Williams “Application of POMDPs to Cognitive Radar” *2019 53rd 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.