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

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 highly 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 types of 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, Slackware, Debian), Red Hat, High Performance Computing
Hardware: Raspberry Pi, ARM mbed microcontroller, LaunchPad, FPGAs, oscilloscope, logic analyzer
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 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.