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

- Utilized convolutional autoencoders and other generative models to coronal images to reduce dimensionality for downstream forecasting and anomaly detection tasks
- Applied recurrent networks to time series prediction problems in forecasting geomagnetic substorms, improving the state of the art for substorm prediction
- Regularly utilized 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 efficient linear program solvers 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

Machine Learning for Financial Forecasting *Fall 2020*
CS 7646 – Natural Language Processing

- Reviewed the use of Natural Language Processing techniques toward financial sentiment analysis for the purposes of forecasting stock movement and volatility.

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

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 / Platforms : Python, R, MATLAB, Vim, VSCode, Git, Slack, Linux (Ubuntu, Red Hat), High Performance Computing (PBS)

Publications / Conference Presentations

- **Topliff, Charles**, Morris Cohen, and William Bristow. "Simultaneously forecasting global geomagnetic activity using Recurrent Networks." arXiv preprint arXiv:2010.06487 *(2020).* (NeurIPS Workshop ML4PS)
- **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.