AUKKAWUT AMMARTAYAKUN

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EDUCATION

Silpakorn University May 2016 - March 2019
Science Classroom in University-Affiliated School (SCiUS, High school) *Nakhon Pathom, Thailand*

· Graduating project: *The study of relation of some factors from Wi-Fi signal and security of Wi-Fi using data mining technique*

Worcester Polytechnic Institute September 2020 - Present
B.S. in Data Science *Worcester, MA*

· Graduating projects:

- *Exploring end-to-end sequence to sequence ensemble model for predicting RNA secondary structure*
- *Westborough high school mental health predictive analyses*

Worcester Polytechnic Institute September 2023 - Present
M.S. in Data Science *Worcester, MA*

· Graduating project: *Unable to disclose due to NDA*

PUBLICATIONS

1. Aswale, A., Lopez, A., Ammartayakun, A. and Pinciroli, C., 2022. Hacking the Colony: On the Disruptive Effect of Misleading Pheromone and How to Defend Against It. In: *21st International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2022)*. IFAAMAS.
2. Busaranuvong, P., Ammartayakun, A., Korkin, D., and Khosravi-Far, R., 2023. Graph Convolutional Network for Predicting Secondary Structure of RNA. In preparation for submission to Nature Communication.

PROJECTS

Adversarial News Propagation January 2022 - May 2022
OIE 4430 Advanced Prescriptive Analytics *WPI*

· Objective: *Investigate competitive cascading behaviors of two types of information within networks. Aimed to maximize the expected edge spreading, deviating from traditional information cascade models which may not reflect true network behaviors.*

- Utilized the Erdős–Rényi model for network generation.
- Adopted a stochastic programming approach influenced by influence maximization techniques.
- Estimated probability measures via a strategy resembling reinforcement learning: setting a random policy and game exploration.
- Post estimation, conducted network pruning to eliminate unfavorable edges and transformed the task into a max-flow problem.
- Developed a strategy to identify nodes that maximize expected flow within a pruned network, drawing parallels to decision-making in a probabilistic game.
- Simplified the original stochastic programming challenge into a more tractable max-flow problem.

News Title Generation August 2021 - December 2021
DS 595 Special Topics In Data Science: Natural Language Processing *WPI*

· Objective: *Advance document summarization techniques by leveraging BERT, T4, and PEGASUS models, aiming to produce concise and accurate summaries.*

- Fine-tuned on the NYT dataset.
- Implemented a generative adversarial network approach, treating BERT, T4, and PEGASUS as generators. These models were fine-tuned using a discriminator, with samples drawn from the NYT dataset.
- Benchmarked this method against conventional fine-tuning techniques.

"Linear" Variational Autoencoder: Why One Should And Should Not Use Linear Models As Generative Model December 2023
MA 554 Applied Multivariate Analysis *WPI*

· Objective: Explore using linear models rather than neural networks for generative modeling to leverage computational simplicity.

- Implement a linear autoencoder with PCA for encoding and multivariate regression for decoding, showing theoretically that reconstructions are limited to principal component span.
- Enhance decoder through variational inference (VI) on regression parameters to try improving expressiveness.
- Evaluate combination of PCA and Bayesian MMLR on MNIST dataset, finding it generates realistic images and comparable performance to conditioned VAE.

TECHNICAL SKILLS

Languages	Python, R, C, C++, MATLAB, LaTeX
Software	Microsoft Office, Oracle Database, Argos
Tools	Microcontrollers, Robotics (Khepera IV, VEX)

TEACHING EXPERIENCES

Teaching Assistant September 2022 - December 2022
CS 525/DS 595 Reinforcement Learning *WPI*

· This advanced-level graduate class focuses on second-year or higher M.S/Ph.D students. The work includes grading the quizzes and projects in the class. Hosting office hours to answer questions regarding to the course materials and topics in reinforcement learning. This class covers from the Markov decision process to the current trend of research in reinforcement learning like AlphaZero.

AWARDS

Best Paper Award
AAMAS 2022

· Best paper award for the paper with titled "Hacking the Colony: On the Disruptive Effect of Misleading Pheromone and How to Defend Against It."

SELECTED CLASS TAKEN

Mathematics	Multivariate Analysis, Optimization for Deep Learning, Causal Inference
Computer Science	Reinforcement Learning, NLP, DBMS, Big Data Analytics, ML
Business	Prescriptive Analytics
Biology	Computational Neuroscience
Robotics	Swarm Intelligence