Yiyang Liu

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Overview

Analytical and results-driven PhD in Applied Mathematics with both very solid background in math, physics and computer programming looking for data science/software development jobs. A good team collaborator and a fast learner of new skills.

Education

University of Michigan Aug. 2018 – Dec 2024
Doctor of Philosophy in Applied and Interdisciplinary Mathematics *Ann Arbor, MI*

William and Mary Aug. 2014 – May 2018
Bachelor of Science in Physics and Mathematics (Double Major) *Williamsburg, VA*

Skills

OS: Windows, Linux, Unix
Programming Languages: Python, MATLAB, SQL, CSS, C++, HTML
Libraries:PyTorch, Scikit-learn, Pandas, NumPy, OpenCV, Matplotlib, PIL, Keras, gymnasium, PySpark, CUDA
Tools: Tableau, Microsoft Office Suite, Adobe Photoshop, Adobe Premiere Pro
Hobbies: Drawing, Video Games, Photography, Creative Writing

Research Experience

Ph.D. Researcher Aug. 2018 – Present
University of Michigan *Ann Arbor, MI*

- Conducted both theoretical and computational research on optimization algorithms in remote sensing. Produced and published research articles in top journal of the field.
- Worked with highly complicated high-dimensional data-driven model. Computed the model from time-domain measurements and implemented the optimizer.
- Ran numerical experiments on a High-Performance Computing cluster. Results showed that our new algorithm could mitigate many limitations of the state-of-the-art imaging approaches.

Remote Collaborator Sep 2017 - May 2018
Fermilab

- Used C++ to run Monte Carlo simulations of the scattering events in MINERνA particle accelerator. Contributed to one of the first high energy neutrino interaction cross-section measurements.
- Performed data classification to extremely large and noisy real-world datasets with multiple types of background data.
- Corrected the distribution of the data using Bayesian unfolding and obtained estimations of neutrino energy. Visualize the results for articles and oral presentations.

Publications

Electromagnetic inverse wave scattering in anisotropic media via reduced order modeling
Liliana Borcea, Yiyang Liu, Jörn Zimmerling
Journal of Computational Physics, Volume 515 , 15 October 2024, 113272

Projects

Multi-modal Internet Memes Classification Algorithm July 2024 - Aug 2024

Erdos Institute Deep Learning Bootcamp

- Created a multi-modal model to identify the sarcasm in memes. The trained model has an AUC-ROC score of 0.80 on the testing dataset.
- Designed and implemented an variation of the openAI CLIP model with DINOv2 and DistilBERT as the image and text encoders.

Completing Stock Volatility Surface Dec 2023

Erdos Institute Data Science Bootcamp

- Improved the modeling of the volatility surface of S & P 500 index (SPX) with XGboost model and the Multilayer-Perceptron Regressor model using data of option prices from February 2018 to February 2023.
- Comparing to the traditionally used B-spline baseline model, we reduced the RMSE by 31% using XGboost and 27.6% with MLPRegressor.

Splatoon 3 Game Statistics Dashboard May 2023

Personal Project

- Cleaned the user self-reported game data (with more than 5 million entries) for Nintendo game Splatoon 3 and organize the data in to a Pandas dataframe ready for presentation and analysis.
- Produced an interactive data dashboard for the collected dataset with Tableau, demonstrating in-game weapon statistics and user preferences.

Laser Signal Recognition with CNN Dec 2020

Machine learning course project at University of Michigan

- Trained an unsupervised CNN with SegNet architecture to perform semantic segmentation on an image dataset from U of Michigan optical lab to identify the laser signals in noisy images.
- Achieved 84% of true positive with the CNN. The project is used as the sample student project by U of Michigan CS department.

Teaching Experience

Graduate Student Instructor/Research Assistant Aug. 2018 – Present

University of Michigan *Ann Arbor, MI*

- Lectured for college intro calculus sequence. Proved to be an efficient communicator of mathematical concepts to non-STEM major audience.
- Worked as the supervisor at U of M Math Lab, which is the math tutoring center for undergraduate students.
- Worked as a TA for *Intermediate Differential Equations*,*Advanced Mathematics for Engineers*, and *Introduction to Numerical Methods*