Saad Khalic

191 West Woodruff Ave, Columbus, OH 43210 ■ 615-521-2726 | ■ khalid.42@osu.edu | @ github.com/ZonovaX

Personal Profile

I am a theoretical quantum physicist with 8 years of experience in analytically solving and numerically simulating complex quantum systems, specializing in extracting patterns from noisy and sparse data and simulating the dynamics of chaotic, high-dimensional systems. Having programmed since middle school, I am zealous about software engineering and have 3+ years of experience specializing in Machine Learning and Data Science. I am pursuing roles involving complex problem solving, with a preference for exploring business-oriented applications of Data Analytics and Machine Learning techniques.

Selected Projects_

Mitigating Racial Bias in Pulse Oximeter Readings using Machine Learning

- Developed an ensemble of gradient-boosted random forest models and classifiers to accurately estimate arterial blood oxygen saturation and identify hidden hypoxemia, effectively reducing the systemic racial bias inherent in current pulse oximeter technology.
- Achieved 30% greater accuracy in estimating oxygen saturation compared to the current medical standard and a sensitivity rate of 70% in detecting hidden hypoxemia, contributing to improved equity and accuracy in patient care and guiding future pulse oximeter design enhancements.
- 1st place project out of 33 groups at the Erdos Institute Machine Learning Bootcamp, 2023.

Multi-Modal Forecasting of Precipitation using a Deep Convolutional Network

- Developed a deep Convolutional Neural Network (CNN) using a custom U-Net architecture, training on over 10,000 multi-modal weather events sourced from the SEVIR database.
- Engineered an innovative data fusion technique combining spatial information with optical flow, resulting in a tenfold reduction in computational cost without compromising the model's competitiveness.
- Surpassed MIT's SEVIR model performance by over 50%, as measured by a range of mathematical, environmental, and economic metrics, demonstrating the model's superior efficacy and versatility.

Correlations in Sentiment of Twitter Users [Erdos Institute 2021]

- Led a team of 4 analysts with the goal of measuring correlations in sentiment between Twitter users.
- Built a network of 1000+ users matching specific criteria using Twitter's API and performed sentiment analysis followed by time series analysis.

Unsupervised Classification of Quantum Systems With Sparse Data

- Designed a new Unsupervised Classification algorithm to classify quantum systems using noisy and sparse data.
- Created a new measure to extract and compare correlations between different systems.
- Generated 10m+ samples of known high-dimensional quantum systems using Monte Carlo methods to test the algorithm.
- Applied algorithm to data of varying degrees of sparsity, ranging from 100 to 100,000 samples, and achieved 99% classification accuracy.

Professional Experience

Crossroads-To-Freedom

Software Developer

- Optimized searching on a database of 30 years of funeral home data in Memphis, TN and created a researcher oriented user interface using SQL and PHP.
- Implemented intuitive public-facing tools to navigate and showcase trends in the data using Tableau, Omeka, and the Google Maps API.

Skills_

Programming	Python, C/C++, Julia, R, Matlab, Java, HTML/CSS, Javascript
Python Packages	PyTorch, TensorFlow, XGBoost, CatBoost, NumPy, Pandas, Cython, SciPy
Machine Learning	CNN, U-Net, RNN, LSTM, GAN, Transformers, Principal Component Analysis, Variational Autoencoders,
	Ensemble Learning, Random Forest, Boosting, Batch Normalization, Dropout
Data Science	Linear/Logistic Regression, Regularization, One-Hot Encoding, Time Series Forecasting, KNN, Support Vector Machines
OS and Platforms	Windows, Linux, Jupyter, Bash, Git, Tableau

Education

The Ohio State University

Ph.D. Candidate in PhysicsAdvisor: Prof. Tin-Lun (Jason) Ho

Erdös Institute

Machine Learning Boot Camp

• Topics in data science ranging from regression to machine learning, culminating in a final project.

Columbus, Ohio 2018 - Present

Columbus, OH 2021, 2023

Memphis, TN

2017-2018