DENNIS FARMER

Ann Arbor, Michigan

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Education

University of Michigan - Ann Arbor, MI   **2022 -**

B.S.E. Data Science - College of Engineering, Minor in Music

Coursework: Probability Theory, Discrete Mathematics, Data Structures and Algorithms,
       Music Theory I, Aural Skills I, Theoretical Statistics, Machine Learning,
       Computational Methods for Statistics

Projects

Music Recommender System   **March 2025**

Personal Project   *Ann Arbor, MI*

- Extracted music track embeddings from a web-scraped database of 5k songs to implement an Automatic Playlist Continuation model via content-based and collaborative filtering methods
- Utilized K-Nearest Neighbours on mean-pooled track embeddings, and user-item interaction matrix factorization, to recommend tracks similar to a submitted playlist
- Web interface: https://northstarsound.streamlit.app/

Convolutional Neural Network for Image Classification   **September 2023 – December 2023**

Michigan Data Science Team   *Ann Arbor, MI*

- Designed and trained a custom convolutional neural network architecture to differentiate photoshopped faces from unaltered faces with a team of five people, including data augmentation and model interpretability via GradCam convolutional layer visualizations.
- Developed a web application using React and Express for uploading images and receiving classification results via API.
- Github Link: https://github.com/Weile-Zheng/rvf-architecture/tree/main
- Powerpoint Presentation from F23 MDST Expo: https://tinyurl.com/5n8k5t5x

Research Experience

Computational Statistics - Roaming Behavior of Domestic Cats   **October 2024 - December 2024**

Course Project - Computational Methods for Statistics and Data Science   *Ann Arbor, MI*

- Utilized Monte Carlo simulations and bootstrapping to analyze operating characteristics of a beta regression model to predict the proportion of time cats spent away from home
- Paper: Final Project Results

Causal Discovery - Philosophy of Science   **September 2022 – August 2023**

University of Michigan - Dr. Patrick Grim   *Ann Arbor, MI*

- Conducted research on the use of structurally adaptive Bayesian networks to determine the causal structure of how scientific theories develop over time
- Developed causal inference algorithms inspired by Judea Pearl's theory of causality, utilizing d-separation, the Peter-Clark algorithm (PC), and Greedy Equivalence Search (GES) in Python to model causal structures

Teaching Experience

Data Science - Education Developer   **June 2024 – Present**

Michigan Data Science Team   *Ann Arbor, MI*

- Worked on improving the MDST educational experience for new club members by developing an introductory Python tutorial, giving workshops on data science topics, and holding in-person office hours
- Developed a onboarding challenge for new members to classify survival of passengers aboard the Titanic using Neural Networks in PyTorch

Music - Educator and Composer   **May 2023 – Present**

South Lyon East High School   *South Lyon, MI*

- Educating keyboard percussionists 2-3 times per week during the fall and winter semesters
- Composing front ensemble music for the indoor percussion group South Lyon Percussion, which performs in competitions hosted by Michigan Alliance for Performing Arts - https://dennisfarmer.dev/music/

Skills

Languages C++, Python (PyTorch, Pandas, Numpy, Beautiful Soup), R, SQL, Bash, Stan

Tools and Software: Git, Docker, Vim, Make, VSCode, GNU Debugger (gdb), Valgrind, Microsoft Excel