# 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*
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 audio features from a web-scraped database of songs to recommend music tracks from playlists similar to those in a user-submitted top-10 mixtape
- Utilized Principal Component Analysis to cluster playlists based on mean pooling of track feature embeddings
- (in-progress) Hosting model with a web interface for users to link their top-10 mixtape Spotify playlist

**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

**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

**Complex Systems** **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

**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 Instructor and Composer - Percussion** **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

## Skills

**Languages/Tools:** C++, SQL, R (Shiny, ggplot2, dplyr), Python (PyTorch, Pandas, Numpy, Beautiful Soup), Stan, Javascript, Microsoft Excel (PivotTable, XLOOKUP, Power Query)

**Developer Tools:** Make, Git, Linux, Vim