DENNIS FARMER

Ann Arbor, Michigan

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Education

University of Michigan - Ann Arbor, MI **2022 - 2026**

B.S.E. Data Science - College of Engineering, Minor in Music
Coursework: Machine Learning, Computational Methods for Statistics and Data Science,
Probability Theory, Theoretical Statistics, Data Structures and Algorithms

Projects

Music Recommender System **March 2025**
Personal Project *Ann Arbor, MI*
- Built an automatic playlist continuation model with a web interface, using web-scraped dataset of audio and user interaction (playlist) data (Beautiful Soup, scikit-learn, SQL, Streamlit, Plotly)
- Created API to extract audio embeddings using containerized CNN model trained on genre classification (Tensorflow, AWS Lambda, Docker, Flask, ngrok)
- Utilized kernel principle component analysis on audio embeddings, as well as latent matrix factorization methods, for track recommendation via content-based and collaborative filtering respectively

Convolutional Neural Network for Image Classification **September 2023 – December 2023**
Michigan Data Science Team *Ann Arbor, MI*
- Designed and trained a convolutional neural network architecture to distinguish between AI-generated faces and real human faces with a team of five people (PyTorch)
- Developed a web application for uploading images and receiving classification results via API, with interpretability via GradCam convolutional layer visualizations (React, Express)

Research Experience

Computational Statistics - Roaming Behavior of Domestic Cats **October 2024 - December 2024**
Final Research Paper - Computational Methods for Statistics and Data Science *Ann Arbor, MI*
- Developed and validated a beta regression model using Monte Carlo simulations and bootstrapping to predict the proportion of time domestic cats spent away from their home (R)

Causal Discovery - Philosophy of Science **September 2022 – August 2023**
University of Michigan - Dr. Patrick Grim *Ann Arbor, MI*
- Developed genetic algorithms for causal Bayesian networks based on Judea Pearl's theory of causality, and ideas from causal discovery literature, to model adaptive causal structures of scientific theories (Python)

Bioinformatics and Computer Vision **May 2022 – December 2022**
University of Michigan - Maerz Laboratory *Ann Arbor, MI*
- Analyzed single-cell RNA sequencing data to characterize immune cell phenotypes in PTOA immune response (R, Bash)
- Implemented and improved on an automated image analysis pipeline using a U-Net CNN for semantic segmentation of post-traumatic osteoarthritis histological images (MATLAB, Great Lakes Cluster)
- Paper: Synovial fibroblasts assume distinct functional identities and secrete R-spondin 2 in osteoarthritis

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 and hosting in-person office hours
- Created a new member onboarding challenge involving classification of Titanic passenger survival with neural networks (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

Skills

Languages C++, Python (PyTorch, scikit-learn, Pandas, Numpy, Beautiful Soup, Flask), R, SQL, Bash
Tools and Software: Git, Docker, ngrok, Vim, Make, VSCode, GNU Debugger (gdb), Valgrind