Zilin Dai

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EDUCATION

Worcester Polytechnic Institute (WPI), Worcester, MA

- Undergraduate **Computer Science** major, GPA: 3.96   August 2021 – May 2025*

Related Courses at WPI:

- Machine Learning, Artificial Intelligence, Digital Image Processing, Algorithms, Operating Systems, Data Science II: Modeling and Data Analysis, Human-Computer Interaction, AI for Robotics, Object-Oriented Programming

SKILLS

Programming: Python, Java, C, C++, Linux, SQL, R, MATLAB, html, CSS, G-code, Bash

Software: Docker, PyTorch, TensorFlow, Scikit-learn, VSCode, Git, Vim, SolidWorks, Blender, ROS, Anaconda

Publications

Zilin Dai*, Yijia Wu*, Haotian Liu, Lehong Wang. 2024. **Vision-based FDM printing for fabricating airtight soft actuators**. IEEE International Conference on Soft Robotics (Oral Presentation)

Zilin Dai, Andrew McReynolds, Jacob Richard Whitehill. 2023. **In Search of Negative Moments: Multi-Modal Analysis of Teacher Negativity in Classroom Observation Videos.** International Conference on Educational Data Mining 2023, founded by National Science Foundation.

EXPERIENCE

Research Assistant under Professor Ziming Zhang, *WPI, MA*   December 2023 – Present

- Optimizing the recurrent neural network architecture to resolve vanishing gradient problem through integration with Brownian-Bridge diffusion model.
- Implementing text-to-image AI on large-scale datasets for synthetic identity generation for face recognition training.

Research Student under Dr. Feng Tian, *Harvard University @ BIDMC*   September 2023 – Present

- Incorporating GPT to create effective embeddings for single-cell RNA sequencing data to predict cellular phenotypes.
- Visualization of single cell sequencing bioinformatics data using Seurat packet in RStudio.
- Reimplemented stereotaxic apparatus through custom designed 3D printed components with SolidWorks.

Research Assistant under Professor Markus P. Nemitz, *WPI, MA*   April 2023 – December 2023

- Design of a closed-loop FDM printing system optimized for real-time detection and remediation of permeability-related defects and formulation of a software architecture capable of executing layer-wise defect detection and correction through whole-layer ironing techniques.

R&D Co-Op, *Olympus Corporation of the Americas, Westborough, MA*   January 2023 – July 2023

- Developing and incorporating machine learning models to differentiate between human tissue, endoscope, and stones with laser spectral data, enabling smart features for the medical device; currently achieving nearly 100% sensitivity and specificity on all testing data under different data collection conditions.
- Implemented data logger processor program with tkinter and seaborn to filter and visualize data from thermocouples.

Research Assistant under Professor Jacob Richard Whitehill, *WPI, MA*   May 2022 – January 2023

- Proposed and implemented an automatic and semi-automatic negativity filter and a classroom emotions analytics system using Speech Emotion Recognition, Google Cloud NLP APIs, and face emotions detection on OpenCV.
- Utilized Pandas and NumPy to achieve an AUC score of *83.3%* with semi-automatic system on *~1000GB datasets*.

Intern under Professor Chris Bailey-Kellogg, *Dartmouth College, NH*   August 2019 – May 2020

- Gathered and processed Episcore, potential, mutation, and sequence design data with Python.
- Developed a program using Plotly to visualize the frequency of point mutation data over sub-selected protein sequences.

PROJECTS

AI Bomberman Bot   January 2024 – March 2024

- Devised an algorithm combining A* and reinforcement learning for path-planning of a simulated character to earn higher score and escape from the world map. Interactive features and full graphics are provided.

Speaker Recognition System   July 2023 – Aug 2023

- Implemented and modified SpeechBrain into a real-time speech activity and speaker recognition system based on PyTorch with user interface to process identification every second based on existing voice samples; system achieved *86.7%* accuracy.
- Enabled a client-server data transfer pipeline to accelerate the speech processing speed from ~1.5 seconds to ~0.14 second.

Pizza Delivery Robot   January 2022 – March 2022

- Designed and controlled an autonomous and teleoperated VEX robot in corporation that can deliver wood blocks to specified locations on racks with a 4-part system design.