

# Yipeng (Perry) Zhu

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## Technical Skills

- **Programming Language** - C++, C, Java, JavaScript, Python, R, SQL, MATLAB
- **Tools/Environments** - Git, Linux, AWS, Node.js, Express, MySQL, Jupyter Notebook, Docker
- **Testing** – JUnit, Mocha, GDB
- **Web** – HTML5, CSS, Sass, JavaScript, Node.js, Bootstrap, Express, React, Responsive Design, Server-Side Rendering, WebGL, Three.js

## Technical Projects

### Personal Website

#### *Full-Stack Web Design & Development With HTML, CSS, and JavaScript*

Mar 2021-Present

- Constructed and hosted a website that contains the introduction, contact information, and works of mine.
- Designed and developed the front-end webpage using HTML5, Sass preprocessor, Three.js, and WebGL for 3D graphics. The pages include my introductions, previous works, and a series of frequently used gadgets using JavaScript and front-end techniques for my daily usage or demonstration.
- Hosted the site on my personal hostname by configuring an AWS Linux EC2 instance cloud server that runs the node.js backend program with Express framework for routing requests.
- Currently working on linking a MySQL database on the server to allow storing user information and posts by interacting with MySQL with the node MySQL2 package.

### NYC Airbnb Reviews ML Prediction

#### *Supervised Machine Learning Project Using Python and Multiple Models*

October 2024

- Constructed and evaluated several machine learning pipelines to predict the number of reviews per month of Airbnb listings in New York.
- Performed data preprocessing and feature engineering by imputing missing values to satisfy the models, standardizing numeric variables to improve analogy-based models, and discretizing continuous features to enhance linear models.
- Encoded text features use the bags of words representation using the Count Vectorizer, and categorical features use One Hot Encoding so they can be absorbed by the models.
- Developed pipelines for multiple models, including linear Ridge model, Decision Tree Regressor, SVM with RBF kernel, and XGBoost ensemble model, and conducted hyperparameter tuning using a randomized search and chose the best-performing parameter according to cross-validation scores to reduce the performance loss by overfitting and underfitting.
- Selected essential features using Select From Model with XGBRegressor and Forward Search approach to reduce overfitting, mitigate the curse of dimensionality, and enhance interpretability and training speeds.
- Evaluated and interpreted the models using SHAP on the test set. The best-performing model achieved around 1.3 MAPE, and the predicted results can be explained logically and consistently with real-world understanding.

### UNO Game Management System

#### *Full-Stack Data Management Project*

Jul-Aug 2024

- Designed and developed a program that manages all game data in a UNO card game in 5 pages plus an administrator authentication page in a group of 3.
- Constructed a front-end interface with comprehensive form validation, clear visual notifications, animations, and smooth interaction by avoiding extra refresh using asynchronous fetches to replace the default form submission behavior using HTML, CSS, and JavaScript.

- Utilized RESTful API to set up the communication between front- and back-end using Express framework and used cookies and local storage to enable previous state restoration and authentication state preservation for a better interactive experience.
- Tailored SQL DDLs and DML templates in the backend model with sanitization to prevent injection for functionalities, including nested group-by aggregation, division, and view creations to handle user request actions triggered by front-end event listeners.

### **Two-Player Snake Game using Java**

#### ***Real-Time Interactive Game With Java***

Sep-Dec 2023

- Later migrated the MatLab game to Java with two interfaces with Swing and Lanterna libraries in an object-oriented manner. Empowered with singleton, observer, and MVC design patterns to divide the project into separate components and hierarchies with well-specified interfaces for better maintainability and scalability. The OOP design also features extra functionality for serializing and exporting all game data into JSON for further reuse.
- Maintained 100% unit test coverage check while developing the Java version using JUnit.

### **Two-Player Snake Game using MatLab**

#### ***Real-Time Interactive Game With MatLab***

Feb-May 2023

- Constructed a video game that allows two players to play the traditional Snake game on the same computer. Won the 1st place winner of the Fundamentals of Engineering Design Showcase with the contribution of developing the main game-loop logic in a group of 4 for being the best group among all first-year students in the OSU College of Engineering.
- Developed the game in MatLab with the provided game engine by initializing the game window with self-created stripes, modeling the gameboard in a 2d matrix, maintaining a synchronous execution to tick the snake movements and food generation while handling user inputs asynchronously by event listeners and model updates with callback functions.

## ***Work Experience***

### **The Center for Accessibility Office at the University of British Columbia**

#### ***Note Taker***

Jul-Aug 2024

- Took clear and detailed notes and uploaded those notes to a secure website within 48 hours of each class to assist a student with a disability.

### **Purdue University Gifted Education Research and Resources Institute (GER2I)**

#### ***Teaching Assistant***

Jul 2022

- Assisted the Professor in demonstrating course concepts regarding basic data science and machine learning concepts, including visualization, linear and logarithmic regression, data cleaning and tidying using Python and libraries such as pandas, matplotlib, turtle, and scipy to a class of 25. Hosted office hours every day for 1 hour to answer students' questions and collected and graded their homework.
- Delivered computer science concepts and skills to students during three 1.5-hour workshops, including Basic Principles and Components of Computer, Web and Basic Web Development, and Introduction to Using Git and GitHub.

## ***Education***

### **University of British Columbia**

Sep 2023-Present

*3<sup>rd</sup> year Bachelor of Science, Combined Major in Computer Science and Statistics*

### **The Ohio State University (transferred)**

Aug 2022 – May 2023

*1<sup>st</sup> year Bachelor of Science, Major in Computer Science Engineering*