Tianyi Xu
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Education

- **University of Wisconsin-Madison** Madison, WI
  Bachelor of Science in Computer Science, Data Science, Math; GPA: 3.964 *Sept. 2021 – May 2025 (Expected)*
  Coursework: Advanced Algorithms, Data Structure, Artificial Intelligence, Machine Learning, Deep Learning, Computational Theory, Database Management System, Big Data System, Intro to Computer System, Discrete Math, Linear Algebra, Probability, Real Analysis, Data Science Modeling.

Experience

- **Wisconsin Institute of Discovery** Madison, WI
  Undergraduate Research Assistant *Jan 2023 - Present*
  - : Conducted Literature Review on Network Analysis/Inference algorithms to build a microbial network to study the effect of fumigation on soil microbiomes.
  - : Identified important patterns within a large dataset using various data visualization tools and skills.
  - : Using permutational multivariate analysis of variance and machine learning techniques to identify the change and variance caused by different fumigation status.
- **UW-Madison Material Sciences** Madison, WI
  Undergraduate Machine Learning Researcher *Feb 2023 - Present*
  - : Utilized deep learning technique to identify aggressive tumor features in kidney CT scan images.
  - : Developed, and optimized a convolutional neural network using PyTorch for feature extraction from images. Improved accuracy of the model in the testing stage from 60% to 95%.
  - : Tested the CNN using various techniques including random naive testing and permutation tests.
- **UW-Madison Computer Sciences** Madison, WI
  Undergraduate Teaching Assistant *Aug 2022 - Present*
  - : Peer Mentor for CS220(F22), CS320(S23), Data Science Programming I/II
  - : Held 180 hours of office hours, assisted over 200 students with Python programming and data science concepts and projects on topics like object-oriented programming, data analysis, visualizations, and machine learning, etc.
  - : Supported the instruction team with creating new exams for 1000 students in the course and also proctoring.
- **UW-Madison, Division of Information Technology** Madison, WI
  Student Developer *Jan 2012 - Dec 2013*
  - : Enhanced the dark mode interface, allowing for a more comprehensible display and supported preference storage.
  - : Created new APIs and documentation with integration of MySQL server for data fetching and posting.
  - : Developed a staff filtering system using react.js that enabled filtering of 1000 employees in DoIT Help desk.
  - : Conducted testing on the shift posting and picking system and fixed various bug identified in the system.

Projects

- **Teeko AI Player**: Developed an AI game player for the game of Teeko using Python. Implemented functions to search for all possible game states with efficient time complexity. Applied minimax algorithm with a depth cutoff and a modified euclidean distance heuristic such that the AI is able to defeat a random player in under 4 seconds.
- **Hierachical Clustering - Pokemon**: Implemented hierachical clustering algorithm with complete linkage in Python and numpy to group Pokemon into clusters based on a 6d feature.
- **Minirel Database**: Desgined ER diagram and database schema for a relational database. Implemented a buffer manager using clock algorithm, heapfile system, and also database operators (select, insert, delete) in C++.
- **Flight Searcher**: Search the shortest flight routes of over 5000 flights using Dijkstra algorithm implemented in Java.

Skills

- **Programmming Languages**: Python, R, Java, C/C++, JavaScript, HTML, CSS, SQL
- **Other Tools**: React, Node.js, Pytorch, Numpy, TensorFlow, Pandas, Matplotlib, Flask, MySQL, Sqlite3, Git, Linux, GCP