Aaryan Misal

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EDUCATION

University Of Massachusetts, Amherst **08/2019 - 05/2023 |** Amherst, MA

- Bachelor of Science, Computer Science and Mathematics
  (Data Science and Statistics)(GPA: 3.913)
- Commonwealth Honors College
- Chancellors Scholar | Dean's List (All Semesters)

RELEVENT COURSEWORK

Computer Science Courses: Data Structures and Object-Oriented Design, Programming Methodology and Design Patterns, Discrete Mathematics, Computer System Principles, Reasoning Under Uncertainty, Algorithms, Artificial Intelligence, Introduction to Software Engineering, Machine Learning
Mathematics Courses: Calculus, Linear Algebra, Multivariate calculus, Statistics I, Statistics II, Regression Analysis, Differential Equations

EXPERIENCE

Undergraduate Research Assistant, *Theory Lab* **06/2021 - 08/2021** | Amherst, MA

- Conducted research under a PhD mentor on graph theory, specifically, Hamiltonian decomposition of Bubble-sort graphs.
- The objective was to either prove or disprove the conjecture that a bubble sort graph can be recursively decomposed into {n-1}/2 Hamiltonian Cycles that do not contain any common edges and if the n is even, a perfect matching.
- Completed the induction proof by detecting patterns of perfect matching in the code which repeated themselves at regular intervals.

Machine Learning and data Science Intern, *E-Zest Solutions Ltd.* **04/2021 - 07/2021** | Pune, India

- Assisted the team to predict the bone age of a human being for radiological purposes.
- Used RSNA data set of over 1500 x-rays to train and evaluate the system.
- Used machine Learning models like U-Net and CNN to segment out the image and classify it for bone age.

Data Science Intern, *Adviant Technologies Pvt. Ltd* **06/2020 - 08/2020 |** Pune, India

- Built and trained AI models for identifying a child in a frame.
- The model is used by the IOT platform to identify unaccompanied children in prohibited areas. E.g. near swimming pools, electricity distribution areas etc. Using OpenCV and TensorFlow libraries.

PROJECTS

Stock Prediction

- Built a stock prediction application using the python Dash library
- Fetched data using the yfinance python library.
- Implemented a ML model (Support Vector Regression) to predict the stock price for the dates requested by the user. Currently working on improving the model by using Long Short-Term Memory.

Loan Prediction

- Built a decision tree classifier that predicts whether the loan will be granted to a person or not.
- The code learns a decision tree from the given dataset and then predicts whether a given person will be granted a loan based on the tree made by classifying the attributes according to their information gain values.
- The code has an accuracy of 80%

Connect 4 AI

- Built a connect 4 gameplay using the techniques of minimax alpha beta pruning in adversarial search.
- The program allows the game to continue until there are no spaces left to put the coins on the board and then assigns points to each player based on the number of connections they have

Hamiltonian Path tracker

- This project traces the Hamiltonian path of a given graph (known NP-Complete problem)
- It asks the user to input the number of nodes of the graph whose Hamiltonian path is to be traced.
- The code helps in detecting patterns in the perfect matching to solve the inductive proof that the Bubble-sort graph can be recursively decomposed into {n-1}/2 Hamiltonian cycles.

Classic 8-puzzle Solver

- The project solves the Classic 8-puzzle game using the searching Algorithm techniques of A* search, Uniform Cost Search, Greed-best First Search and BFS.
- The solver takes a start state as input, performs a search over the state space, and returns a solution path to the goal state when possible
- It uses strategies of "number of misplaced tiles" and "Manhattan distance" as heuristics to improve the search process for A* search.

TECHNICAL SKILLS

- **Languages:** Python, Java, C++, C, HTML, CSS, JavaScript, R
- **Frameworks and Libraries**: Node.js, Django, Express, Flask, React.js, NumPy, Pandas, SciPy, beautifulsoup, selenium, Pygame, Matplotlib, Seaborn, OpenCV, TensorFlow, Scikit-learn
- **Developer Tools**: Git, Linux
- **Database Programs**: MongoDB, SQL