Varun Shrivastav

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Dissertation

- **Overview of Reinforcement Learning with Tic Tac Toe | Python, Pygame, and Numpy** Github

  Tic Tac Toe game built with Python that learns to play using a Reinforcement learning model. Play on itch.io

  - Implemented **Reinforcement Learning with Decision Trees** model which **learns to play with experience.**
  - Utilized **Numpy** for efficient **matrix transformations** to **Detect Symmetrical States** of the game board for avoiding **redundancy**.
  - **Record each game played** and **predict optimal move**s using **Probability** and avoiding previously learned losing moves.
  - Implemented **Mini-Max Algorithm mode** in the game to enhance gameplay experience.
  - Implemented the **Elimination of Symmetrical States** and **Memoization**, resulting in a **96% reduction in Minimax runtime**
  - Enabled two players to engage in **Player vs Player** mode on the same device.
  - Developed a **user-friendly interface** for the game using **Pygame** and enabled the game to be played in a **browser** using **Pygbag.**

Projects

- **Self Driving Car Simulation | HTML, CSS, JavaScript** Github

  Autonomous Car Simulation built with HTML Canvas powered by Neural Network built in JavaScript. Visit Project

  - Car drives in a **straight road** and **avoid collisions with traffic and road** borders.
  - Implemented a **Neural Network** from scratch in **JavaScript** to enable **autonomous driving**.
  - Developed **user-friendly interface** allowing users to **launch multiple cars** with custom speed and **random network parameters.**
  - Implemented **friction** and **acceleration** to make car **movements look Realistic.**
  - Implemented **device orientation** and **key controls** for car.
  - **Optimized animation** with **Queue Data Structure**

- **Social Media Web Application | Python, JavaSript, Django, Ajax, WebScockets, Bootstrap, HTML, CSS** Github

  Developed a social media app for individuals interested in poetry using the Django framework.

  - Implemented key features such as **authentication, posts, comments, likes, sidebar animations**, **infinite scroll**.
  - Ensured full **Responsiveness** of the site for optimal user experience on **mobile devices.**
  - Utilized **SQLite Database** and **Django ORM** to store data in the application.
  - Implemented **AJAX** to enhance user experience by **avoiding page reloading.**
  - Utilized **Django Channels** to introduce **WebSockets** and implement a **real-time public chat.**

- **Chat Level Telegram - Bot | Python, Telebot, Pymongo, OpenAI API, NewsAPI, and MongoDB Atlas.** Github

  Created a Chat Level Bot for telegram groups to manage levels and XP of members. bot username -> @Chat_Level_Bot

  - Implemented features such as setting **custom ranks**, **custom levels**, **custom nicknames**, **changing reps with emojis.**
  - Stores Data in **MongoDB Altas Database** using **Pymongo.**
  - Can communicate with users using **Openai API** to facilitate **interactive conversations**.
  - **Fetches** news using **News API** to provide up-to-date news information.

- **Maze Runner Robot | Arduino UNO, C++, Bluetooth, IR Sensor** Github

  Developed an Arduino robot programmed in C++ capable of solving maze puzzles using black line detection.

  - The robot is capable of **solving mazes** and remembering the **shortest path**.
  - Utilized **IR** pair **sensor** to accurately **detect black lines**.
  - Designed and implemented a **Bluetooth-enabled Arduino controller** to remotely control the robot.

SKILLS

• Software Development • Data Structures and Algorithms • Machine Learning • Python • JavaScript • HTML • C++

EDUCATION

B.Sc (Hons.) Electronic Science | 2020-2023

SGTB Khalsa Collage, Delhi University