Mrinall Umasudhan

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Education

University of Florida Gainesville, FL

Bachelor of Engineering in Computer Science (GPA: 4.0) *Aug. 2023 – May 2027*

- AP Computer Science A (High School), MAC 2311 (Calculus I), ABE 6933 (Special Topics in Agricultural and Biological Engineering: Computer Vision and Deep Learning

Experience

Undergraduate Researcher August 2023 – Present

University of Florida Virtual Human Experiences Research Group (UF VERG)

- Assisting Dr. Dre Fedd with launching a study on the effectiveness of virtual humans in promoting HIV PrEP (Pre-Exposure Prophylaxis) among emerging African American adults.
- Developing an advanced virtual human using Google Dialogflow and Synthasia tailored for promoting HIV PrEP
- Utilizing the React framework to create an online interface for facilitating virtual human interaction

Software Developer July 2023 – Present

University of Florida's Machine Intelligence Lab (UF MIL)

- Utilized ROS (Robot Operating System) with Python to build and maintain software for UF MIL's autonomous submarine for the annual robosub competition.
- Enabled vision processing by integrating the YOLO machine learning model into the codebase.
- Employed Blender to create models for the development of a virtual robot simulation environment.
- Authored several pages of documentation to educate new team members on various aspects of the codebase.

Website Developer and Content Author August 2020 – May 2023

Competitive Programming Initiative

- Volunteer content author and web developer for the Competitive Programming Initiative's USACO Guide website which aims to provide students with a comprehensive roadmap to improve performance in algorithmic programming competitions. Site contains over **31.2K users**
- Leveraged TypeScript/JavaScript, HTML, Tailwind CSS, MaterialUI, and React to enhance the website's user interface and implement various features on the site frontend.
- Modified site backend to support new frontend features using Firebase API, Gatsby, and GraphQL.
- Created a code compiling and grading back-end server using DynamoDB, AWS Lambda API, Linux, and AWS S3 buckets to support CPI's free, online programming classes platform, serving hundreds of students. **API has been queried over 100,000 times.**

Projects

FIRST Tech Challenge (FTC) Tech Toolbox | *React, CSS, Java, OpenCV, Latex* MrinallU/FTC-Tech-Toolbox

- A tutorial website for programming in the FTC robotics competition which fosters the development of high schoolers' programming skills through robotics. Lifetime total of **7000 views within a month of release.**
- Contains high-quality lessons, code implementations, and videos to teach advanced techniques and algorithms found in robotics. Content is written using Markdown and Latex.
- **Hosted on a site developed with React, MDX, and CSS**. Deployed using Vercel.
- Utilized Java and the FTC SDK to educate students on implementing a high-level control system for an autonomous robot. Contains advanced path-planning algorithms, localization techniques, and autonomous movement controllers.
- Utilized OpenCV to implement several advanced computer vision algorithms
- Leveraged Latex to illustrate the underlying mathematical concepts behind a variety of algorithms used in robotics.

3DHoloPool | *Unity, C#, Microsoft Hololens SDK, Git, Jira* MrinallU/3DHoloPool

- Augmented Reality-based billiards game, created as a part of an internship program with 3DHoloGroup.
- Developed hand-based controls by creating a robust grip detection algorithm, eliminating the need for an external controller when running the application.
- Integrated improved game objects and programmed game object interactions to enhance the in-game user interface using the Unity 3D editor.
- Programmed all game logic to enable scoring calculation.

Genetic Algorithm For Video Game AI | *Python, Numpy, Machine Learning* MrinallU/Genetic-Algorithm

- Custom implementation of a genetic algorithm for training fighting game (made with PyGame) AI in CPU vs CPU sessions.
- Neural network architecture and all computations required for training and testing the model were built from scratch using NumPy.

Technical Skills

Languages: Java, Python, C/C++, JavaScript, TypeScript, HTML/CSS
Frameworks: React, GraphQL, AWS, Tailwind CSS, Material-UI
Developer Tools: Git, Docker, Jira