Pranav Pushkar Mishra

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TECHNICAL EXPERIENCE

UIC College of Applied Health Sciences: V-ARE Labs | *Graduate Assistant* Feb 2024 - Present

- Spearheaded the design and development of EQUITY, a virtual patient system in **Unreal Engine 5**, integrating UE5's MetaHuman plugin, **Nvidia Omniverse**, and automated GenAI animation generation using **REST APIs** and **Python** scripts, enabling medical learners to identify and mitigate racial biases, with successful deployment to research participants.
- Developed and implemented a virtual avatar for our lab website, enhancing presence and user interaction with real-time avatar features. Integrated **Azure's** Text-to-Speech model with OpenAI for natural language processing. Built **Python** / **Flask** backend and **JavaScript**/ **Django** / **CSS** frontend. while exploring digital twins in healthcare. Implemented **Langchain**-powered chatbot for dental hygiene education, exploring digital twins in healthcare research. Integrated with project IVORY for VARE Labs.

Bipolar Factory | *Software Developer Intern* March 2023 - May 2023

- Contributed to the development of Metawood, a pioneering gamified streaming platform and decentralized creator economy within a virtual world. Assisted in building the platform's website using **React** and **Node.js** to create a seamless user experience.
- Utilized **C++**/**MERN (MongoDB, Express, React, Node.js)** to implement in-game chat and user communication features, enhancing real-time interactions and user engagement. Developed the in-game theater for hosting and watching media files with users concurrently. Contributed to **Quality Assurance**.

PROJECTS

Automating Prompt Generation for Training-Free Object Segmentation in PaintSeg | - GitHub

- Developed an autoprompting system for PaintSeg using K-means clustering and Dense Prediction Transformer models to automate precise input mask generation & achieved a **72.48%** IOU on the DUTS dataset through a hybrid approach segmentation.

Stellarium: A Space Odyssey - VR Star System | - GitHub | Website

- Designed and developed a VR educational experience in Unity visualizing 107k+ stars and constellations. Data pre-processing with Python
- Implemented custom shaders and GPU Instancing to accurately represent stellar properties while optimizing runtime performance

Metadata Enrichment for RAGs using LLMs | - GitHub

- Architected a production-grade RAG pipeline for enterprise documentation using LangChain and Pinecone, implementing semantic chunking, custom metadata extraction with LLMs, and metadata enrichment, achieving improvement upto 92% in query relevance.
- Enhanced RAG performance through hybrid search (BM25 + dense retrievers) and custom prompt engineering, reducing hallucination rate by 65% and implementing evaluation metrics (ROUGE, BERTScore) to measure retrieval quality.

Reproduced InBedder Text embedding: Answer is All You Need | - GitHub

- Reproduced INBEDDER text embedding research (ACL 2024), validating embedding quality and instruction alignment.
- Evaluated 7 benchmark datasets for classification and topic clustering, optimizing hyperparameters for improved performance

Virtual Van Gogh - NFT Art Galleria | - GitHub | Website

- Created an immersive, interactive NFT museum with Unity, enabling Crypto transactions, enhancing the digital art exchange experience.

EDUCATION

Master of Science, Computer Science August 2023 - Present
University of Illinois at Chicago, Illinois, USA GPA: 3.5/4.0

Bachelor of Science, Computer Science and Engineering August 2019 - June 2023
Dayananda Sagar College of Engineering, Bangalore, Karnataka, India CGPA: 9.1/10

TECHNICAL SKILLS

Languages: C#, Python, C++, JavaScript, R, Java, GLSL, React, Node.js, Ruby, Rust, Tailwind CSS
Version Control: Git, GitHub, PowerShell
Technologies and Tools: Unity, Unreal Engine 5, Blender, Azure Cloud Services, Neural Networks, OpenGL, Vulkan, AWS
Databases: PostgreSQL, MySQL, NoSQL, Pinecone, Amazon S3, CosmosDB, MongoDB, Redis, Cloudfare
Methodologies: Agile, Kanban, Jira
ML Libraries/Frameworks: TensorFlow, PyTorch, Keras, Scikit-learn, OpenCV, LangChain, PySpark, Pandas, NumPy
Development Libraries/Frameworks: .NET Framework, Flask, Node.js, REST APIs, React, Express.js, Django, FastAPI
Machine Learning & AI: Machine Learning, Deep Learning, Computer Vision, NLP, Transfer Learning, Generative Models, Transformers
Mathematics for ML: Linear Algebra, Probability, Statistics, Calculus, Optimization, Graph Theory, Information Theory, Differential Equations
Relevant Courses: Applied AI, Virtual Reality, Game Design & Development, Computer Vision, Advanced Machine Learning, NLP, Algorithms, Object-Oriented Programming, Data Structures, Blockchain Development, Operating Systems, Parallel & Distributed Computing

EXTRACURICULLAR & CAMPUS INVOLVEMENT

Winner of MIT XR Hackathon 2024 | *SnAlder Cut* , a Meta Quest-3 app, utilizing Meshy AI, Hugging face, Unity Engine, Niantic Lightship VPS & Meta Presence platform, demonstrating a tool for pre-production planning of stunts and sequences in film and media.

Secured first place at HINT 5.0(Hack in the North), April 2022, with an innovative NFT virtual museum concept.

Contributed as an organizer and curator for DSCE's Technical Fest Iteration22. Organized stock-management event Silicon Valley.

Showcased Pixel Punks at Solana Hacker House, May 2022, pioneering collaborative pixel art NFTs with blockchain integration.