Nishan Shehadeh

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Education

Vanderbilt University — Nashville, TN

Master of Science in Computer Science with Thesis, GPA: 4.00/4.00 — *August 2023*

Bachelor of Science in Computer Science, GPA: 3.71/4.00 — *May 2023*

Experience

Post-Graduation Backpacking — August 2023 – September 2024

Machine Learning Intern — May 2022 – August 2022

Accenture Federal Services (AFS) — *McLean, VA*

- Conducted research on the application and adaptation of emerging AI technologies for federal services
- Implemented CLIP-GEN to synthesize images to improve hotel classification in human trafficking photographs
- Used AWS EC2 for scalable data preprocessing and distributed multi-GPU training to reduce model training time
- Fine-tuned CLIP to learn latent state representations of hotel picture and location pairs using HuggingFace, resulting in 98% accuracy classifying hotel chains and the generation of basic synthetic images

VISE Researcher — May 2021 – May 2022

BEAM Lab, Vanderbilt University — *Nashville, TN*

- Implemented a backend system and GUI to facilitate live ultrasound placement on patients
- Engineered an acoustic window detection algorithm using MATLAB, MEX, and CUDA (C) for efficient real-time ultrasound analysis using GPU processing on beamformed data
- Improved ultrasound image quality with UNET, achieving 15% average SNR gains on phantom RF data

Research

An Investigation of Presence in Augmented Reality (AR) | *C#, Unity, MRTK* — May 2022 – August 2023

Masters Thesis, LIVE Lab, Vanderbilt University

- Built a custom AR environment for a HoloLens2 using Unity's MRTK with adjustable interaction, physics, and shadows levels for virtual objects
- Conducted a study to evaluate how users perceive the plausibility of virtual objects through transition probability distributions and questionnaires to inform current models of presence in MR

SUDS: Sanitizing Universal and Dependent Steganography | *Python, PyTorch* — Sep. 2022 – March 2023

Second author, Published in ECAI, VeriVITAL Lab, Vanderbilt University

- Developed a VAE-based sanitizer framework (SUDS) for various steganography techniques capable of removing hidden information from images while maintaining image quality
- Evaluated SUDS on sanitization, noise comparison, latent dimension flexibility, detection, and scalability.
- Mitigated data poisoning effects in a test case using SUDS, reducing attack success from 88.31% to 0.72%

Projects

PolicyBot | Github | *Python, LangGraph, Django, MongoDB, Pinecone, React* — 2024

- Designed a full-stack chatbot and search app using a Django REST API and channels, PostgreSQL, and React
- Implemented agentic workflows and RAG using LangGraph to provide contextually relevant LLM responses
- Scraped and compiled databases, using Pinecone for vector similarity searches and MongoDB for document storage, enabling efficient embeddings and retrieval of large-scale text data scraped from White House documents

XROG | Github| *Python, C#, Unity, HoloLens, Scikit-learn, Flask, Heroku* — 2023

- Developed a novel system for interactive 3D object generation through real-time hand gesture recognition in AR
- Created and preprocessed a dataset of point cloud sketches to train an SVM, achieving 94% classification accuracy
- Integrated the API into a Unity environment through a Flask API hosted on Heroku's cloud

Contrastive Learning for Surgical Gesture and Skill Recognition | Github | *Python, PyTorch, XGBoost* — 2023

- Integrated contrastive learning into an autoencoder that reconstructs robot kinematics from endoscope videos to improve the embedding space separability and XGBoost's classification results on surgeons' gestures and skill

Technical Skills

Languages and Libraries: Python, PyTorch, Scikit-learn, LangGraph, Pandas, NumPy, C++, C#, CUDA, OpenCV
Developer Tools: GitHub, Unity, AWS, GCP, Linux, HuggingFace, SQL/NoSQL Databases, LLMs, Docker