YUVANSHU AGARWAL

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
Major with Minor: B.S Information Systems, Minor in Artificial Intelligence. Dec 2024, **GPA: 3.8**
Coursework: Reinforcement Learning, Large Language Models, Systems Architecture, Data Structures, and Algorithms.

TECHNICAL SKILLS

Languages: Python, C, C++, Java, JavaScript, TypeScript, SQL, Ruby, HTML
AI/ML/Robotics: TensorFlow, PyTorch, Keras, Pandas, Scikit-learn, ROS, CAN Protocol, MATLAB & Simulink

EXPERIENCE

Openstream.ai, Machine Learning Intern May 2024 – July 2024
A multimodal, plan-based Conversational AI platform enabling natural interactions with various channels and languages.

- Designed a **novel fusion mechanism** that captures temporal dependencies across audio and video frame sequences.
- Implemented a **proprietary personality detection ML algorithm** that takes in real-time video feed of a user and outputs a score for openness, conscientiousness, agreeableness, extroversion, and neuroticism traits**.**
- Trained **100+ ML models** through experimenting with various visual subnetworks including Video Action Transformer and FaceNet as well as audio subnetworks like VGGish, Wav2Vec 2.0, and WavLM.

MIT Lincoln Laboratory, Machine Learning Intern June 2023 – July 2023
Lab develops ML technologies using advanced sensors and high-performance computing to protect the U.S Homeland.

- Implemented **Neural Radiance Field (NeRF) ML algorithms** like Instant-NGP, Nerfacto, and Nerfacto-Big to render 3D photo-realistic models from poor and sparse 2D images.
- Transformed 2D images into camera perspectives using COLMAP's **Structure From Motion** image processing tools.
- Optimized rendering quality to **30+ Peak Signal-To-Noise Ratio** and **reduced training time in half** using samplers and multi-resolution hash encoding.
- Pushed limits of NeRF models to train on drone, CCTV, and DSLR image data with **<60% overlapping features**.
- Analyzed **25+ 2023 Computer Vision Pattern Recognition Conference** NeRF papers and documented how to run NeRF models using lab's superclusters.

Carnegie Autonomous Racing, Path Planning SLAM Team Lead September 2021 – September 2023
Team of CMU students who design, build, and race the first-ever North American autonomous Formula Student race car.

- Led a team of 5 students in the development of the car's **GraphSLAM system**; it uses **pose graph optimization** to derive the racetrack map and car location.
- Debugged path-planning system to enable race car to complete **first autonomous lap in North American history** at New Hampshire Motor Speedway in May 2023.
- Gained a comprehensive understanding of an autonomous race car through **collaborating** across the **Software Architecture, Controls, and Perceptions** sub-teams.

Carnegie Mellon University, Mobility Privacy Security Lab Research Assistant January 2023 - May 2023
Lab focuses on research involving ubiquitous computing and usable privacy and security.

- Designed **Python web crawling algorithm** that extracts **Google Play Store** app data using Beautiful Soup library.
- Extracted data from **3 million+ apps** to perform trend analysis by deploying algorithm on **Google Cloud Platform**.

PROJECTS

Carnegie Mellon University, Chess Trainer Application October 2021 - December 2021

- Invented an open-source, Python chess application with a **chess AI agent** that uses a **minimax algorithm** with **alpha-beta pruning** to simulate all possible legal moves efficiently.
- Integrated a **custom chess evaluation engine**, trained on 500,000+ chess positions, using **TensorFlow** framework.

RESEARCH PUBLICATIONS

Computer Vision Pattern Recognition (CVPR) June 2024

- *Shifted Reality: Navigating Altered Visual Inputs with Multimodal LLMs*