SHREYAS ACHARYA

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EDUCATION

University of Maryland, College Park **Aug 2023 – Present**
MEng in Robotics *College Park, MD*

Savitribai Phule Pune University **Aug 2019 - May 2023**
B.E in Computer Engineering *Pune, IN*

SKILLS

Languages: Python, C++, MATLAB, SQL

Libraries/Frameworks: TensorFlow, PyTorch, OpenCV, Scikit-Learn, Numpy, Pandas, ROS2, UML, SolidWorks.

Development Platforms: Linux, HuggingFace, RESTful API, Agile, CUDA, Gazebo, Moveit

Design/Tools: Docker,Git, Kubernetes,GitHub Actions, GPU Programming, CI/CD Pipeline, Software Architecture.

Relevant Coursework: Multimodal Foundation Models, Computer Vision, Software Design, Data Structures..

EXPERIENCE

techR Business Solutions **Jan 2023 - July 2023**
Machine Learning Engineer *Pune, IN*

- Developed a real-time video processing pipeline to capture live video to recognize and classify over 400 distinct human actions using a deep learning model.
- Improved the action recognition accuracy by 17%, achieving 100% precision for detecting suspicious activities. Integrated a responsive Flask-based web interface for remote viewing with an automated alert mechanism.

PROJECTS

Temporal Coherence Evaluation for Multimodal Foundation Models **Nov 2024**
Python, Pytorch, CLIP, Hugging Face

- Developed a novel evaluation framework leveraging semantic similarity (BERTScore) and CLIPGain metric to evaluate temporal reasoning in video-language models, demonstrating a 15.6% improvement in reasoning accuracy by increasing temporal context (16 vs. 4 frames).
- Engineered a reference-free temporal consistency metric (CLIPGain) to objectively measure temporal consistency in video captioning, benchmarking performance across leading state-of-the-art AI models.

Multiview Structure from Motion | *Python, OpenCV, NumPy, SciPy* **May 2024**

- Designed a robust 3D reconstruction pipeline to accurately reconstruct scenes from multiple images, employing SIFT and FLANN-based matching techniques for enhanced accuracy across synthetic and real-world datasets.
- Incorporated custom bundle adjustment optimization to jointly refine 3D points, reducing reprojection errors by 10x across all datasets while preserving structural integrity, yielding high-fidelity 3D structures.

Homography-Net: End-to-End Homography Estimation **March 2024**
Python, TensorFlow, NumPy, Keras

- Designed a custom deep learning model(VGG-19 backbone) to estimate image alignment(homography), achieving an L2 loss of 5 pixels with two-stage training. Implemented both supervised/unsupervised approaches, with the supervised model demonstrating a 68% lower error rate.
- Built a panorama stitching pipeline leveraging traditional computer vision techniques such as Shi-Tomasi corners and RANSAC to align up to 5 images with 98.4% feature matching, enabling precise panoramic image creation.

Pb-Lite Edge Detection| *Python, Tensorflow, Scikit-learn, SciPy* **Jan 2024**

- Engineered an improved edge detection algorithm(pb-lite) to accurately detect edges by analyzing multi-scale feature data from brightness, color, and texture variations.
- Enhanced Pb-lite edge detection through an iterative approach, refining precision and improving edge continuity by approximately 30%, thereby preserving structural details and achieving more robust edge detection.