ADITYA WAGH

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Computer Vision Engineer skilled in Detection, Segmentation, Multi-view Geometry, 3D Reconstruction, Visual-Inertial Odometry, SLAM, Sensor Fusion, Bundle Adjustment, and LiDAR Point-cloud Processing.

EDUCATION

New York University — Sep '21 – May '23
MS in Robotics & Electrical Engineering; GPA: 3.5/4
Coursework: Robot Perception, Robot Localisation, Deep Learning, High Performance Machine Learning, Foundations of Robotics, Probabilility & Stochastic Processes, Digital Signal Processing

Birla Institute of Technology and Science (BITS), Pilani — Aug '15 – May '19
B.Eng in Electronics Engineering

EXPERIENCE

AI4CE Lab at New York University — Sep '22 – Present
Graduate Research Asistant
- Developing new models to improve **pair-wise registration of LiDAR point cloud with a low overlap ratio**
- Experimented with **machine learning** based **outlier rejection** techniques to find the low overlapping region.

Central Electronics Engineering Research Institute — Jul '18 – Dec '18
Deep Learning Intern
- Developed a **deep learning** based **object detection** model to detect power cables in aerial images.
- Fine-tuned a Mask-RCNN semantic segmentation model to identify power cables on this new dataset and achieved a test accuracy of approximately 85%

New York University — Sep '22 – Dec '22
Graduate Teaching Asistant
- Co-taught the ROB-GY 6203 Robot Perception course – a graduate level course on **3D Computer Vision**.
- Designed and graded homeworks, coding assignments and exams.

PROJECTS

- **Deep Image Matching using Local Feature Trasformers** — PyTorch, Kornia, OpenCV · ○
  - Pass

- **Visual Place Recognition using Bag of Visual Words** — OpenCV, Sklearn · ○
  - Developed a **visual re-localisation** & **loop-closure** tool to identify a location previously visited by a robot by searching form a database of captured images.
  - Used **Scale-invariant feature transform (SIFT)** to extract features, **k-means clustering** algorithm to generate visual words, **TF-IDF** to improve robustness, and **k-nearest neighbours (kNN) ML algorithm** to find matching images using these visual words.

- **Marker based Augmented Reality** — OpenCV · ○
  - Developed a **augmented reality (AR)** application to project a virtual cube on a fiducial marker in the real world
  - Calibrated the camera, detected **AprilTag** fiducial marker interest points, solved a **Perspective-n-Point (PnP) problem** to establish 3D-2D correspondence, and projected world points on the image to construct a virtual cube.

- **Post-Earthquake Damage Assessment using Fully Convolutional Networks** — Tensorflow, Keras · ○
  - Designed fully convolutional **neural networks** for **multi-task semantic segmentation** of building components and their damage state using a **shared backbone and multiple heads**
  - Achieved a mAP of 97% over 5 component classes and mAP of 70% for 5 damage state classes

- **State Estimation of a Quadrotor Drone using On-board Camera and IMU** — MATLAB · ○
  - Pass

TECHNICAL SKILLS

Python, **C/C++**, Bash, MATLAB, SQL, CUDA, Rust, HTML, CSS, **PyTorch**, Keras, TensorFlow, **OpenCV**, Open3D, Scikit-learn, Pandas, Kornia, NumPy, React.js, Bootstrap, CMake, Git, **Docker**, **AWS**, SLURM, High Performance Computing (HPC), Linux