

ADITYA WAGH

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Machine Learning Engineer




EDUCATION

- New York University** New York City, NY
MS in Robotics & Electrical Engineering; GPA: 3.5/4 Sep 2021 – May 2023
- Birla Institute of Technology and Science (BITS), Pilani** Pilani, India
B.Eng in Electronics Engineering Aug 2015 – May 2019

EXPERIENCE

- AI4CE Lab at New York University** New York City, NY
Graduate Research Asistant Sep 2022 – Present
 - 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.
- New York University** New York City, NY
Graduate Teaching Asistant Sep 2022 – Dec 2022
 - 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.
- Central Electronics Engineering Research Institute** Pilani, India
Deep Learning Intern Jul 2018 – Dec 2018
 - Fine-tuned a Mask-RCNN model for instance segmentation of power cables on this new dataset and achieved a test accuracy of approximately 70%
 - Contributed to the pixel wise ground truth annotation of a novel data set consisting of 6000+ Infrared and RGB aerial images of power cables

PROJECTS

- 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
- Visual Place Recognition using Bag of Visual Words** OpenCV, Sklearn · 
 - Computed SIFT features for each image in database and queries using OpenCV's built-in SIFT feature extractor
 - Employed the k-means clustering algorithm to compute 800 cluster centroids to be used as visual words to generate a histogram of visual words in each image
 - Computed histograms of visual words for all the query images and database images and extracted similar images from the database by using the k-nearest neighbours algorithm on the generated histograms
- Two-View Geometry based Relative Pose Estimation** OpenCV · 
 - Calibrated a camera using a calibration rig and removed radial distortion from the input images using the obtained camera matrix and distortion coefficient
 - Computed the fundamental matrix using the normalized 8 point algorithm and obtained the essential matrix using the fundamental matrix and camera matrix
 - Decomposed the essential matrix to obtain the orientation and translation vectors between the images
- Marker based Augmented Reality** OpenCV · 
 - Obtained interest points to compute the epipolar geometry by detecting the corners of an AprilTag fiducial marker
 - Solved a PnP problem to compute 3D to 2D correspondence between the marker corners and face of a cube in 3D space
 - Projected 8 corners of the cube on the image and constructed an AR cube by joining the points
- Deep Image Matching using Local Feature Trasformers** OpenCV · 
 - Computed SIFT features for each image in database and queries using OpenCV's built-in SIFT feature extractor
 - Employed the k-means clustering algorithm to compute 800 cluster centroids to be used as visual words to generate a histogram of visual words in each image
 - Computed histograms of visual words for all the query images and database images and extracted similar images from the database by using the k-nearest neighbours algorithm on the generated histograms
- State Estimation of a Quadrotor using On-board Camera and IMU** MATLAB · 
 - Computed SIFT features for each image in database and queries using OpenCV's built-in SIFT feature extractor
 - Employed the k-means clustering algorithm to compute 800 cluster centroids to be used as visual words to generate a histogram of visual words in each image
 - Computed histograms of visual words for all the query images and database images and extracted similar images from the database by using the k-nearest neighbours algorithm on the generated histograms
- Kinematic and Dynamic Control of a KUKA Manipulator** Meshcat, Pinocchio · 
 - Designed a robot controller for the KUKA 7-joint manipulator
 - Computed the forward and inverse kinematic and dynamic parameters of the manipulator
 - Designed and compared a PID Controller, Resolved Rate Controller and an Impedance Controller for the manipulator
- Smart Pet Feeder** PBASIC · 
 - Developed a smart bluetooth operated automatic feeder with an accompanying android app
 - Designed an android app to control 3 features of the feeder – drop food, disable feeder and reset food drop count.
 - Employed a HC-06 bluetooth module to connect a BASIC Stamp micro-controller to to the mobile app
 - Designed and 3D printed CAD models of the chasis of the feeder

TECHNICAL SKILLS

- **Languages & Frameworks:** Python, C/C++, Bash, MATLAB, SQL, CUDA, Rust, HTML, CSS, PyTorch, Keras, TensorFlow, OpenCV, Open3D, Scikit-learn, Pandas, NumPy
- **Tools & Platforms:** VSCode, Vim, CMake, Ninja, Git, GitHub, Docker, SLURM, Linux, MacOS, Windows