ADITYA WAGH

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Machine Learning Engineer

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

- **Post-Earthquake Damage Assessment using Fully Convolutional Networks** Tensorflow, Keras ·
  - Designed fully convolutional networks for multi-task semantic segmentation of building components and their damage state using a shared backbone
  - Utilized batch normalization layers to enable faster convergence and better generalization over real data since the data used for the project was synthetically generated using physics based graphical models
  - 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
- **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, Pinnochio ·
  - 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

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