Aditya Wagh

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EDUCATION

New York University — New York City, NY
Master of Science in Mechatronics and Robotics; GPA: 3.667/4 — Sep. 2021 – May. 2023

Birla Institute of Technology and Science, Pilani — Pilani, India
Bachelor of Engineering in Electronics and Instrumentation — Aug. 2015 – May. 2019

EXPERIENCE

Central Electronics Engineering Research Institute — Pilani, India
Deep Learning Intern — Jul. 2018 - Dec. 2018

- **Data Annotation**: Contributed to the pixel wise annotation of a novel data set consisting of 6000+ Infrared and RGB aerial images of power cables.
- **Mask RCNN**: Fine-tuned a pretrained mask RCNN model for instance segmentation of power cables on the new dataset and achieved accuracy of approximately 70%

TECHNICAL SKILLS

- **Languages**: Python, C++, Bash, MATLAB, LaTeX
- **Frameworks**: PyTorch, Keras, TensorFlow, OpenCV, Open3D
- **Tools**: VSCode, Vim, Git, GitHub, GitHub Actions, Docker
- **Operating Systems**: Linux, MacOS, Windows

RELEVANT COURSEWORK

- **Robot Perception**: Protective Geometry, Camera Calibration, SFM, SLAM, Optical Flow, Tracking
- **Robot Localisation and Navigation**: Bayes Filter, Kalman Filter, Pose Estimation, Motion Field, EKF & Pose Graph SLAM.
- **Deep Learning**: CNNs, RNNs, Transformers, GANs, Deep RL, Self-Supervised Learning
- **Mechatronics**: Basic Electronics, Actuators, Sensors, Interfacing, Micro-Controller Programming
- **Foundations of Robotics**: Kinematics, Inverse Kinematics, Dynamics, PID, Resolved Rate, & Impedance Control.(fall 2021)
- **MOOCs**: Neural Networks & Deep Learning, Mathematics for Machine Learning, Convolutional Neural Networks in Tensorflow, Introduction to Tensorflow

PROJECTS

- **Fully Convolutional Networks for Post-Earthquake Damage Assessment**:
  - **About**: A FCN for semantic segmentation of components of a damaged building, another FCN for semantic segmentation of extent of damage.
  - **Model**: Designed two networks with a symmetric encoder and decoder, one to classify building components and another to detect damaged components.
  - **Outcome**: Achieved a mean IoU of 83% over 5 component classes and mean IoU of 70% for 5 damage states.

- **Marker based Augmented Reality**:
  - **About**: A near perfect 3D cube drawn on the image of an AprilTag marker.
  - **Marker Detection**: Detected an AprilTag marker by computing corresponding corners and centers of the marker.
  - **Perspective Transformation**: Solved a PnP transform between the corners of a marker and a face of a cube.
  - **Cube Construction**: Projected 8 point of the cube on the image and drew lines using OpenCV

- **Pose Estimation between two images**:
  - **About**: Calibrate a camera using a calibration rig and estimate pose between two images
  - **Camera Calibration**: Calibrated a camera using April Tag based calibration rig. Got the Camera matrix and distortion parameters.
  - **Fundamental Matrix Estimation**: Removed distortion from the images and computed the fundamental matrix using the normalised 8 point algorithm.
  - **Pose Estimation**: estimated the relative pose between two images by decomposing essential matrix.

- **Bag of Visual Words for finding similar images**:
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