

Ankit Billa

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EDUCATION

University of Pennsylvania

Philadelphia, PA

M.S.E in Computer and Information Science

Aug 2021 – May 2023

Relevant Coursework: Advanced Machine Perception, Computer Vision & Computational Photography, Interactive Computer Graphics, Internet & Web Systems, Distributed Software Systems, Applied Machine Learning, Brain Computer Interfacing, 3D Machine Perception, Analysis & Design of Algorithms

Punjab Engineering College

Chandigarh, India

B.E in Computer Science and Engineering

Aug 2017 – June 2021

RELEVANT WORK EXPERIENCE

Dragonfruit AI Inc.

San Francisco, CA

Software Engineer - Computer Vision | Co-op

Jun 2023 – Present

- Working on Multi-Camera Multi-Person Tracking for real time human track detection
- Benchmarking multi-modal transformer models like CLIP for efficient Re-Identification
- Deploying the algorithm on both real and virtual cameras across multiple cross-continental locations.

Standard AI Inc.

San Francisco, CA

Machine Learning Intern

Jun 2022 – Dec 2022

- Worked on a Multi-Camera Multi-Object Tracking algorithm in densely packed, confined spaces.
- Solved joint multi-view 3D reconstructions and multi-object tracking, with simultaneous space and time association.
- Developed the algorithm from scratch as part of the Tracking team, followed by rigorous experimentation and testing for hyperparameters and algorithmic optimization.

Karlsruhe Institute of Technology | Fraunhofer IOSB

Karlsruhe, Baden-Württemberg, Germany

Research Engineer

Jan 2020 – July 2021

- Worked on generating a unique data embedding for document fraud detection using novel computer vision techniques.
- Employed the use of Shearlet Transforms, Beta Variational Autoencoders and Generative Networks for Fingerprint generation.
- Generated a custom dataset of 55,000 Paper Texture Images for Deep Learning model training.
- Benchmarked performance of Gabor Filters & Local Binary Patterns for Paper Fingerprint Robustness using Euclidean Distance and Bhattacharyya Distance, on the proposed custom dataset, comparing with previous SOTA algorithms.

RELEVANT PROJECTS

Egocentric Motion Tracking for 3D Scene Interactions

- Designed a model pipeline to identify hand-object interactions with varying degrees in a given video stream.
- Explored pseudo-labelling techniques for contact point identification in 3D meshes of objects in an environment.
- Formulated a hybrid model involving semantic segmentation, depth estimation and scene flow tracking in 3D.

Populated Environment Traversal for Autonomous Vehicles

- Implemented and deployed an Autonomous Driving model in the CARLA simulator for autonomous driving research.
- Utilized object detection algorithms like the FCDenseNet56 & PSPNet models for semantic segmentation of live video of roads.
- Employed Deep Q Learning Networks for Reinforcement Learning based path planning.

3D Scene Flow for Mesh-Subject Correspondence Tracking

- Implemented an algorithm to track 3D objects on 2D subjects using 3D Scene Flow and feature correspondence.
- Utilized the OpenPose framework for Human Pose Estimation to extract feature points from subject's pose skeleton.
- Employed the use of Homography transformations with 3D mesh feature correspondence algorithms like 3D point regression models.

2D Depth-Image based Terrain Classification for Quadruped Robots

- Built a robust terrain classification model using depth assisted semantic segmentation.
- Collected and generated a novel RGBD + Semantic Segmentation dataset of completely off-road / wild terrains.
- Employed the use of SOTA models like Intel's Dense Prediction Transformer and MiDaS for dataset benchmarking.
- Dual-stream RGB + Depth channel based multi-modal architecture with fusion-based feature combination.

SKILLS

Programming: C, C++, Java, Python, HTML5, CSS, MySQL, OpenGL, GLSL, JavaScript, XML, Android

Libraries & Frameworks: Git, Apache Spark, Storm, Hadoop, MapReduce, numpy, pandas, scikitlearn, Tensorflow, PyTorch

Technologies: Deep Learning, Neural Networks, Computer Vision, Object Detection, Clustering Analysis, Image Processing, Object Tracking, Depth Estimation, SLAM, Epipolar Geometry, Projective Geometry, 3D Reconstruction, Structure-from-Motion, Neural Radiance Fields (NeRF), Key-point Detection, Tracking, Generative Networks, Trajectory Planning, GPU Programming, Failure Prediction