Ankit Billa

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Relevant Work Experience

Dragonfruit AI Inc. San Francisco, CA

Computer Vision Engineer (Machine Learning Platform Team) *May 2023 – Present*

- Developed & optimized a microservices pipeline for Multi-Camera Multi-Entity tracking, increasing pipeline throughput by 15%.
- Developed a novel entity re-identification algorithm combining graph-based matching & deep learning, improving accuracy by 25%.
- Led multiple model releases for robust entity detection & clustering, deployed over 40+ locations, overseeing a team of 4 engineers.
- Optimized legacy codebase for both on-premises and cloud deployments, enabling real-time insights from video streams.

Standard AI Inc. San Francisco, CA

Machine Learning Engineer (Object Tracking Team) *Jun 2022 – Dec 2022*

- Implemented a novel algorithm for multi-view 3D reconstructions & multi-object tracking, with simultaneous space-time association.
- Optimized the graph-based algorithm for handling higher number of camera channels, and improved scalability by 420%.
- Achieved an improvement in multi-camera multi-person tracking accuracy, by 15%.

Karlsruhe Institute of Technology | Fraunhofer IOSB Karlsruhe, Baden-Württemberg, Germany

Research Engineer (Vision & Fusion Laboratory) *Jan 2020 – July 2021*

- Spearheaded a novel data embedding technique for document fingerprint synthesis using generative & deep learning methods.
- Developed custom architecture combining GANs & Variational Autoencoders, achieving 98% accuracy in fingerprinting.
- Created and curated a large-scale dataset of 55,000 high-resolution paper texture images for generative model training.
- Benchmarked the model's performance against traditional image processing and wave filtering techniques, demonstrating superior generative capabilities on the proposed custom dataset.

Skills

Programming: C, C++, Python, MySQL, OpenGL, GLSL, CUDA
Libraries & Frameworks: numpy, pandas, scikit-learn, Tensorflow, PyTorch, Keras, OpenCV, CVAT
MLOps & Deployment: Docker, Kubernetes, CI/CD Pipelines, Edge AI deployment, Model optimization & quantization
Cloud Platforms & Version Control: AWS, Google Cloud Platform, Azure, Git, Github, Gitlab
Deep Learning & Computer Vision Expertise: Advanced Object Detection & Tracking, Multi-Camera Calibration & 3D Reconstruction, Depth Estimation & SLAM, Semantic Segmentation & Instance Segmentation, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Transformer architectures, Generative Adversarial Networks (GANs), Reinforcement Learning, Neural Radiance Fields (NeRF), Pose Estimation & Motion Tracking

Relevant Projects

Egocentric Motion Tracking for 3D Scene Interactions

- Engineered a pipeline for detecting three degrees of hand-object interactions in video streams, enabling precise contact point detection.
- Developed a cutting-edge pseudo-labeling algorithm for 3D contact point identification, reducing manual annotation time by 65% while maintaining 88% labeling accuracy compared to human experts, streamlining the creation of large-scale datasets for graphics research.
- Formulated a novel multi-modal deep learning architecture integrating RGB images, depth maps, and IMU data to improve 3D interaction tracking accuracy by 25% over single-modality approaches.

Advanced Perception & Decision-Making System for Autonomous Vehicles in Urban Environments

- Developed a semantic segmentation pipeline using FCDensenet56 & PSPNet models, achieving 85% mIoU on road scene imagery.
- Designed an RL-based framework to predict steering angle & acceleration, with Deep Q-Networks (DQN) for path planning.
- Integrated perception and decision-making modules into the CARLA simulator, to get a crashless driving path for the car.

Advanced 3D-to-2D Correspondence Mapping for Real-time Subject Tracking

- Developed an algorithm for mapping 3D character meshes onto 2D video subjects, achieving real-time tracking at 30FPS.
- Integrated OpenPose for robust human pose estimation, extracting key skeletal features with 95% accuracy to track subjects.
- Engineered an optimized pipeline combining homography transformations and 3D point regression models, reducing mesh-to-subject alignment errors by 40%.

Terrain Classification System for Quadruped Robots Using Multimodal Deep Learning

- Created a novel RGBD + Semantic Segmentation dataset containing 1200 images across 11 diverse off-road terrain types.
- Implemented and fine-tuned state-of-the-art models including Intel's Dense Prediction Transformer (DPT) and MiDaS.
- Implemented a dual-stream architecture processing RGB and depth inputs, with a custom fusion module that improved F1 score by 10% compared to single-stream models.

Education

University of Pennsylvania Philadelphia, PA

M.S.E. in Computer and Information Science

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