Prabhdeep Singh Sethi

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Computer Vision — December 2024
Coursework: Advanced Computer Vision, Introduction to Robot Learning, Multimodal Learning

Government College of Engineering, Nagpur — Nagpur, India
Bachelor of Engineering in Computer Science (GPA: 9.5/10) — August 2021
Coursework: Operating Systems, Data Structures & Algorithms, Artificial Intelligence, Databases

EXPERIENCE

Wobot Intelligence — New Delhi, India
Computer Vision Engineer-II — 02/2022 - 08/2023

- Led a team of 6 to deliver person and vehicle Re-Identification features, serving 1M+ cameras and 10,000+ customers.
- Implemented an attribute-based fuzzy search with custom EfficientNet for local and global feature extraction. Further utilized VAE for dimensionality reduction & designed dynamic cosine similarity thresholds using k-means clustering.
- This approach reduced false IDs by 65% and improved Rank-1 of ReID by 35% in our multi-camera tracking algorithm.
- Achieved 55 HOTA (Higher Order Tracking Accuracy) on MOT17 with custom object tracker, reducing false tickets by 28%. Created Central Tracking Server akin to model-serving architectures for efficient tracking in a scalable setup.
- Undertook development of two internal use cases: Achieved 94%+ accuracy in mapping customer journeys for Customer Dwell Time and maintained 96% accuracy for detecting incorrect door usage in safety-critical areas for Entry-Exit Specific Door.

Solar Industries India Ltd. (Research and Development Lab) — Nagpur, India
Senior Computer Vision Researcher — 08/2021 - 01/2022

- Led Smart Blast Project, achieved fume toxicity detection through background subtraction and color clustering.
- Trained a Vision Transformer for object detection of critical military parts for Product Inspection of Multi-Mode Hand Grenade, achieving 96.5% mAP for detecting 9 such parts. Deployed models using Nvidia Triton for enhanced operational efficiency.

Computer Vision Intern — 01/2020 - 08/2021

- Developed Overspeeding and Automatic Number Plate Recognition solutions using YOLOv4, PaddleOCR for plate extraction, and DeepSORT for real-time tracking and relative speed calculation with a margin of error of 10 m/s.

PROJECTS

UAV Detection (Small Object Detection, Bird vs. Drone Classification) | [Code] — 10/2021 - 12/2021

- Enhanced UAV detection via GAN-based augmentation & tiling of input infrared video streams, achieving 95.1% mAP using TensorRT Quantized YOLOv5s; the solution excelled in Anti-UAV Challenge by ICCV '21, delivering 37 FPS on Jetson TX2.

Autonomous Drone (Person Tracking & Intruder Detection via UAV) | [Code] — 06/2021 - 11/2021

- Designed a perception stack to detect people from autonomous UAV and optimized it for real-time edge processing.
- Led a team of 5 to deliver a 3D person following drone; utilized DJI Tello for live UDP streaming, enabling YOLOv3 to detect individuals and provide coordinates for 3D space. Developed an app for drone control and a website for real-time alerts.

Image Forgery Detection (Benford's Law, Discrete Cosine Transform (DCT)) | [Code] — 05/2021 - 06/2021

- Implemented a multi-step approach to detect copy-move attack, dividing input image to blocks and applying feature extraction using DCT followed by dimensionality reduction through JPEG quantization, with lexicographical sorting to enhance accuracy.

Researcher at Intelligent Mobility Labs (Class-agnostic object segmentation) — 02/2021 - 05/2021

- Enhanced class-agnostic object segmentation for Autonomous Vehicle; improved unknown object detection by 4.5%.
- Achieved the accuracy stated using self-supervised features from the DINO backbone and an adversarial training setup.

Fragmentation Analysis for Blast Precision (Holistically Nested Edge Detection (HED)) | [Code] — 08/2020 - 02/2021

- Identified rock fragments in the image using HED through Caffe, complemented by Mask-RCNN for rock segmentation.
- Packaged the solution as a self-managed system and got 78% accuracy for normal distribution of rock sizes across conditions.

SKILLS

Programming Languages: Python, C++, Go, C, Bash, Dart
Frameworks: PyTorch, TensorFlow, OpenCV, Scikit-Learn, Flask, Flutter, React.js
Tools & Platforms: Docker, Kubernetes, Triton, DeepStream, TensorRT, AIMET, PostgreSQL, AWS, Azure, GCP