

# **Internship Summary Report**

## **Internship Overview**

During my internship at Trecent Systems, I had the opportunity to work on a variety of machine learning and computer vision projects, specifically focusing on YOLO (You Only Look Once) and CVAT (Computer Vision Annotation Tool). My tasks involved implementing and refining object detection techniques, dataset annotation, and contributing to various real-world applications in traffic monitoring and Video Incident Detection System.

## **Key Contributions**

### **1. Working with YOLO**

I gained hands-on experience with YOLO, a state-of-the-art object detection algorithm. This involved customizing and fine-tuning YOLO models for specific tasks, such as pedestrian detection and vehicle identification in complex traffic scenarios and Reverse Vehicle Detection.

### **2. Working with CVAT**

I also worked extensively with CVAT for dataset labelling. This tool allowed me to efficiently annotate images and videos with high accuracy, categorizing objects such as cars, light commercial vehicles (LVC), buses, trucks, two-wheelers, and three-wheelers. This data was crucial for training our machine learning models.

### **3. Dataset labelling**

My primary task was to label datasets for vehicles across different categories, including:

- Car
- LVC (Light Commercial Vehicle)
- Bus
- Truck
- Two-wheeler
- Three-wheeler

This labelling was vital for ensuring the precision of our detection models and the overall system's performance.

#### **4. VIDS Task**

I contributed to the VIDS (Video Incident Detection System) task, where I helped refine the detection algorithms for traffic management and monitoring. This involved integrating and analysing vehicle and pedestrian data from traffic footage to improve the system's real-time decision-making.

#### **5. Pedestrian Detection**

Another critical project I worked on was pedestrian detection, particularly focusing on detecting people walking in the middle of the road. This task was challenging but rewarding as it required real-time detection and filtering of pedestrians within specific zones of interest.

#### **6. Reverse Vehicle Detection**

I worked on developing and optimizing algorithms for detecting vehicles moving in the reverse direction. This task was essential for identifying dangerous driving behaviours on highways and improving overall road safety.

#### **7. Number Plate Labelling**

I also contributed to a number plate labelling task, where I annotated number plates in various images and videos. This dataset will serve as the foundation for developing automatic number plate recognition (ANPR) systems.

#### **Learning Experience**

This internship was an excellent opportunity to deepen my knowledge of YOLO and CVAT, two crucial tools in computer vision. I had the chance to apply these technologies in real-world settings, gaining insights into the nuances of object detection and dataset management. Working with an actual organization gave me a valuable understanding of how to tackle challenges in machine learning applications, enhance model performance, and improve detection accuracy.

## **Acknowledgments**

I would like to extend my heartfelt thanks to **Imtiyaz Sir, Khushbu Mam, Rushikesh Sir, and Saniya Mam** for their guidance and support throughout my internship. Their mentorship helped me navigate the complexities of machine learning and computer vision projects and allowed me to grow professionally and personally.

Thank you to the entire Trecent Systems team for providing me with this opportunity.