**Object Detection and Tracking using Deep Learning and Artificial Intelligence for Video Surveillance Applications**

## Abstract

Data is the new oil in current technological society. The impact of efficient data has changed benchmarks of performance in terms of speed and accuracy. The enhancement is visualizable because the processing of data is performed by two buzzwords in industry called Computer Vision (CV) and Artificial Intelligence (AI). Two technologies have empowered major tasks such as object detection and tracking for traffic vigilance systems. As the features in image increases demand for efficient algorithm to excavate hidden features increases. Convolution Neural Network (CNN) model is designed for urban vehicle dataset for single object detection and YOLOv3 for multiple object detection on KITTI and COCO dataset. Model performance is analyzed, evaluated and tabulated using performance metrics such as True Positive (TP), True Negative (TN), False Positive (FP), False Negative (FN), Accuracy, Precision, confusion matrix and mean Average Precession (mAP). Objects are tracked across the frames using YOLOv3 and Simple Online Real Time Tracking (SORT) on traffic surveillance video. This paper upholds the uniqueness of the state of the art networks like DarkNet. The efficient detection and tracking on urban vehicle dataset is witnessed. The algorithms give real-time, accurate, precise identifications suitable for real-time traffic applications**.**

**Existing System**

Object tracking is a very challenging task in the presence of variability Illumination condition, background motion, complex object shape partial and full object occlusions. Object detection and location in digital images has become one of the most important applications for industries to ease user, save time and to achieve parallelism. This is not a new technique but improvement in object detection is still required in order to achieve the targeted objective more efficiently and accurately. The main aim of studying and researching computer vision is to simulate the behavior and manner of human eyes directly by using a computer and later on develop a system that reduces human efforts.

**Disadvantage**

1. Objects are not easily Tracking & Detected.
2. Less Accuracy.
3. Human effort is more.
4. More Time Tacking process.

**Proposed System**

In order to overcome the issue of detection, tracking related to object movement and appearance. Most of the algorithm focuses on the tracking algorithm to smoothen the video sequence. In this project using python and OPENCV module we are detecting objects from videos and webcam. This application consists of two modules such as ‘Browse System Videos’ and ‘Start Webcam Video Tracking’.

Browse System Videos Using this module application allow user to upload any video from his system and application will connect to that video and start playing it, while playing if application detect any object then it will mark that object with bounding boxes, while playing video if user wants to stop tracking then he need to press ‘q’ key from keyboard to stop video playing.

Start Webcam Video Tracking: Using this module application connect itself with inbuilt system webcam and start video streaming, while streaming if application detect any object then it will surround that object with bounding boxes, while playing press ‘q’ to stop web cam streaming.

**Advantage**

1. Objects are Tracking & Detected Easily.

**SYSTEM REQUIREMENTS**

**HARDWARE REQUIREMENTS:**

# Processor - Pentium –IV

* Speed - 1.1 Ghz
* RAM - 256 MB(min)
* Hard Disk - 20 GB
* Key Board - Standard Windows Keyboard
* Mouse - Two or Three Button Mouse
* Monitor - SVGA

**SOFTWARE REQUIREMENTS:**

* Operating System - Windows7/8
* Programming Language - Python