

Computer Vision Task

Problem statement : Detecting People and tracking them throughout the view.

Problem Solution : Object detection and tracking is implemented using YOLOv4, DeepSort and Tensorflow. YOLOv4 is a state of the art algorithm that uses deep convolutional neural networks to perform object detections. The output of YOLOv4 is fed into Deep SORT (Simple Online and Realtime Tracking with a Deep Association Metric) in order to create a highly accurate object tracker. Counters are implemented to count the total number of unique people throughout the video and using a reference line, the number of people passing from left to right is counted.

Libraries Used : OpenCV, TensorFlow, Numpy, Pillow

Execution Time of the Code : Frames Per Second (FPS) is 7.06, Elapsed time is 122.04

Code Scalability : Due to GPU constraints the weights used are YOLOv4-tiny weights, the same model can be implemented in real-time with more classes like cats, dogs and so on. By fine-tuning this project a more accurate solution can be built for surveillance cameras for analyzing data and provide useful insights in retail industry.

Simple FlowChart of the Project :



To Execute the code - Run the following commands in Terminal/Command Prompt :

1) `python save_model.py --weights ./data/yolov4-tiny.weights --output ./checkpoints/yolov4-tiny-416 --input_size 416 --model yolov4 --tiny`

2) `python track_objects.py --weights ./checkpoints/yolov4-tiny-416 --score 0.3 --video ./data/test.mp4 --model yolov4`

During execution, the video shows the tracking of each person(bounding box) with their respective ID's. The Unique Person count in the entire video and the count of people moving from left to right is displayed in the terminal after the execution.

Screenshots :



```
(dlenv) sarjhana@Sarjhanas-MacBook-Pro  
--video ./data/test.mp4 --model yolov4  
Elapsed time: 125.69  
FPS: 6.64  
Unique persons = 62  
Left to Right person = 25  
(dlenv) sarjhana@Sarjhanas-MacBook-Pro
```

Caption