ABSTRACT

Multiple Object Tracking (MOT) *is a computer vision task that aims to analyze video to identify and track objects that fall into one or more categories, such as pedestrians, cars, animals and inanimate objects, without prior knowledge of the appearance and number of targets.* MOT *aims to predict the trajectories of multiple targets in successive videos.* MOT *applications range from autonomous driving to smart video analysis. You only look once* (YOLO) *is a sophisticated algorithm that uses deep Convolutional Neural Network* (CNN) *to perform object detection, using the output of the* YOLOv4 *feed of this object detection to Simple Online and Realtime Tracking with Deep Association Metric* (Deep SORT) *will get accurate object tracking results and lightweight computing. Deep* SORT *allows multiple object tracking by integrating appearance information with its tracking components. The combination of Kalman Filter and Hungarian algorithm is used for tracking. Here, Kalman filtering is performed in the drawing space while the Hungarian technique facilitates frame-by-frame data association using the association metric which calculates the overlapping of the bounding boxes. To obtain motion and display information, a trained* CNN *is applied.*

In this final project, the parameter and architecture exploitation of YOLOV4-*Deep* SORT *has been carried out. The exploit focuses on Deep* SORT *which is a combination of Kalman Filter and Hungarian algorithm. The exploited performance parameters include batch size, matching threshold, n init, max age and max cosine distance. From the results of this study, it was found that the performance value of Multi-Object Tracking Accuracy* (MOTA) *had increased to 5.9%, Multi-Object Tracking Precision* (MOTP) *was up to 0.01 and also processing speed* (FPS) *was up to 3.69* FPS. *The system is designed using the Python programming language and the TensorFlow framework.*

Keywords: Multiple Object Tracking, YOLOv4, *Deep* SORT, *Convolutional Neural Network, Kalman Filter, Hungarian Algorithm*