Project Weekly Report

Topic : - Offline Track association problem

Group Name: ML Titans

Project Definition: 3

Group Member's names:-

Kaushik Gohil, Richa Saraiya, Devanshi Rathod, Devasya Rajguru, Jay Golakiya

❖ **Progress Summary**

➢ We refined trajectory tracking techniques by incorporating bounding boxes and occlusion handling, ensuring smoother and more continuous object paths.

➢ In our analysis of object tracking approaches, we explored multiple methodologies mentioned in research papers, including DeepSORT, ByteTrack, Graph-based Tracklet Association, and MHT Tracklet Association. Each method has its strengths, with integrating for robust identity tracking, ByteTrack improving low-score detection association, and Graph-based models leveraging hypothesis graphs for enhanced trajectory linking.

➢ We implemented the MHT Tracklet Association Algorithm to track and merge object trajectories effectively. The pipeline involved:

➢ Loading Tracklets from CSV, parsing object IDs, and organizing tracklet sequences based on frame order.

➢ Building a Hypothesis Graph, where association costs between tracklets were computed using a combination of spatial distance and temporal gaps to determine trajectory likelihoods.

➢ Solving Tracklet Associations using the Hungarian Algorithm, assigning tracklet pairs based on minimal cost.
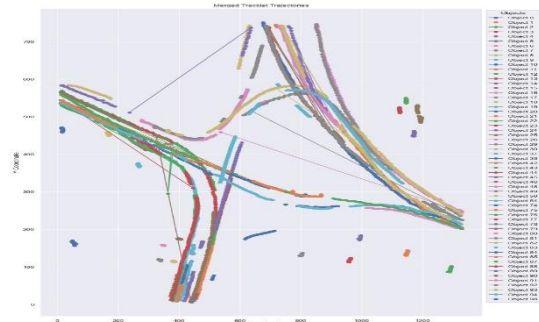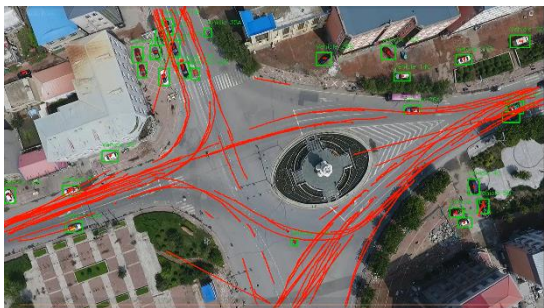
➢ Lastly, significant progress was made on the Mid-Semester Report and PowerPoint Presentation, summarizing research findings, methodology implementation, and comparative analysis of tracking approaches.

◊ **Next week**- We will implement STCMOT and graph-based approaches, focusing on enhancing spatio-temporal feature extraction, optimizing dynamic graph updates to effectively handle occlusions and motion variations, and integrating Bayesian networks for robust tracklet association and improved trajectory consistency.