

The paper addresses a precise pedestrian detection method with high localization accuracy for real-world applications. Due to the inherent flexibility of the human body, it is difficult to create a template-based pedestrian detector that simultaneously attains high detection rates and acceptable localization accuracy. To overcome this, we introduce a two-stage model. In the first stage, we employ a novel detection method to identify pedestrians. Simultaneously, they extract key points from the detected pedestrians' bodies. In the second stage, these extracted body key points are treated as feature vectors for each pedestrian in every video sequence frame. These feature vectors are fed into a series of 2D LSTM blocks, allowing for pedestrian tracking based on key points. Additionally, a 3D LSTM block is employed to aggregate temporal data, aiding in trajectory prediction. In the final step of the second stage, trajectory predictions are refined using Kalman filtering. We benchmark our method against similar approaches like Track R-CNN and YOLOv7 on pixel- and region-wise metrics. Results reveal impressive performance, boasting an MOTP score of 0.803 and a MOTA score of 0.603. These outcomes underline the efficacy of our proposed method in achieving robust localization accuracy for pedestrian detection in practical scenarios.