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SATELLITE VIDEO TARGET TRACKING BASED ON IMPROVED YOLOV3 AND DEEP SORT

Abstract

Tracking of moving objects has always been an important technology in the field of computer vision. Moving target tracking has been widely used in traffic management, security systems and other fields. Although great achievements have been made in moving target tracking, there are still many problems. The target in satellite video is easily affected by occlusion and the interference of complex environment, resulting in inaccurate estimation of the motion state of the target, which will eventually lead to the failure of target tracking. In this paper, we propose an improved YOLOv3 model combined with the Deep Sort algorithm to track satellite video targets. First, use the k-means clustering transformation algorithm to optimize the size of the anchor box to improve the matching degree between the prior box and the real box; after obtaining the target features through YOLOv3, use the Kalman filter algorithm to estimate the trajectory state of the target and update the state. The Kalman filtering method can predict the position of the occluded target. After the target is occluded, the target can be re-tracked to solve the problem of the target being occluded in the satellite video. Finally, the Hungarian algorithm is used in cascade matching to detect the frame. Matching with the prediction frame, for the unsuccessfully matched trajectories and detection results, the Generalized Intersection over Union (GIOU) association matching is used to replace the Intersection over Union (IOU) matching to improve the matching performance of the Deep Sort tracking algorithm. After experiments, the results show that the method proposed in this paper has a good effect on satellite video target tracking, and the tracking accuracy and success rate have been greatly improved, laying a foundation for further satellite video target tracking.