Research on method of object tracking in dynamic scenes

Abstract

As an important research direction in the field of computer vision, moving target tracking can obtain target trajectory information, provide important data for high-level semantic processing such as behavior analysis and scene understanding, and has received extensive attention from various research scholars. Relevant results have been successfully applied to people. Machine interaction, security monitoring, intelligent monitoring and many other fields. However, in the motion scene, the target is affected by complex obstacles such as obstacle interference, illumination and scale changes, and the target apparent dynamic changes. It is of great theoretical significance and engineering practice value to study the method of effectively achieving target stable tracking in different scenarios. In this paper, a multi-scale anti-occlusion tracking scheme with multi-features is presented in combination with typical kernel correlation filtering methods. The related research work is as follows:

According to the target blur and deformation in the tracking process, the HOG features and color features of the target are extracted, and then the fusion is performed. The complementarity between the two is used to characterize the color change and shape change sensitivity, and a pair of deformation and blur is obtained. Non-sensitive fusion features.

In the case that the target scale changes during the tracking process, multi-scale detection is added when the tracking target position is updated, and the maximum scale of the response image of a larger scale and a smaller scale is obtained by acquiring the original scale of the target image. Compare the three peak sizes and select the scale with the largest peak as the target tracking frame that best fits the target size.

Aiming at the short-term occlusion problem that occurs during the tracking process, the target occlusion situation is judged, and the target trajectory prediction method when the occlusion situation occurs is given. The target is occluded by detecting whether the maximum response peak of the most suitable scale is less than the set threshold. When the target is occluded, the Kalman filter is used to predict the upcoming position of the target.

Finally, the performance evaluation of the proposed method and related typical algorithms is carried out on the benchmark library. The qualitative and quantitative evaluation results show that in the complex cases of scale transformation, short-term partial occlusion, motion blur and deformation, the paper mentions The method is superior to other filtering algorithms in both performance rate and accuracy, and has good computational real-time performance.

Keywords: object tracking; kernel correlation filtering; fusion feature; multiscale; Kalman filter