An object tracking algorithm based on color, space and texture information

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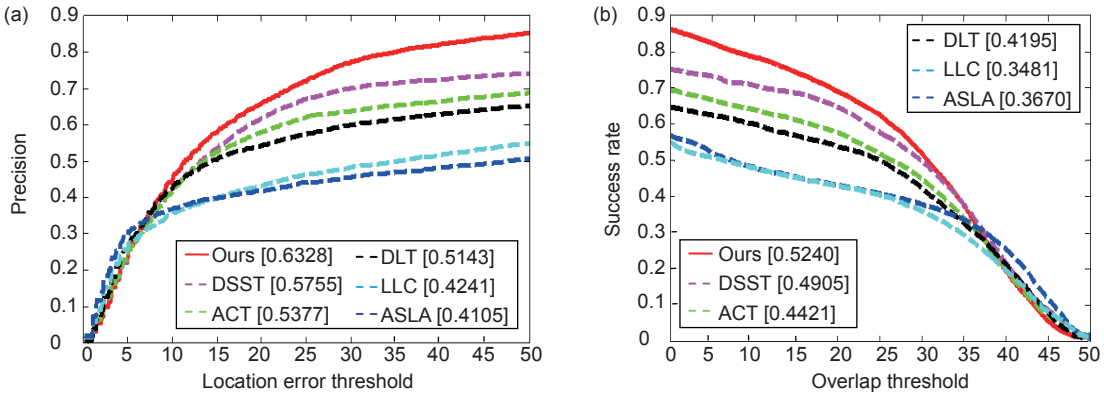

Overall comparison of precision (a) and success rate (b)

Overview: In order to deal with complex scene change problem in the tracking process, we propose a tracking algorithm via multiple feature fusion. Due to the computational convenience, single feature descriptor is widely used in visual tracking for target model expression. However, single feature descriptor is usually not enough to describe the complex characteristics and changes of target. The target representation combined with multiple feature descriptors can improve the overall performance of visual tracking, because different features can provide complementary target information. How to effectively combine multiple features to make the algorithm truly improve performance is the most important issue for the multi-feature fusion algorithm. Therefore, we use a method of uncertainty measurement, by measuring the reliability of feature to determine the influence of it. Under the framework of particle filter, dynamic feature weights are calculated by making an uncertain measure of each feature in the tracking process, which results in adaptive feature fusion. This method adjusts the influence of features on tracking according to the uncertainty of features, so that the reliable feature has a stronger influence. In addition, color feature is robust to changes in rotation, scaling, etc., but difficult to cope with changes in illumination variation. Spatial feature contains the spatial information of target, which can make up for the lack of spatial information in color histogram. Texture feature is not sensitive to changes in illumination variation and not easily affected by local deviations. Therefore, if we fuse these three kinds of complementary features, the target expression can be provided by these features, and it can provide more effective target information. Based on the above discussions, the algorithm uses the complementarity of color, space and texture features to improve the tracking performance. Experimental results show that the algorithm can adapt to complex scene changes such as scale, rotation and motion blur. Compared with traditional algorithms, the proposed algorithm has obvious advantages to complete the tracking task. In order to verify the performance of the algorithm in this paper, we programmed it through MATLAB2009a, and tested a large number of experiments on the computer with 4 GB memory. We chose ACT, ASLA, DLT, DSST, and LLC as contrast algorithm, which have good performance. The figure shows the overall tracking accuracy and success rate of 30 videos in OTB2013 dataset. It can be seen from the figure that the accuracy and success rate of proposed algorithm are the highest of these six algorithms. The overall tracking performance of ours algorithm is the best, which can better adapt to different tracking environment and target changes.

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