CS512 Project Proposal: Object tracking

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Main paper: Real-time Non-rigid Object Tracking Using CAMShift with Weighted Back Projection

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PROBLEM STATEMENT

The object tracking can be used in wide range of applications. In order to detect the object and promptly tracking in each frame, the selection of the algorithm will be the crucial part of the object tracking. The speed and the accuracy are the two main criteria for measuring the performance of target recognition algorithms. The CAMShift Tracking and The Meanshift Tracking are widely used in the object tracking area.

However, Since Meanshift or CAMShift establish the target model by the color histogram, the model only roughly estimates of the characteristics. If the background and target are similar, the target recognition might interfere the tracking. At this time, the tracking performance of the Meanshift and CAMShift tracking method will be poor. In the actual tracking process, the edge of the target has a high coefficient with the similarity of the background and the gradient of the image will be lower than what we expected. Thus, the CAMShift algorithm being affected.

In this project, the CAMShift algorithm apply the weighted back projection will be implemented.

APPROACH

The improved CAMShift tracking will be implemented in Python, The OpenCV will be auxiliary in the implementation. The algorithm will take the previous frame's position and size to restrain the edge in the back projection image by the weighted method. The interfering content from the background can be removed in the process of the tracking target.

Since CAMShift itself is not a general purpose tracker, it fails to deal with many complex situations such as multi-colored object tracking and similar color interference. In this project, a back projection weighting strategy is proposed as a solution towards these complex situations.

The weighted method weakens the information of the target edge, which can prevent the confusion of the background. Thus, the tracking performance of the target recognition and tracking can be improved.

DATA

1. Live video captured by webcam.
2. video file with a moving object. It will be included in data file.

RESPONSIBILITY

Yizhi Hong: Proposal, The implementation of the CAMShift tracking, combination, Report, Material preparing.
Chen Xu: Proposal, The implementation of weighted back projection, Research, Testing, Report.

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