Reading Notes

ORIGINAL

Ritesh Boda and M. Jasmine Pemeena Priyadarsin. Face Detection and Tracking Using KLT & VIOLA JONES.

CATEGORIES

[**Computer Vision**]:Kanade Lucas Tomasi (KLT), VIOLA JONES method

KEYWORDS

Face Tracking, Kanade Lucas Tomasi (KLT), Viola Jones.

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1. BACKGROUND

Object Detection

As the foundation of activity recognition, object detection has been an important research topic. It is needed for many computer applications like HCI, surveillance, human-robot interaction, etc. Object tracking is defined as keeping a trace on a particular kind of object. Basically video sequences provide more information than a still image for they maybe contains factors like illumination; pose variation and occlusion in pre-processing stages. Fortunately, we can overcome by detection of the target object continuously in each and every frame. As this paper mainly discuss face detecting, it is a computer technology which let us know the locations and sizes of human faces. This helps in getting the facial features and avoiding other objects and things.

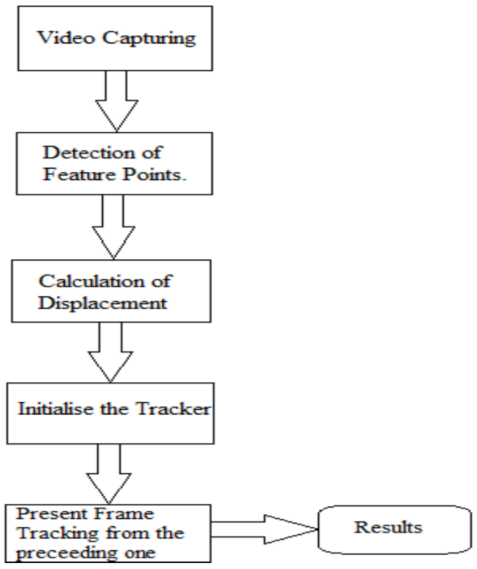
Existing Problems

For face detection and tracking in a given video sequence different algorithms have been emerged over the past few years, each shares its own advantages and disadvantages. Any face tracking algorithm will inevitably have some errors which will cause deviation from the required object. To minimize this deviation, the technique used in the paper is one of the effective approaches. It is quicker and simpler. Where haar features of the Viola Jones algorithm gives a way for detecting faces and harris detector provides a route for tracking.

2. APPROACH

Kanade Lucas Tomasi (KLT) algorithm

Kanade Lucas Tomasi (KLT) algorithm is used here for tracking human faces continuously in a video frame. This method is accomplished by them finding the parameters that allow the reduction in dissimilarity measurements between feature points that are related to original translational model. And the flow chart of KLT is shown as figure.



Alignment estimation

In the first frame the initially detected points is taken as a template image. In the later stages difference between displacement and the preceding point is taken to get the next tracking points. After a series of manipulation, we can roughly estimate the displacement and find the next traceable point.

Viola Jones algorithm

This algorithm helps us detect features of a face in a particular frame of a video sequence. Haar features represent a kind of simple rectangular feature which is the difference of the sum of pixels (also named as Integral Image) of areas inside the rectangle. This rectangle can be at any position of the frame and can scale the image. Each feature type can indicate the

existence or the absence of certain characteristics in the frame, such as edges or changes in texture. These haar features are applied to determine the facial features.

classifier

Ada-boost is a process used to find out whether the feature is of relevant, using the weak classifiers and weights to form a strong classifier. It could find the single rectangular feature and threshold which best separate the faces and non-faces in training examples in terms of weighted error. Additionally, cascading is introduced to speed up the process and give an more accurate result.

3. EVALUATION

This process is implemented using Matlab software. The input is given as a video format or else it can take a live video with the help of a webcam. The result is relatively pleasant. As the video keeps playing it is a bit difficult for it to track the faces exactly. But checking it practically, we can say that it has accuracy above 95%.

4. COMMENTS

As one of the basic algorithms, its accuracy and security are to be praised. In the coming days these algorithms can be used to detect a particular object rather than faces. Future work is to work on the same domain but to track a particular face in a video sequence. That is like avoiding all other faces except the face required.