METHOD FOR FACE TRACKING IN VIDEO SEQUENCE

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One of the established standards for face tracking in the image is method developed by Viola and Jones [1]. However, this standard method becomes unreliable when used along with video processing. For example, the system may lose person's face when he is turning or tilting his head. The reason for this is limited set of target classes of the classifier, which determines face. This problem can be solved by adding additional classifiers or increasing the number of target classes for a single classifier. However, this solution leads to significant increase in number of training samples.

Alternative to this approach is the method of pattern recognition, where the pattern dynamically addapts to the content of the video. The initial assumption of the position of the face in the image is obtained through Viola-Jones method. Then the template is constructed using the contour representation of the face. With this representation, position and orientation of the face in next frames can be obtained using the generalized Hough transform [2]. Adaptation of the template to match the video data occurs when the distance between contours of the input image and the template exceeds a threshold value . In this case, a new template is built based on the result of the last Hough transform.

To prevent error in determining face position from causing creation of invalid template there is a restriction on the movement the target face between shots - . The thresholds and are calculated by trainig the system on a set of test data.

Current method is able to process videos where there is only one face present. Additionally the result of Hough transform is affected by amount of background clutter.

The method has been implemented in C# using EmguCV (OpenCV) library. Training data and learning system is under development.

Literature

1. P. Viola and M.J. Jones, «Robust real-time face detection» // International Journal of Computer Vision, vol. 57, no. 2, 2004, p. 117-136

2. D.H. Ballard, «Generalizing the Hough Transform to Detect Arbitrary Shapes» // Pattern Recognition, vol. 13, no.2, 1981, p.111-122