FACE RECOGNITION OF TARGETED PERSON FROM INVESTIGATED VIDEO

V.SIVASANKARAREDDY & A.PRASAD
Assistant Professors
Krishnachaitanya Institute of Technology & Sciences
Markapur-523316

Abstract: **- In this paper, a targeted person is found from the digital videos. In the videos, the investigation is to be processed on the targeted person & on which the scenes related to targeted person. Firstly in that video, multiple people's faces are to be processed and from that the targeted person is selected. After choosing, the scheme is to apply for face tracking & face quality for assessment. This proposed scheme can helpful to find out the required person either criminal, businessman or whoever from the CCTV footages, TVs and in any videos.**

Keywords: **Face detection, face tracking, face quality assessment, and face recognition.**

I. INTRODUCTION

A face recognition system is a computer application capable of identifying or verifying a person from a digital image or a video frame from a video source. One of the ways to do this is by comparing selected facial features from the image and a face database.

It is typically used in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems.[1] Recently, it has also become popular as a commercial identification and marketing tool.

Some face recognition algorithms identify facial features by extracting landmarks, or features, from an image of the subject's face. For example, an algorithm may analyze the relative position, size, and/or shape of the eyes, nose, cheekbones, and jaw.[3] These features are then used to search for other images with matching features.[4] Other algorithms normalize a gallery of face images and then compress the face data, only saving the data in the image that is useful for face recognition. A probe image is then compared with the face data [5] . One of the earliest successful systems [6] is based on template matching techniques [7] applied to a set of salient facial features, providing a sort of compressed face representation.

Recognition algorithms can be divided into two main approaches, geometric, which look at distinguishing features, or photometric, which is a statistical approach that distills an image into values and compares the values with templates to eliminate variances.

A different form of taking input data for face recognition is by using thermal cameras, by this procedure the cameras will only detect the shape of the head and it will ignore the subject accessories such as glasses, hats, or make up. A problem with using thermal pictures for face recognition is that the databases for face recognition are limited. Diego Socolinsky, and Andrea Selinger (2004) research the use of thermal face recognition in real life, and operation sceneries, and at the same time build a new database of thermal face images. The research uses low-sensitive, low-resolution Ferro-electric electrics sensors that are capable of acquire long wave thermal infrared (LWIR). The results show that a fusion of LWIR and regular visual cameras has the greater results in outdoor probes. Indoor results show that visual has a 97.05% accuracy, while LWIR has 93.93%, and the Fusion has 98.40%, however on the outdoor proves visual has 67.06%, LWIR 83.03%, and fusion has 89.02%.

II.THE PROPOSED SCHEME

The components used in this proposed scheme are: face detection, tracking, quality assessment and recognition. In the digital video, the face detection helps to identify the scenes with human faces. Face tracking shows the different face frames of detected person. Face quality assessment helps to select appropriate images for further processing. Finally, the targeted person will be recognized from investigated videos from the manually selected faces by the user. The details of the proposed scheme are as follows.

A. Face Detection

Face detection is the identification of rectangles that contain human face features. Face-detection algorithms focus on the detection of frontal human faces. It is analogous to image detection in which the image of a person is matched bit by bit. Image matches with the image stores in database. Any facial feature changes in the database will invalidate the matching process.

Face detection also refers to the psychological process by which humans locate and attend to faces in a visual scene.

To efficiently locate faces appearing in a video, face detection is only applied to scene-change frames in the

proposed scheme. A compressed-domain scene-change detection mechanism [8] is employed to process the videos encoded with H.264/AVC.

B. Face Tracking

By observing multiple frames of the targeted person, if first face image in a video shot or scene may not be of good quality, a short video segment with a few frames related to a detected face will be determined by face tracking. The Tracking-Learning-Detection (TLD) [9] consists of three major components, including detector, tracker and machine learning. In digital videos, the motions of actors, camera zoom in/out and movements appear frequently so tracking the detected objects is necessary to associate faces in adjacent frames. The machine learning component employs cascaded classifiers to update the model of positive and negative samples. The face detection is to apply to each frame in the tracking process. If faces are not detected in consecutive frames, the tracking procedure of the examined face will be terminated.

C. Face Quality Assessment

When a person passes by a surveillance camera a sequence of image is obtained. Before performing any analysis on the face of a person, the face first needs to be detected and secondary the quality of the different face images needs to be evaluated. Here four simple features including out-of-plan rotation, sharpness, brightness and resolution, to assess the face quality in a video sequence. These features are combined using both a local scoring system and weights. The system is evaluated on two databases and the results show a general agreement between the system output and quality assessment by a human. The determination of face pose is based on the deformable part models of [10]. Laplacian filter is adopted to calculate sharpness. The selected face images are displayed for the user to choose the target person and will also be used for the model training and face detection/recognition.

D. Face Recognition

Face recognition service for streaming video, the following steps are.

1. Detect face in stream video.
2. Once there is a new face trace, I will extract several frames (e.g. 0, +1, +2 sec) and crop the face areas.
3. Submit these face frames to face recognition API, if they return the same result, that's the one in video.

Extended Local Binary Pattern (LBP) associated with a face landmark and Support Vector Machine (SVM) are used in the step of face recognition.

III. IMPLEMENTATION

To test the effectiveness of the scheme, some length of video is taken with some characters with various facial expressions captured from different camera angles. The user interface is equipped with five buttons, including reading file, face tracking, face assessment, model generation and face recognition. In the model generation phase, the user can open an exemplar video and extract face images in scene-change frames. Next, the user can proceed to apply face tracking and face assessment to retrieve better face images. An example is shown in Fig. 1.

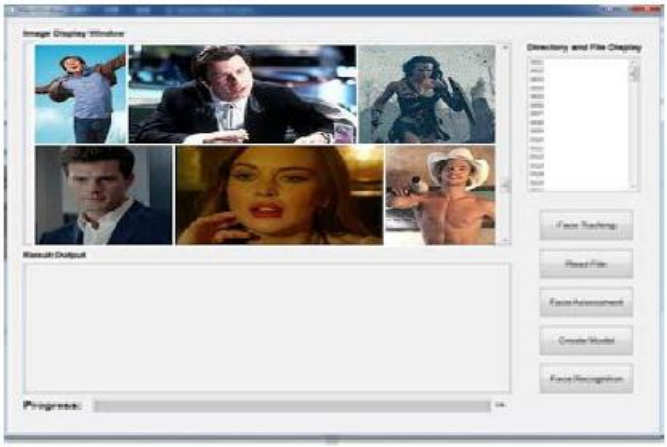

Fig. 1 Retrieving face images from an exemplar video

The user can then examine the face images to determine the targeted person. Selecting more images of the same person is certainly helpful in establishing a more feasible model. Finally, face recognition can be applied to a given investigated video, from which the faces of targeted person can be extracted and shown in the bottom panel of the interface in Fig. 1. An example of targeted face detections is demonstrated in Fig. 2.

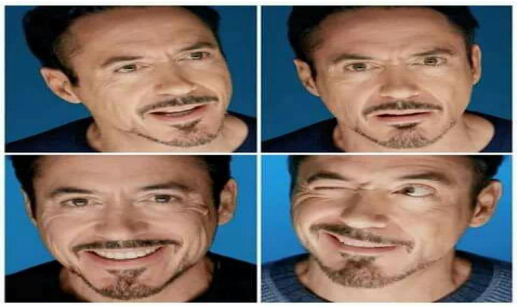

Fig. 2 An example of detected faces from an investigated video.

IV.CONCLUSION

This scheme is very useful in the practicality to find any person regarding criminal issues or business issues or any other

purpose in the digital videos.

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