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RESEARCH ARTICLE

RECOGNIZING PERSONS IN MULTI VIEW VIDEOS BY SIMILARITY BETWEEN FEATURE SETS FROM DIFFERENT VIDEOS

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Abstract: ***The recognition of the persons from videos has numerous applications in Video Surveillances and Computer Vision. The main challenge of detecting face images in videos is the pose and the illumination variations and sudden changes in the movement of the object. The videos taken from cameras are taken. The surveillance videos were normally not so clear and there may be some illumination variations and at some places due to rapid movement of the objects. The proposed system analyzes and recognizes the exact face image from the video while the existing systems deals with the recognition of the face images from still images. The videos were converted into frames. Preprocessing is applied to the video frames using median filter to remove the unwanted noises from the frames. The face of the person is detected and the face is masked. The face region is masked so that identifies the face images of the particular person more clearly. The gradient value of the image and the histogram values were calculated. Based on the detected face the position of the face is determined in each frame and the person is tracked continuously. Hog (Histograms Of Oriented Gradients) features are extracted and then RBF (Radial Basis Function) kernel function is applied. The Hog features are more reliable and they are useful in the identification of the face image of the particular person. The Hog features calculate the histogram of the gradient points in the images. Face images is retrieved from the dataset which is trained based on the distance calculated using Bhattacharya coefficient.***

Index Terms— Face recognition, pose variations, multi-camera networks, spherical harmonics, distance calculation

1. INTRODUCTION

The identification of persons in the video has numerous applications in video surveillance system. It is easy to identify persons in frontal view cameras by identifying the face. The identification of the persons in other views was difficult. The identification of the persons in

different views can be much helpful in identifying the suspicious persons in a video. The process requires some tedious works including a multiple camera network an effective tracking system to track and identify the persons in an effective manner.

A facial recognition system is a computer application for automatically 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 facial database. It is typically used in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems. Face recognition has been one of the most active research topics in computer vision and pattern recognition for more than two decades. Some facial 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. These features are then used to search for other images with matching features. 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. One of the earliest successful systems is based on template matching techniques 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 looks 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. Popular recognition algorithms include Principal Component Analysis using eigenfaces, Linear Discriminate Analysis, Elastic Bunch Graph Matching using the Fisherface algorithm, the Hidden Markov model, the Multi linear Subspace Learning using tensor representation, and the neuronal motivated dynamic link matching. A newly emerging trend, claimed to achieve improved accuracies, is three-dimensional face recognition. This technique uses 3D sensors to capture information about the shape of a face. This information is then used to identify distinctive features on the surface of a face, such as the contour of the eye sockets, nose, and chin. One advantage of 3D facial recognition is that it is not affected by changes in lighting like other techniques. It can also identify a face from a range of viewing angles, including a profile view. Three-dimensional data points from a face vastly improve the precision of facial recognition. 3D research is enhanced by the development of sophisticated sensors that do a better job of capturing 3D face imagery. The sensors work by projecting structured light onto the face. Up to a dozen or more of these image sensors can be placed on the same CMOS chip—each

sensor captures a different part of the spectrum. Even a perfect 3D matching technique could be sensitive to expressions. For that goal a group at the Technician applied tools from metric geometry to treat expressions as isometrics. Another emerging trend uses the visual details of the skin, as captured in standard digital or scanned images. This technique, called skin texture analysis, turns the unique lines, patterns, and spots apparent in a person's skin into a mathematical space. Tests have shown that with the addition of skin texture analysis, performance in recognizing faces can increase 20 to 25 percent. The applications of face recognition can be found in telecommunication, law enforcement, biometrics and surveillance. Although there have been some early successes in automatic face recognition, it is still far from being completely solved, especially in uncontrolled environments. In fact, the performance of most of current face recognition systems drops significantly when there are variations in pose, illumination and expression.

A facial recognition device is one that views an image or video of a person and compares it to one that is in the database. It does this by comparing structure, shape and proportions of the face; distance between the eyes, nose, mouth and jaw; upper outlines of the eye sockets; the sides of the mouth; location of the nose and eyes; and the area surrounding the check bones. Upon enrolment in a facial recognition program, several pictures are taken of the subject at different angles and with different facial expressions. At time of verification and identification the subject stands in front of the camera for a few seconds, and then the image is compared to those that have been previously recorded. To prevent a subject from using a picture or mask when being scanned in a facial recognition program, some security measures have been put into place. When the user is being scanned, they may be asked to blink, smile or nod their head. Another security feature would be the use of facial thermography to record the heat in the face. The main facial recognition methods are: feature analysis, neural network, and eigen faces, automatic face processing.

2. LITERATURE SURVEY

2.1 Probabilistic head pose tracking evaluation in single and multiple camera setups

A probabilistic method based on a mixed state particle filter to perform head poses tracking with respect to a single camera view. Applying this method solves the AMI (Augmented Multi-Parity Interaction) head pose estimation task. To address the CHIL (Computers In The Human

Interaction Loop) task, the head pose with respect to the camera is transformed to be relative to the global room coordinate system using the camera calibration parameters. Then the head pose estimated with respect to the global room coordinate obtained from the four cameras are fused into a single head pose estimate using the percentage of skin present in the estimated bounding box for the head as reliability measure**.**

2.2 Real time head pose tracking from multiple cameras with a generic model

Given all the reference frames their associated poses, select features on the face from the Harris detector for tracking from each camera. The KLT (Kanade-Lucas-Tomasi) algorithm is used to track the features onto the frame at time t. This provides a set of 2D-3D correspondences at each view temporally. To make the algorithm less prone to error drift, to retain key frames accumulated over time for additional matches. Both key and previously tracked frames serve as reference for establishing 2D-3D correspondences.

Finally, the smoothness constraint for camera geometry is added to the cost function for optimization. The assumption that the intrinsic parameters do not change over time is reasonable since there is not much need of PTZ (Pan Filt Zoom) cameras for a user sitting in front of the desktop. Tracking from each camera starts with face detection which identifies a face rectangle. Run 2D mesh alignment to get 2D feature points for initial tracking. Basically, the 3D model is oriented and projected to the individual camera coordinate in the face region so that obtain an initial guess of the camera geometry relative to world coordinate. At each camera, select point features over the face region based on the KLT selection criterion and back-project these points onto the mesh model to obtain the 3D point locations on the model denoted for the camera.

2.3 Face recognition based on frontal views generated from non-frontal images

The model may well be applied to reconstruct 3D shape from images of a wider ethnic variety. In the conversion of the laser scans into shape and texture vectors it is essential to establish dense point-to-point correspondence of all scans with a reference scan, to make sure that vector dimensions describe the same point, such as the tip of the nose, in all faces.

Dense correspondence is computed automatically with an algorithm derived from optical flow. Principal Component Analysis is used to estimate the probability distribution of faces around the averages of shape and texture, and replace the basis vectors by orthogonal eigenvectors.

3D shape reconstruction from a single input image is achieved by fitting the Morphable Model to the image in an analysis-by-synthesis loop: At each iteration, the current model parameters define a 3D face, and computer graphics can be used to render a colored model image with red, green and blue channels.

2.4 Morphable displacement field based image matching for face recognition across pose

A statistical shape model to constrain the rational matching parameter which can make sure the obtained displacement field satisfying not only local consistency but also global conformity. To build the statistical model, first generate a set of real template displacement fields from a 3D face database.

Then the model target displacement field between a new pair of faces as a convex combination of these predefined template displacement fields. This model Morphable Displacement Field. Further prove that the proposed MDF(Medium Density Fibreboard) model also guarantees local consistency. Finally, present an approximate but efficient solution of MDF model which not only avoids intractable optimization of the high-dimensional displacement field but also facilitates a constrained quadratic optimization.

Given a 3D face shape model, one can rotate the model according to X or/and Z axis and project the rotated model onto X-Z plane to get 2D face shape models in arbitrary pose. Then with 2 or more landmarks and assigned pose, one can further normalize the face shape models in X-Z plane using similarity transformation in order that the obtained template displacement fields and probe images are aligned.

3. CONCLUSION

The face image of the subject is detected exactly. The detection of the face and the retrieval is very useful in many of the processes. There is no need to identify the pose and other such process. The person is identified correctly even though there are pose variations and illumination variations. The performance of the proposed system is high compared to the techniques that are used to identify the face images in multi view videos.

REFERENCES

[1] S. Ba and J. M. Odobez, "Probabilistic head pose tracking evaluation in single and multiple camera setups," Multimodel Technology. Perception Humans, vol. 4625, pp. 276–286, Jun. 2008.

[2] Q. Cai, A. C. Sankaranarayanan, Q. Zhang, Z. Zhang, and Z. Liu, "Real time head pose tracking from multiple cameras with a generic model," in Proc. CVPR Workshops, Jun. 2010, pp. 25–32.

[3] V. Blanz, T. Grother, P. J. Phillips, and T. Vetter, "Face recognition based on frontal views generated from non-frontal images," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., vol. 1. Jun. 2005, pp. 454–461

[4] S. Li, X. Liu, X. Chai, H. Zhang, S. Lao, and S. Shan, "Morphable displacement field based image matching for face recognition across pose," in Proc. Eur. Conf. Comput. *Vis.*, Oct. 2012, pp. 102–115.

