IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SURVEY ON TRADITIONAL FACIAL RECOGNITION PROCESS

Dr.Veena.S[1], Ravishankar .R[2], Santhosh Kumar.K[3], Syed Muzammil.S.R[4]

[1]*Professor,Department of Computer Science and Engineering*

[2]*Student,Department of Computer Science and Engineering*

[3]*Student,Department of Computer Science and Engineering*

[4]*Student,Department of Computer Science and Engineering*

S.A Engineering College

ABSTRACT:

Emotions are the purest form of our soul to express what we feel inside our hearts. The process of recognizing feelings developed in the computer field a long time ago. Several face recognition techniques have been discovered in the technological aspect. Surveys into automatic face detection has been conducted since the 1960s, but the problem remains largely unsolved. The past decade has made major advances in this field due to advances in facial analysis and modeling techniques. Despite the development of face detection and tracking systems, reliable face recognition remains a major challenge for researchers in the field of computer vision and pattern recognition. There are several reasons behind the recent increased interest in face recognition, including a growing public interest in security, the need for identity verification in the digital world, and face analysis and modeling techniques in managing multimedia and computer entertainment data. In this chapter we discussed the processing of face recognition, including key components such as face detection, tracking, alignment, and feature extraction, and points out the technical challenges of building a face recognition system. We focus on the importance of the most successful solutions available to date. In

INTRODUCTION:

Recent advances in automatic face analysis, pattern recognition, and machine learning have made it possible to develop automatic face recognition systems to address these applications. Facial recognition is a natural process, because people usually do so effortlessly without much awareness. On the other hand, implementing this process in the field of computer vision remains a difficult problem. Automatic face recognition has many variety of properties. It's based on the important feature - non-interference. The different biometric methods can be classified into physiological (fingerprint, DNA, face) and behavioral (keystrokes, voice prints) categories. Physiological methods are more stable and immutable, except through severe injury. Behavior patterns are more sensitive to general human condition, such as stress, illness or fatigue.The brief analysis of the face detection techniques using effective statistical learning methods seems to be crucial as practical and robust solutions.

Facial recognition has the positives of high resolution and low interference, so it has drawn the attention of researchers in various fields from psychology and image processing to computer vision.

The next step, the system based on the anthropometric

The entire process is repeated for predicting sub-features and verified with clustering statistic to eliminate any misleading features.

Anchor points are created as a result of the geometry of the face image and then the actual recognition process begins. It is implemented by finding a local representation of the facial appearance at each of the anchor points. Representation scheme depends on the approach. In order to deal with such complexities and learn the true constant of recognition, researchers have developed various discrimination algorithms.

There are several limitations to the current face recognition technology (FERET). In [1,2] early standards for face recognition technologies are taken. While under ideal conditions the performance is very good, under various lighting conditions, articulation, accuracy, distance or aging, the performance drops dramatically. Another problem is an efficient way to store and access a face code (or face template) stored as a set of features and extracted from a photo or video.

It requires clarification or replacing it with new algorithms, methods, or even technologies.

In this chapter we discussed the processing of face recognition, including key components such as face detection, tracking, alignment, and feature extraction, and points out the technical challenges of building a face recognition system. We focus on the importance of the most successful solutions available to date.

TRADITIONAL METHODS USED FOR FACE RECOGNITION:

Traditional face recognition algorithms are often classified into two classes: comprehensive features and native feature approaches. the great set are often further divided into linear and nonlinear projection methods.

Several applications have shown good results for methods supported linear projection appearance like principal component analysis (PCA) [3], independent component analysis (ICA) [4], linear discrimination analysis (LDA) [5,6], 2DPCA [7] and classifier. rectilinear regression (LRC) [8].

However, thanks to large differences in lighting

a kernel discriminant common vectors [23] or enhanced generic vectors and a support vector machine (SVM) [24] are presented for a face recognition task.

Similar to the tactic LLE, the projection of maintaining the neighborhood (NPP) and therefore the orthogonal NPP (ONPP) is presented in [25,26]. These methods preserve the local structure between samples. To reflect the intrinsic geometry of local neighborhoods, they use data-driven weights by solving the smallest amount

PCA (KPCA), kernel LDA (KLDA) [9], or locally linear inclusion (LLE) [10] are suggested. the foremost nonlinear method is using kernel techniques, where the overall idea consists of mapping the input face images to a better dimensional space during which the forked faces are linear and simplified.

These methods project the face onto a linear subspace extended by images with a symmetrical face. the space from the face area is that the perpendicular distance to the plane, while the space within the face area is that the distance along the plane from the center image. These two distances are often converted into Mahalanobis distances and provides probabilistic explanations [11].

Then, KPCA [12], the nucleus ICA [13], and a generalized linear differentiation analysis [14] were developed.

Another group of nonlinear projection techniques has been evolved. They reduced complexity from linear methods and therefore the potential to handle difficult data from nonlinear becomes easy. Among these methods, it's worth emphasizing: LLE [15] and projecting LPP [16]. They only produce a projection chart for training data, but their ability to display new data items is questionable.

In the second category, local appearance features have certain advantages over comprehensive ones. These methods are more stable to local changes like expression, occlusion, and misalignment. a standard analog method is to call the local binary patterns (LBP s) [17,18]. Adjacent changes round the center pixel are described during a simple but effective manner by LBP. it's a continuing monotonous intensity shift and supports small lighting differences. Several variants LBP are proposed to optimize the first LBP like the histogram of the Gabor phase patterns [19] and therefore the histogram sequence of the local binary Gabor pattern [20, 21]. generally , LBP is employed to jointly model the adjacent relationship within the spatial, frequency, and directional domains [20].

A further development of the mentioned subspace approaches represents the characteristic co-vector approach (DCV) [22].

The DCV method brings together the similarities of things within the same class and drops the differences between the many of Gabor's features is extremely time consuming [43]. Moreover, extracting Gabor features is computation-intensive, therefore the features are currently useless for real-time applications [37]. A simplified version of Gabor waves has been introduced in [38]. Unfortunately, the simplified Gabor features are more sensitive to lighting variations during a nod to the first Gabor features.

FACE DESCRIPTOR BASED METHODS

It helps to assess things and detects obscured areas for every face scan. Then, an annotated face form is recorded and fitted to the scan. During composition, face symmetry is employed to beat the challenges of missing data [45].

The disadvantage of using 3D data for face recognition is that these face recognition methods got to be calibrated and synchronized all elements of the system to get accurate 3D data (texture and depth maps). Current 3D face recognition methods are supported surface registration or on complex feature extraction and matching (surface descriptor) techniques. Therefore, it's computationally expensive and not suitable for practical applications. Moreover, it requires the cooperation of the topic which makes it not useful for unsupervised or semi-controlled scenarios where the sole input for the algorithms may be a 2D density image obtained from one camera.

VIDEO BASED FACE RECOGNITION

The inspection of video streams of facial images is receiving an steady increase interest in biometrics [46]. an instantaneous benefit in using video information is that the repeatation within the video sequence are often wont to improve still image systems.

Although an excellent deal of research has been done into matching still images of the face, the utilization of video clips for face recognition has been relatively unexplored [47]. the primary stage of video-based face recognition (VFR) is that the re-identification procedure, during which a group of video clips is matched to spot all occurrences of the person of interest [48].

In general, VFR approaches are often categorized into two categories supported what percentage of the knowledge available within the video sequence is utilized: (1) sequence based and (2) group based, where at a high level, what distinguishes these two approaches is whether or not they use the knowledge Temporal or not [49, 50].

In [51], the task VFR is transformed into a drag measuring similarity between two sets of images, where the examples from a video clip form one set of images. The authors considered the facial images from each segment as a gaggle and formulated a VFR within the Joint Scattered Representation (JSR) problem. In JSR, to find out the sparse representation of a search segment adaptively, they simultaneously consider the contrast of the separation plane and therefore the atom level, because the former composes the recorded segments employing a sparse regulator uniform and therefore the latter seeks for a few relevant examples employing a sparse regulator.

TABLE OF TRADITIOAL METHODS WITH ADVANTAGES AND DISADVANTAGES

S.NO	METHOD	ADVANTAGES	DISADVANTAGES
1	Classical face recognition algorithms	Focuses on local architecture From the manifold. These project methods Face to linear subspace extended by self-portraits. The distance from the face space Perpendicular to the plane From the middle picture, it might be Easily converted to Mahalanobis spaces With a probabilistic explanation	These methods may fail Represent faces adequately when Significant differences in face lighting Expressions and other factors occur. With respect to [34], the application of nonlinear based methods does not result in a kernel a Significant improvement compared to linear methods. LLE, LLP and LBP brought simplicity and efficacy A method for describing adjacent changes in the face Describe. Partial space approach It has been applied in DCV- and SVM based methods. Preserving the local structure between samples is a range of methods NPP and ONPP. The problem is that it still is It is unclear how to determine neighborhood size or set optimal values for them
2	Gabor wavelets	Gabor Wavelet Gallery Desired capture properties Notable visual characteristics such as trend of spatial localization Selective and spatial repeat. For Different Biometrics applications This approach is preferred	The disadvantage Gabor based methods Remarkably high dimensions The Gabor feature space since then Face portrait wrapped with a Bank Jabour filters. Algorithmic approach Condensed and impractical for real-time applications. In addition, simplified Gabor features are sensitive To lightning changes
3	Face descriptor-based methods	The main idea behind the development Image descriptors are learning Most recognizable locally Features that reduce the difference between Photos of the same	The approach is computationally intensive during the descriptor extraction stage, but it encourages simplicity and performance with respect to online applications.

		individual And maximize it among the pictures of other people. These methods Discriminatory and powerful For illumination and expressiveness the changes. It provides compact, Easy to extract and highly descriptive	
4	3D-based face recognition	Conventional extension 2D capture process And he has the largest The possibility of accuracy. Depth information no Dependent on the situation And lighting Make the solution more powerful	Request that all elements of the 3D face recognition system be well calibrated and synchronized with existing 3D data. It is computationally expensive and not suitable for practical applications
5	Video-based recognition	The main feature Of approach The possibility of using repetition Is in the video To improve still image systems	Relatively poorly investigated. Multiply problems measuring the similarity between two (or more) pictures

CONCLUSION

Face recognition remains a difficult problem in the field of computer vision. It has gained much attention during the past years due to its multiple applications in various fields. Although there are strong research efforts in this area, face recognition systems are far from ideal for adequate performance in all real-world situations. The paper provided a brief survey of the problematic methods in face recognition. Much work needs to be done in order to realize the technologies that reflect how face recognition and make the best use of the temporal evolution of the face in order to recognize it.

REFERENCES

[1]Philips, P. J., Moon H., Rauss P., Rizivi S.: 'The FERET September 1996 Database and Evaluation Procedure', Audio- and Video-based Biometric Person Authentication, Lecture Notes in Computer Science, vol. 1206, 395-402, Springer 1997.

[2]Liao, S., Lei, Z., Yi, D., Li, S.: 'A benchmark study of large-scale unconstrained face recognition'. Int. Joint Conf. on Biometrics (IJCB 2014), Florida, USA, 2014, pp. 1–8.

[6]Hu, H., Zhang, P., De la Torre, F.: 'Face recognition using enhanced linear discriminant analysis', IET Comput. Vis., 2010, 4, (3), pp. 195–208.

[7]Yang, J., Zhang, D., Frangi, A.F., Yang, J.-Y.: 'Two-dimensional PCA: a new approach to appearance-based face representation and recognition', IEEE Trans. Pattern Anal. Mach. Intell., 2004, 26, (1), pp. 131–137.

[8]Naseem, I., Togneri, R., Bennamoun, M.: 'Linear regression for face recognition', IEEE Trans. Pattern Anal. Mach. Intell., 2010, 32, (11), pp. 2106–2112.

[9]Lu, J., Plataniotis, K.N., Venetsanopoulos, A.N.: 'Face recognition using kernel direct discriminant analysis algorithms', IEEE Trans. Neural Netw., 2003, 14, (1), pp. 117–126.

[10]He, X., Yan, S., Hu, Y., Niyogi, P., Zhang, H.-J.: 'Face recognition using Laplacian faces', IEEE Trans. Pattern Anal. Mach. Intell., 2005, 27, (3), pp. 328–340.

[11]Perlibakas, V.: 'Distance measures for PCA-based face recognition', Pattern Recognit. Lett., 2004, 25, (6), pp. 711–724.

[12]Kim, K.I., Jung, K., Kim, H.J.: 'Face recognition using kernel principal component analysis', IEEE Signal Process. Lett., 2002, 9, (2), pp. 40–42.

[15]Roweis, S., Saul, L.: 'Nonlinear dimensionality reduction by locally linear embedding', Science, 2000, 290, (5500), pp. 2323–2326.

[16]Xiaofei, H., Partha, N.: 'Locality preserving projections'. Int. Conf. on Advances in Neural Information Processing Systems (NIPS'03), 2003, pp. 153–161.

[17]Ahonen, T., Hadid, A., Pietikäinen, M.: 'Face description with local binary patterns: application to face recognition', IEEE Trans. Pattern Anal. Mach. Intell., 2006, 28, (12), pp. 2037–2041.

[18]Ahonen, T., Hadid, A., Pietikäinen, M.: 'Face description with local binary patterns: application to face recognition', IEEE Trans. Pattern Anal. Mach. Intell., 2006, 28, (12), pp. 2037–2041.

[19]Zhang, B., Shan, S., Chen, X., Gao, W.: 'Histogram of Gabor phase patterns (HGPP): a novel object representation approach for face recognition', IEEE Trans. Image Process., 2007, 16, (1), pp. 57–68.

[20]Yang, B., Chen, S.: 'A comparative study on local binary pattern (LBP) based face recognition: LBP histogram versus LBP image', Neurocomputing, 2013, 22, pp. 620–627.

[21]Zhang, B., Gao, Y., Zhao, S., Liu, J.: 'Local derivative pattern versus local binary pattern: face recognition with high-order local pattern descriptor', IEEE Trans. Image Process., 2010, 19, (2), pp. 533–544.

[22]Cevikalp, H., Neamtu, M., Wilkes, M., Barkana, A.: 'Discriminative common vectors for face recognition', IEEE Trans. Pattern Anal. Mach. Intell., 2005, 27, (1), pp. 4–13.

[23]Jing, X.-Y., Yao, Y.-F., Yang, J.-Y., Zhang, D.: 'A novel face recognition approach based on kernel discriminative common vectors (KDCV) feature extraction and RBF neural network', Neurocomputing, 2008, 71, pp. 3044–3048.

[24]Wen, Y.: 'An improved discriminative common vectors and support vector machine based face recognition approach', Expert Syst. Appl., 2012, 39, (4), pp. 4628–4632.

[25]Kokiopoulou, E., Saad, Y.: 'Orthogonal neighborhood preserving projections: a projection based dimensionality reduction technique', IEEE Trans. Pattern Anal. Mach. Intell., 2007, 29, (12), pp. 2143–2156.

[26]Yanwei, P., Lei, Z., Zhengkai, L., Nenghai, Y., Houqiang, L.: 'Neighborhood preserving projections (NPP): a novel linear dimension reduction method', Lect. Notes Comput. Sci., 2005, 3644, pp. 117–125.

[27]Gu, W., Xiang, C., Venkatesh, Y., Huang, D., Lin, H.: 'Facial expression recognition using radial encoding of local Gabor features and classi_er synthesis', Pattern Recognit., 2012, 45, (1), pp. 80–91.

[28]Serrano, S., Diego, I., Conde, C., Cabello, E.: 'Recent advances in face biometrics with Gabor wavelets: a review', Pattern Recognit. Lett., 2010, 31, (5), pp. 372–381.

[29]Shen, L., Bai, L.: 'A review on Gabor wavelets for face recognition', Pattern Anal. Appl., 2006, 9, (2–3), pp. 273–292.

[30]Zhang, W.C., Shan, S.G., Chen, X.L., Gao, W.: 'Are Gabor phases really useless for face recognition?', Int. J. Pattern Anal. Appl., 2009, 12, (3), pp. 301–307.

[31]Zhao, S., Gao, Y., Zhang, B.: 'Gabor feature constrained statistical model for ef_cient landmark localization and face recognition', Pattern Recognit. Lett., 2009, 30, (10), pp. 922–930.

[32]Kanan, H., Faez, K.: 'Recognizing faces using adaptively weighted sub-Gabor array from a single sample image per enrolled subject', Image Vis. Comput., 2010, 28, (3), pp. 438–448.

[33]Yu, L., He, Z., Cao, Q.: 'Gabor texture representation method for face recognition using the Gamma and generalized Gaussian models', Image Vis. Comput., 2010, 28, (1), pp. 177–187.

[34]Zhao, Z.-S., Zhang, L., Zhao, M., Hou, Z.-G., Zhang, C.-S.: 'Gabor face recognition by multi-channel classi_er fusion of supervised kernel manifold learning', Neurocomputing, 2012, 97, pp. 398–404.

[35]Serrano, A., de Diego, I., Conde, C., Cabello, E.: 'Analysis of variance of Gabor _lter banks parameters for optimal face recognition', Pattern Recognit. Lett., 2011, 32, (15), pp. 1998–2008

[36]Perez, C., Cament, L., Castillo, L.E.: 'Methodological improvement on local Gabor face recognition based on feature selection and enhanced Borda count', Pattern Recognit., 2011, 44, (4), pp. 951–963.

[37]Perez, C., Cament, L., Castillo, L.E.: 'Methodological improvement on local Gabor face recognition based on feature selection and enhanced Borda count', Pattern Recognit., 2011, 44, (4), pp. 951–963.

[38]Oh, J., Choi, S., Kimc, C., Cho, J., Choi, C.: 'Selective generation of Gabor features for fast face recognition on mobile devices', Pattern Recognit. Lett., 2013, 34, (13), pp. 1540–1547.

[39]Chen, J., Shan, S., He, C., et al.: 'WLD: a robust local image descriptor', IEEE Trans. Pattern Anal. Mach. Intell., 2010, 32, (9), pp. 1705–1720.

[40]Jabid, T., Kabir, M., Chae, O.: 'Facial expression recognition using local directional pattern (LDP)'. IEEE Int. Conf. on Image Processing (ICIP), Hong Kong, China, 2010, pp. 1605–1608.

[41]Bereta, M., Karczmarek, P., Pedrycz, W., Reformat, M.: 'Local descriptors in application to the aging problem in face recognition', Pattern Recognit., 2013, 46, (10), pp. 2634–2646.

[42]Bereta, M., Pedrycz, W., Reformat, M.: 'Local descriptors and similarity measures for frontal face recognition: a comparative analysis', J. Vis. Commun. Image Represent., 2013, 24, (8), pp. 1213–1231.

[43]Lei, Z., Pietikäinen, M., Stan, Z.L.: 'Learning discriminant face descriptor', IEEE Trans. Pattern Anal. Mach. Intell., 2014, 36, (2), pp. 289–302.

[44]Ira, K.-S., Ronen, B.: '3D face reconstruction from a single image using a single reference face shape', IEEE Trans. Pattern Anal. Mach. Intell., 2011, 33, (2), pp. 394–405.

[45]Lei, Y., Bennamoun, M., El-Sallam, A.: 'An ef_cient 3D face recognition approach based on the fusion of novel local low-level features', Pattern Recognit., 2013, 46, (1), pp. 24–37.

[46]Marin-Jimenez, M., Zisserman, A., Eichner, M., Ferrari, V.: 'Detecting people looking at each other in videos', Int. J. Comput. Vis., 2014, 106, (3), pp. 282–296.

[47]O'Toole, A., Harms, J., Snow, S., Hurst, D., Pappas, M., Abdi, H.: 'A video database of moving faces and people', IEEE Trans. Pattern Anal. Mach. Intell., 2005, 27, (5), pp. 812–816.

[48]Poh, N., Chan, C.H., Kittler, J., et al.: 'An evaluation of video-to-video face veri_cation', IEEE Trans. Inf. Forensics Sec., 2010, 24, (8), pp. 781–801.

[49]Cui, Z., Chang, H., Shan, S., Ma, B., Chen, X.: 'Joint sparse representation for video-based face recognition', Neurocomputing, 2014, 135, (5), pp. 306–312.

[50]Barr, J., Boyer, K., Flynn, P., Biswas, S.: 'Face recognition from video: a review', Int. J. Pattern Recognit. Artif. Intell., 2012, 26, (5), pp. 53–74.

[51]Cui, Z., Chang, H., Shan, S., Ma, B., Chen, X.: 'Joint sparse representation for video-based face recognition', Neurocomputing, 2014, 135, (5), pp. 306–312.