Recognition of Face on Different Facial Expressions

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Abstract: **Face recognition as a biometric derives a number of advantages from being the primary biometric that humans use to recognize one another. Facial expression and personal appearance changes due to aging, movement of lips and eyes in a conversation. In this paper we are recognizing the faces on different expressions which include various positions of lips, eyes etc. It also includes different angles of image capturing.**

INTRODUCTION

The face is the primary focus of attention in the society. The ability of human beings to remember and recognize faces is quite robust. Automation of this process finds practical application in various tasks such as criminal identification, security systems and human-computer interactions. Face recognition has a number of strengths to recommend it over other biometric modalities in certain circumstances, and corresponding weaknesses that make it an inappropriate choice of biometric for other applications. Some of the earliest identification tokens, i.e. portraits, use this biometric as an authentication pattern. Furthermore it is well-accepted and easily understood by people, and it is easy for a human operator to arbitrate machine decisions — in fact face images are often used as a human-verifiable backup to automated fingerprint recognition systems. Because of its prevalence as an institutionalized and accepted guarantor of identity since the advent of photography, there are large legacy systems based on face images—such as police records, passports and driving licenses—that are currently being automated. Video indexing is another example of legacy data for which face recognition [1], in conjunction with speaker identification, is a valuable tool. There are many attributes leading to the variability of images of a single face that add to the complexity of the recognition problem if they cannot be avoided by careful design of the capture situation. Inadequate constraint or handling of such variability inevitably leads to failures in recognition.
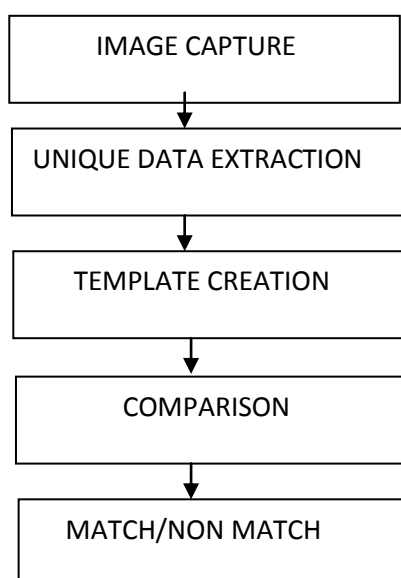
Facial expression change and personal appearance like wearing of glasses, having different hairstyle or facial hair are the part of Physical changes. In case of imaging changes lighting variation, camera variations or channel characteristics especially in broadcast or compressed images are the major factors. In acquisition geometry changes change in scale, location and in-plane rotation of the face (facing the camera) as well as rotation in depth are the criteria for changes.

No current system can claim to handle all of these problems well. In particular there has been little research on making face recognition robust to the effects of aging the faces. In general, constraints on the application scenario and capture situation are used to limit the amount of invariance of face image sample that needs to be afforded algorithmically.

The main challenges of face recognition today are handling rotation in depth and broad lighting changes, together with personal appearance changes. Even under good conditions, however, accuracy needs to be improved.

FACE DETECTION

Face must be located in the image before recognizing it. Skin-tone and face texture combination is used to determine the location of a face and use an image pyramid to allow faces of varying sizes to be detected. Increasingly, systems are being developed to detect faces that are not full-frontal. Cues such as movement and person detection can be used to localize faces for recognition.

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│      IMAGE CAPTURE       │
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             ▼
┌──────────────────────────┐
│  UNIQUE DATA EXTRACTION   │
└──────────────────────────┘
             │
             ▼
┌──────────────────────────┐
│     TEMPLATE CREATION     │
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│        COMPARISON         │
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│     MATCH/NON MATCH       │
└──────────────────────────┘
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Training Database

For making classes of face image as required in LDA, we named face images using the numbers. Each class has nine elements, it means for each person there are total nine images captured in different condition.Total number of person is five, and hence total number of class is also five. Images from 1 to 9 belongs to class 1, images from 10 to 18 belongs to class 2, and so on…

Figure 1: Training database structured in different expressions

Recognition result

After applying the face recognition methodology, described above, to test unknown face, we get the image in database corresponding to it.

Figure 2: Face recognition using LDA with different facial expressions

CONCLUSION

The above method is able to find out the equivalent image which is having almost the same expression as given in the test images set. It is able to recognize the face not only among different persons but also in different facial conditions like smile or sadness.

REFERENCES

1. Tolba, El-Baz, El-Harby, "Face Recognition – A Literature Review", International Journal of Signal Processing, Vol.2, No.2, 2005, pp.88-103

2. Liton Chandra Paul , Abdulla Al Sumam, "Face Recognition Using Principal Component Analysis Method" , International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 1, Issue 9, November 2012

3. Kshirsagar, V.P.; Baviskar, M.R.; Gaikwad, M.E., "Face recognition using Eigen faces," Computer Research and Development (ICCRD), 2011 3rd International Conference, vol.2, no., pp.302-306, 11-13 March 2011
.

4. M.S.Bartlett, J.R.Movellan, T.R.Sejnowski, "Face recognition by Independent Component Analysis," IEEE Trans. on Neural Networks, Vol. 13, No. 6, Nov. 2002.

5. F. Samaria and A. Harter , "Parameterisation of a stochastic model for human face identification", 2nd IEEE Workshop on Applications of Computer Vision December 1994, Sarasota (Florida).

6. K. R. Singh, Roshni S Khedgaonkar, Swati P Gawande, "A New Approach to Local Plastic Surgery Face Recognition Using Near Sets", International Journal of Engineering Science and Technology (IJEST) Feb 2011.

7. A. Bouzalmat, A. Zarghili, J. Kharroubi, "Facial Face Recognition Method Using Fourier Transform Filters Gabor and R_LDA", IJCA Special Issue on Intelligent Systems and Data Processing, pp.18-24, 2011.

8. Marian Stewart Bartlett, Javier R. Movellan, Terrence J. Sejonowski, "Face Recognition by Independent Component Analysis", IEEE Transactions on Neural Networks, vol-13, No- 6,November 2002, PP 1450-1464