Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X
IMPACT FACTOR: 6.017

IJCSMC, Vol. 5, Issue. 10, October 2016, pg.44 – 47

Human Action Recognition Analysis through Facial Expressions: A System Overview

Harshali S.Sawale[1], R. R. Keole[2]

[1]Department of CSIT, SGBAU Amravati University, INDIA

[2]Department of CSIT, SGBAU Amravati University, INDIA

[1] Harshalisawale8@gmail.com; [2] ranjitkeole@gmail.com

Abstract— Online learning involves a rich array of cognitive and affective stages remembering and understanding these critical dimension of learning is to design informed interventions. This paper presents an automated analysis of fine –grained facial movements that occur during computer mediated tutorials. Within the dataset, upper face movements were found to be predictive of engagement, frustration, and learning, while mouth dimpling was a positive factor of learning. Additionally this paper represents novel validation of an automated tracking tool on a naturalistic dataset, the development introduced here represent a next step toward automatically moment by moment affective stages during learning. We address the problem of estimating pose as a continuous regression problem on real world images with large variations in background, illumination and expression. This representation is used in a generative model for automatic estimation of head poses.

Keywords— "Facial expression, frustration, affect, computer –mediated method, gesture, detection"

I. INTRODUCTION

The paper represent the system which automatically detects the front image in its video stream and codes each frame with respect to seven dimensions .Neutral , fear , joy, sadness etc..Learning centered and affective states , such as engagement and frustration are inextricably linked with the cognitive aspects of fundamental research problem. Recent research has identified facial expressions that are related to self – reported and judge learning centered affective stages which typically includes boredom , confusion , engaged , concentration.

The facial Action Coding System (FACS) has been widely used to study the facial movements for decades. FACS enumerates the possible movements of the human face as facial action units. Facial feature tracking tools recognize the presence of face and then locate facial features. This paper represent an automated facial movements.

II. METHODS

Face detection algorithm detects facial features and ignores anything else, such as buildings, trees and other bodies. Some systems detect and locate faces at the same time, others first perform a detection routine and then, try to locate the face. Some tracking algorithm is needed.

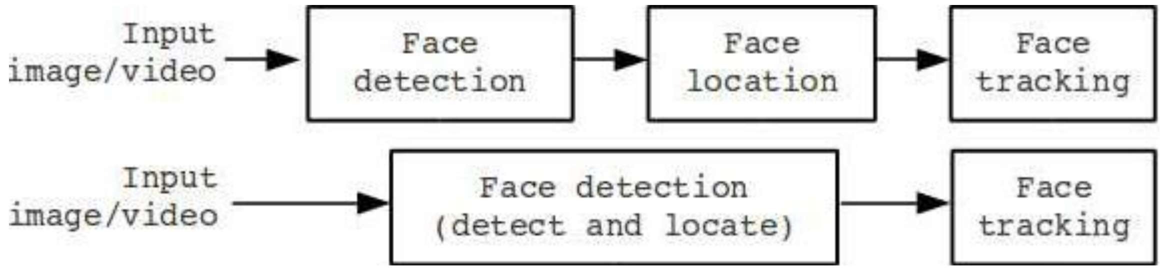

Fig.1 Face detection Process

Early face detection algorithms focused on the detection of frontal human faces, whereas newer algorithms attempt to solve the more general and difficult problem of multi-view face detection. These algorithms take into account variations in the image or video by factors such as face appearance, lighting, and pose.

1) Gabor-Fisher Classifier (GFC) by Liu and Walsher.: The Gabor-Fisher Classifier is most robust to changes in illumination and facial expression. This method applies the Enhanced Fisher linear discriminate Model (EFM) to an augmented Gabor feature vector derived from the Gabor wavelet representation of face images. The critical features of this method are -the derivation of an augmented Gabor feature vector, whose dimensionality is further, reduced using the EFM by considering both data compression and recognition (generalization) performance. The development of a Gabor–Fisher classifier for mulch-class problems extensive performance evaluation studies the feasibility of the new GFC method has been successfully tested on face recognition using 600 FERET frontal face images corresponding to 200 subjects, which were acquired under variable illumination and facial expressions. The novel GFC method achieves 100% accuracy on face recognition using only 62 features.

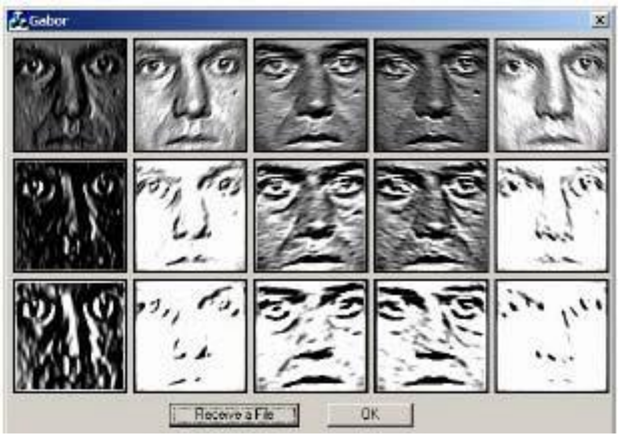

Figure Gabor – Fisher Classifier System

Exhaustive Search Algorithm: Human face detection is a key technology in face information processing, the speed of which is very important during real-time face detection for input images or input video sequences. This algorithm presents a novel face window searching algorithm based on evolutionary agent when detecting faces in gray-scale images. It can quickly AND the candidate face windows through the evolutionary computation of distributed agents, which represent different kind of windows. Experimental results prove that the evolutionary agent-based searching algorithm can increase the detection speed by 5-7 times compared with the traditional exhaustive searching method used in some general algorithms. The traditional face window searching starts from left-top corner of the image to classify all possible sub windows marks the windows which meet classification characteristics. The exhaustive searching method can't identify the face like windows quickly because generally there are so many non-face regions in the input image. It is not only computationally expensive but also has high false detection rate. As we all know, human can find the face regions quickly when browsing an image. If there are several faces in the image, people will focus on them simultaneously rather than search the face windows from the left-top corner to the right-bottom corner of the image, and it is very easy for human to know how many faces exist in the image by counting them.

Branch and Bound algorithm: Recently, researchers have proposed many face recognition methods with the aim of improving the accuracy rate of face recognition. However, few face recognition methods only focus on computational cost. For reduction in the computational cost of face recognition, an effective face recognition method using Haar wavelet features and a branch and bound method is used. In this method extracts features of the Haar wavelet from a normalized face image, and recognizes the face by classifiers learned with the Ada-Boost M1 algorithm. To accelerate the recognition process we select features according to the accuracy of classification and apply a branch and bound method to the recognition tree into which the classifiers of an individual in the face database are merged.

DCT-mod 2 utilizes polynomial coefficients derived from 2D DCT coefficients obtained from horizontally & vertically neighbouring blocks via the use of various windows and diagonally neighbouring blocks. In DCT-mod2 feature extraction a given face image is analyzed on a block by block basis. Here the block is Np x Np and overlaps neighbouring blocks by 50%. Each block is divided in terms of 2D Discrete Cosine Transform (DCT) basis functions.

RELATED WORK TO RECOGNIZE:

This paper presents various methods involved in past to identify facial expression and emotion from still images. This paper mainly focuses on automated techniques for (i) Face Detection (ii) Feature Extraction (iii) Emotion Detection

Skin Color Segmentation:

The first step after acquiring the image is segmenting it. Skin color segmentation is done in the paper to separate the non-skin pixels from the skin pixels .Before applying this, the image is contrasted as a pre –requisite and for better results. This helps us getting closer to the next step of face detection .It eliminates the region not required, if suppose the person in the image is wearing a shirt then the shirt won't be seen in the output, only the face and the neck in some cases.

Principle Component Analysis for Face Detection:

The face is where all the answers lie to the emotion expressed by a person so it's necessary that the algorithm chosen for the face is as accurate as possible or else it will be harder to detect the lips and the eyes. Principal Component Analysis is used to reduce the dimensionality of image and provides effective face indexing and retrieval. It is also known as the Eigen face approach.

Bezier Curve and difference measurements Technique for Eyes and Lip detection:

Bezier curve and difference measurement is one the techniques to recognize human emotions using mathematical expressions. Bezier curve is used to generate contour points considering global shape information with curve passing through first and last curve points.

Emotion Detection using Pattern Matching:

Design the database which contains the values (patterns) of all types of emotions. Once all feature extraction is done, convert the obtained values in to large area and compare with already existing database. If pattern matches with happy emotion value then result will display as Happy Mood.

III. CONCLUSIONS

We represented systematic comparison of machine learning methods applied to the problem of fully automatic recognition of facial expressions, including Adaboost, support vector machines and linear discriminant analysis, We reported results on a series of experiments comparing methods for multiclass decisions, spatial frequency ranges , feature selection methods, and recognition engines. Best results were obtained by selecting a subset of Gabor filers using Adaboost and then training Support Vector Machines on the outputs of the filters selected by Adaboost.

Our results suggest that user independent, fully automatic real time coding of facial expressions in the continuous video stream is an achievable goal at the present future.

Our work also indicates that the current datasets may be inadequate for further progress and a new generation of dataset is greatly needed in the field.

We are presently exploring applications of this system including automatic evaluation of human robot interaction and deployment in automatic tutoring system. The problem of classification of facial expression can be solved with a high accuracy.

ACKNOWLEDGEMENT

Thanks to Prof. R. R. Keole, Asst. Prof., Department of computer science and information technology, HVPM COET, Amravati, India and P. L. Ramteke (HOD) Department of computer science and information technology HVPM COET, Amravati.

REFERENCES

[1] Proyecto Fin de Carrera "Face Recognition Algorithms", June 16, 2010 [2] Peter N. Belhumeur, " Ongoing Challenges in Face Recognition".
[2] Kyong, K. and Jung, K.," GPU Implementation of Neural Network. Pattern Recognition", vol. 37, no. 6, pp. 1311-1314. Pergamon, 2004.
[3] Ekman,"Facial action Coding System",COmsulting Psycologistic Press,CA 1998
[4] Gargesha and P Kunchi,EE 511-Artificial Neural Computing Systems, Spring 2002,Department Of Electrical Engineering,Arizon state Univer sity,Tempe,AZ 85287
[5] Yongsheng Gao, Member , IEEE , and Maylor K.H. Leung, Member , IEEE, "Face Recognition Using Line Edge Map",IEEE transactions on pattern analysis and machine intelligence, vol. 24, no. 6, june 2002
[6] Sanderson and K.K. Paliwal,"Fast feature extraction method for robust face verification C.",Elecronics Filters,5th Dec 2002.
[7] JAFFE database : h t t p : / / w w w . m i c . a t r . c o . j p / ~ m l yons/jaffe_temp.html
[8] D. J. Field, "Relations between the statistics of natural images and the response properties of cortical cells," J. Opt. Soc. Amer. A, vol. 4, no. 12,pp. 2379–2394, Dec. 1987.
[9] Seyed Medi Lajevadi,Member IEEE,"Facial Expression Recognition in Perceptual Color Space" ,IEEE transaction on IMAGE PROCESSING,Vol.21,No.8,Aug.2012.
[10] Juan Balarini,Nesmachnow,Rodriguez,"Facial recognition using Neural Networks over GPGPU",CLEI Electronic Journal, Vol 15,No.3,Paper 6,Dec 2012.
[11] NVIDIA CUDA, "http://developer.download.nvidia.com/compute/Devzone/docs/html/C/doc/CUDA_C_Programmomg_Guide.pdf", Accessed June 2012.
[12] NVIDIA, "Nvidiacomputeunifieddevicearchitecture," http://www.nvidia.com/object/cuda.html, 2008.
[13] Zhiguo Niu ,Xuehong Que, "Facial expression recognition based on weighted principal component analysis and support vector machines", Advanced Computer Theory and Engineering (ICACTE), 2010 3rd International Conference.

