International Journal of Research
Available at https://edupediapublications.org/journals
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 07
March 2018

Emotion Recognition- The Next Big Innovation

Shamna.V.H & Mr.M.P.Viswanathan
[1]PG Scholar, ME, Dept. of ECE, Hindusthan College of Engineering and Technology, Coimbatore, Tamil Nadu, Email id:- shamnavh@gmail.com
[2]Assistant Professor, Dept. of ECE, Hindusthan College of Engineering and Technology, Coimbatore, Tamil Nadu, Email id: -viswaveena@gmail.com

Abstract

Today, as we progress through each passing day the interaction, communication and connectionsbetween human and machinery have been more and more prevalent. Many types of software have been developed to take out human interventions to the extent possible and to make our life easy and convenient. An interesting thing to note here is that no level of automation or programming hasbeen successfully developed so far as a perfect solutionto understand the human sentiments or behaviors. However, the efforts in this direction are humongous. Continuous efforts are being made to make gadgets that can easily recognize signs of human beings and sentiments. Oncewe can have a mechanism to recognize human behavior in an enhanced way, there way do or experience everything now will move into a different stages of wonder.All our behavioralaspects such body language,creativity, perception, response-ability, facial expressions and emotions have huge impact in our daily life be it personal or professional.Facial expression is one of the lively investigated subjects in Human Computer Interaction (HCI). Sensation can be well-known by tone of voice, expression, text and any kind oral communication. Facial expressions play a significant role in classifying feeling of human beings. Through this assignment, actual time emotion detection from facial representation is planned where 3 steps face recognition using 1) Haar cascade, 2.Skin tone origin using Active Shape Model (ASM) and 3. MultiSVclassifierare designed to classify five main human sentiments i.e. Anger, Disgust, Joy, Neutral and Sad. This is projected to be put into practice through a machine called MATLAB. The training handpicked datasetsof emotion detection has shown a standard result at 94% accuracy which is awesome.

Keywords: -ASM,SVMs,VIOLA JONES ALGORITHM

1. INTRODUCTION

In today's world, changes happening at an unbelievable speed. With each day progressing, we can see a greater level of communication between human and machinery. Enormous and consistent efforts are being made to make softwares or machines that can easily recognize signs or behavior of human beings and sentiments. The fundamental objective is to go one step ahead from the current level of innovation to capture, analyze and form a base to understand different human behaviors, emotions and feelings. Once this is achieved with a standard level of accuracy, many things which are human dependent now will be automated in future and this will be a great change in human fields. Sentiments are powerful thoughts which are ruled by atmosphere. This play a large responsibility in our everyday duties such as judgment, knowledge, concentration, inspiration, managing, awareness, preparation, way of thinking and a lot more emotions that show the way to a large unexplored ground. Feelings can be identified by words, the way one speak and facial looks. Study on human's feeling can be sketched back from Darwin's original work and has inspired a lot of investigators to this part. There are seven necessary feelings that are common to human beings. These are being neutral, anger, hatred, fear, joy, sad, and surprise. These fundamental feeling can be known from the facial expression of a person. The investigation has suggested a useful method to identify four emotions, i.e. being neutral, joy, sad and surprise from front facial sensation. In the earlier period, various ways has been planned for emotion detection. Many calculative tables were recommended to expand method and application that can identify the facial expression easily. Computer appliance can enhance exchange a few words by shifting reaction as per the emotional situation of human being in a range of communications. Sentiment of an individual can be identified by the language used and faces looks or even one's indication of any sign language. The most important work offered in this assignment investigates the detection of expressions from face expressions.

2. TYPES OF FACE RECOGNITION STRUCTURES

1. Paul V., Michael J., 'Robust immediate Face Detection', International Journal of computer vision.

This document explains a face recognition structure that is skilled in giving out descriptions very fast whereas attaining high recognition speed There are three vital contributions. The first is the beginning of a

new picture image known as the "Essential Image" that permit the quality used by our detector to calculate very promptly. The second is an easy and well-organized classifier which is put together with the Ada Boost learning algorithm to pick a small quantity of vital image characteristic from a very large set of probable characteristic. The third input is a way for joining classifiers in a "flow" which let surroundings area of the picture to be promptly unnecessary while spending more calculation on promising face-like area.

2. Real-Time Mobile Facial Expression Recognition System -- A Case Study

Myunghoon Suk, BalakrishnanPrabhakaran

This document highlights a mobile phone application which is used for actual time facial expression detection on a smart phone platform with a camera. The planned methods utilize a set of Support Vector Machines (SVMs) for organizing 6 essential sentiments and neutral appearance besides examining mouth position. The facial expression aspect for feeling detection are taken out by Active Shape Model (ASM) fitting familiar sight on a face and then active quality are generated by the dislocation link between neutral and expression quality.

3. Real-time Facial Expression Recognition Based on Adaptive Canny Operator Edge Detection

In this document, plan a process of real-time facial expression detection on the basis of adaptive canny operator edge discovery. In this process, use primary face position based on familiarized skin color and formation replica. Then, used facial expression quality extraction way based on adaptive canny operator edge discovery and AAM (Active Appearance Model) algorithm joint, which compact the computational difficulty and better the accuracy of characteristic point position. During the usage of canny operator edge discovery, the complete picture was divided into many sub-images. According to the border gradient information of the sub-images, active entrance was created self-adaptively joint with the unique information of universal edge gradient, which enhanced the border finding outcomes. At last, least-square techniques to categorize and spot the personality information.

3. CONCEPTS

VIOLA JONES ALGORITHM

A face detection structure that is capable of handing out images very fast while achieving high recognition rates. There are mainly three main contributions.

1) "Integral Image" which is a new image specimen allows the features used by our detector to be computed very quickly.

2) An easy and well-organized classifier built using the AdaBoost learning algorithm (Freund and Schapire, 1995). It chooses a small number of significant visual features from a very large set of possible facial appearance.

3) A method for merging classifiers in a "flow" that allows setting regions of the image to be swiftly discarded while spending more calculation on talented face-like regions.

The system gives way to faces recognition performance similar to the best used earlier systems. Implemented on a conservative desktop, face detection continue at 15 frames per second. Face recognition process categorize images based on the importance of easy features. There are many inspiration for using features rather than the pixels directly. The most common reason is that the information that is not easy to learn using a limited number of teaching data.

4. PROPOSED METHODOLOGY

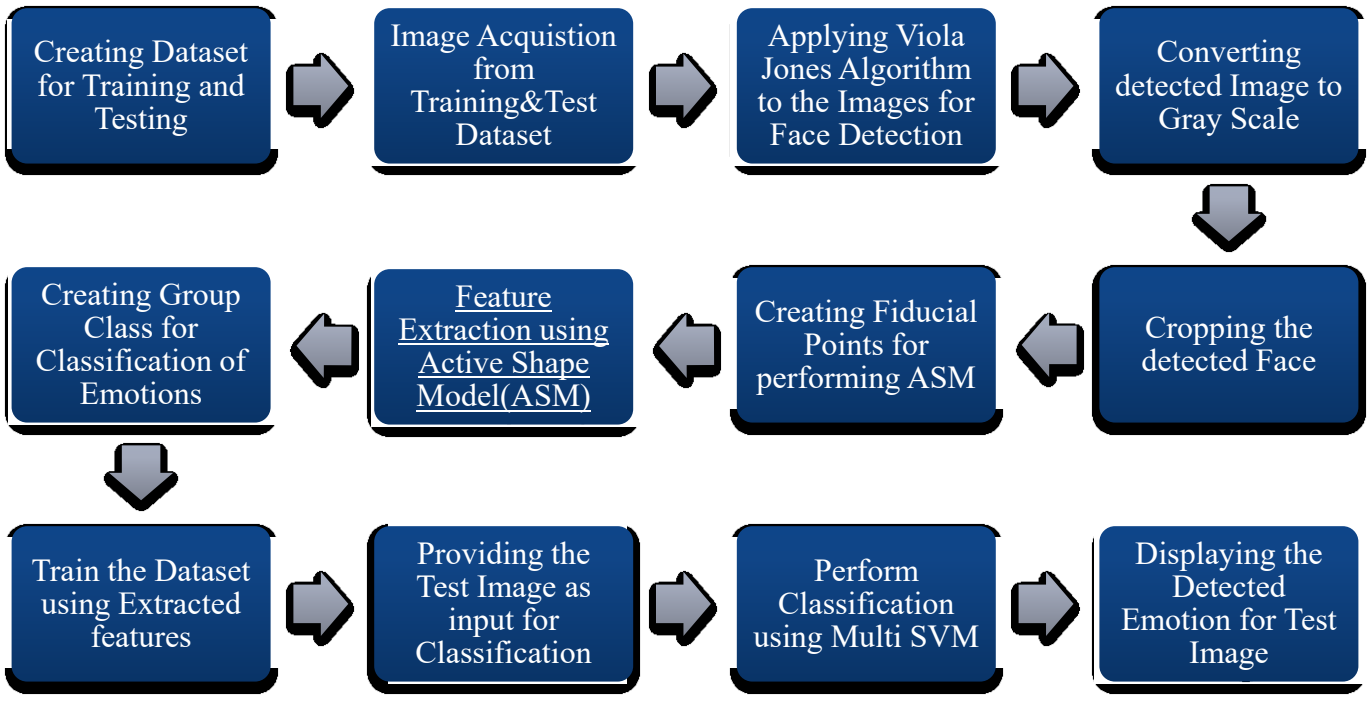

Figure1: Proposed Methodology for the Project

5. DESIGN MODELLING

Step 1

The image input in Dataset is captured first.

Step 2

For the purpose of facial image detection the Viola-Jones face detection technique is used.Viola-Jones had used a concept called Haar wavelet to detect face by developing integral image. This Haar features takes into consideration various intensity of measures of adjacent rectangular region taking it as different parts of face has different value of intensity from one to other region. For further processing after detection facial image is saved and non-face area is deleted.

Step 3

While image being preprocessed, it is cropped as upto to required size and turned into gray image.

Step 4

Geometric approach is the basis for Feature extraction for which Active Shape Model (ASM) is used in it. First, ASM automatic fiducial point location algorithm is applied to a facial expression image, later Euclidean distances from centergravity coordinate to the annotated fiducial points coordinates of face image are calculated.For the purpose of extracting the discriminate deformable geometric information, the system will extracts the feature geometric deformation difference between neutral expression of a person and the other basic expressions. Input face shape is iteratively deformed In ASM to get the shape model. Shape model feature being compared, point of input facial image is obtained.

Step 5:

Multi SVM can be made use of for classification.

6. Conclusion

Team is happy to see the outcome as expected with emotion recognition USING DATASET, based on ASM MODEL features and Multi Class SVM usingMATLAB. Good part is the overall accuracy of 94 % with average processing time of 120s on Windows platform. Beyond doubt our proposed system would be highly useful to the society and pave the way for the development of different applications where emotion recognition is involved and critical.

The Way Forward (PHASE 2)

This Project will be implemented on real time using Raspberry Pi 2 using the proposed methodology.

References

[1] Mehrabian, A. Communication without words, Psychology Today, volume 2, pp 52-55, 1968.

[2] Peng Zhao-yi, Zhu Yan-hui, Zhou Yu, Real-time Facial Expression Recognition Based on Adaptive Canny Operator Edge Detection, IEEE, Multimedia and Information Technology (MMIT), SecondInternational Conference on (Volume:2), pp 154 – 157, 2010.

[3] F. Abdat, C. MAAOUI And A. Pruski, Human-computer interaction using emotion recognition from facial expression, IEEE, Computer Modeling and Simulation (EMS), Fifth UKSim European Symposium, pp 196 – 201, 2011

[4] Michel F. Valstar, Member, IEEE, And MajaPantic, Senior Member, IEEE, Fully Automatic Recognition Of The Temporal Phases Of Facial Actions, IEEE Transactions On Systems, Man, And Cybernetics—Part B: Cybernetics, Vol. 42, pp 28 – 43, 2012

[5] Ralph Gross, Iain Matthews, Jeffrey Cohn, Takeo Kanade, and Simon Baker," Guide to the CMU Multi-PIE Face Database", The Robotics Institute, Carnegie Mellon University.

[6] Paul V., Michael J., 'Robust Real-time Face Detection', International Journal of computer vision, May 2004, Volume 57, Issue 2, pp 137-154

[7] RohitVerma and Mohamed-YahiaDabbagh, Fast facial expression recognition based on local binary patterns, IEEE, Electrical and Computer Engineering (CCECE), 2013 26th Annual IEEE Canadian Conference, pp 1 – 4, 2013.

[8] Myunghoon Suk, BalakrishnanPrabhakaran, Real-time Mobile Facial Expression Recognition System –Computer Vision and Patter Recognition Workshops (CVPRW), IEEE Conference , pp 132 – 137, 2014.- A Case Study

[9] KamleshMistry, Li Zhang, Siew Chin Neoh, Ming Jiang, AlamgirHossain, BenoîtLafon, "Intelligent Appearance and Shape based Facial Emotion Recognition for a Humanoid Robot" Software, Knowledge, Information Management andApplications (SKIMA), 2014 8th International Conference, pp 1- 8, Dhaka.

[10] Felipe Cid, Jos´e Augusto Prado, Pablo Bustos and Pedro Nunez, A Real Time and Robust Facial Expression Recognition and Imitation approach for Affective Human-Robot Interaction Using Gabor filtering, IEEE, Intelligent Robots and Systems (IROS), RSJ International Conference, pp 2188 – 2193, 2013.

Authors Profile

SHAMNA.V.H received her B-Tech. degree in Electronics and Communication Engineering. She is now doing M.E.degree in Hindusthan College of Engineering and Technology, Coimbatore, Tamil Nadu, India. Her area of interest includes Digital Image Processing and Wireless Communication. Email Id:- shamnavh@gmail.com

Mr.M.P.Viswanathan received his B.E. degree in Electrical and Electronics Engineering and the M.E. degree in Power Electronics and Drives. He has about 16 years of teaching experience and doing Ph.D. He is now Assistant Professor in the department of Electrical and Electronics Engineering, Hindusthan College of Engineering and Technology, Coimbatore, Tamil Nadu, India. His area of interest include Power Electronics and Drives, Digital Signal Processing and Digital Image Processing, Email id:-viswaveena@gmail.com