SSLED: A Novel Technique to Perform Sentimental Analysis Using Lip's Expression

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Abstract ***The field of computer science is limitless and vast; it is no more strict to traditional computations and programming. Sentimental Analysis becomes the burning issue and with the emergence of image analysis, face detection, recognition and then to perform sentimental analysis on it becomes the major challenges to achieve. We have taken one such big challenge of performing sentimental analysis on image and thus proposed a novel methodology named SSLED in which we have stored segmented images in a repository with tags that depict surprise, sadness, anger, joy, fear, disgust, contempt and then compare the input image to them and finding the pattern and thus finding sentiments of an individuals. These images were taken during a technical and innovative event. The result describes enthusiasm, energy and sentiments of people attending such events.***

Keywords: Sentimental Analysis, Face analysis, Lips Analysis, Opinions, Emotions.

I. INTRODUCTION

The major challenge to perform sentimental analysis on image varies from individual to individual. Image recognition and face detection from the image can be achieved either through edge detection over the boundaries or through pixel intensity
analysis. We used pixel intensity analysis to detect various faces of individual and hence used the lips to analyze the emotions. SSLED encourages us to compare the lips of individual with the already created repository in which we have already stored emotion wise segmented image. These segmented images include major seven types of emotions namely joy, fear, disgust, sad, anger, surprise, contempt. Figure 1 shows the different kind of lips emotion. Still it is hard to compare the pixel intensity because of the following reasons.

1. Low quality of camera which captures the image.
2. Environmental or climatic conditions.
3. Improper click to capture.
4. Smoothness of image.
5. Observer biased due to which the recipient changes its actual expression.

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In this paper we have chosen the data set consisting of 3000 images, detecting their lips and using SSLED approach to gather the results.

Fig. 1 shows various Lips Emotions.

Literature Review and Related Work

Boychuk Vasiliy and et al. [1]: The paper is about the case of football violence, the author says that the level of anger among the spectators is much higher during the match with fights as compared to the normal games. The photographs were taken from the social networking site "Instagram". For recognizing the emotions these photos were transferred as the input. The comments on the photos of the Instagram were used as initial data of the analysis of social unrest prediction. Support Vector Machines (SVM) models were used to reduce the error in training comments which were detecting the individual opinions.

P. Lalitha and et al. [2]: The paper is about the analysis of face recognition techniques which proposes a methodology for face recognition in dynamic background with the use of artificial neural networks.

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To compare the important information sequences and characteristics we make use of dynamic background. Face recognition is not a single step process it comprises of steps namely face detection, face extraction and face recognition. Face recognition helps in building a bridge between machines and humans. The 4 different approaches which are used in recognizing a face are "Principle Component Analysis," "Linear Decrement Analysis," "Eigen faces," and "Hidden Markov Method". Among all the 4 approaches Face recognition using a DCT-HMM approach has the highest accuracy of 99.5%.

Luis Antonio Beltran Prieto and et al. [3]: The paper is about the comparison of the performance of emotion-recognition implementations. The author compares the performance of emotion recognition implementations in fields which are "OpenCV," "Cognitive Services" and "Google Vision APIs". For each of the three implementations more than one thousand tests were carried out. After carrying out the research the author finds that performance of OpenCV is the best.

Poria Soujanya and et al. [4]: The extraction of sentiments from the text has made a desirable progress in the past few years. People are now gradually shifting from text to video. This leads to identify sentiments and emotions from video. The extraction of emotions and polarity from videos becomes increasingly important. It describes a novel temporal deep convolutional neural network for extracting the visual and textual features and uses multiple kernel learning to fuse heterogeneous features extracted from audio, video, and text. This paper proposes a temporal network where two images are combined to a single image. Multiple kernel language (MKL) is a selection method where features are organized into groups and then each group has its own kernel language

Mircoli Alex [5]: This paper is about Automatic Emotional Text Annotation Using Facial Expression Analysis. It describes a methodology for depicting automatic emotional text annotation from the speaker's facial expression in videos. This is a very difficult process. Annotated data is the data which is usually in short supplies and requires great efforts in terms of manual annotation.

Mehta Dhwani and et al. [6]: The paper is about the emotion recognition by faces. The author describes the brief study of various approaches and techniques used to detect the facial expression and emotion recognition. The mixed reality device that is used for observing emotion recognition in Augmented Reality (AR) is called Microsoft Holo Lens (MHL). Later it was proved that MHL gives the best accuracy in emotion recognition as compared to the webcam.

Chul Ko Byoung [7]: The article is about the emotion recognition which is based on visual information. The paper presents a brief review of FER approaches. The FER approaches can be divided into two main streams convolution FER approaches and deep-learning-based FER approaches.

Pantic Maja [8]: Machine Analysis of Facial Behaviour. This article is about the machine analysis of facial behaviour. It also describes the advances in machine analysis of facial expressions.

Guibon Gael and et al. [9]: From Emojis to Sentiment Analysis. This is article is related to the use of emojis in sentiments. It describes that at some times emojis can used for sentiment analysis. It provides a theoretical background for the exploitation of emojis for sentiment analysis. In formal text conversations emojis are not used. Emojis are mostly used in Informal textual conversations. When we use an emoji in the sentence it adds the emotion in it.

Murtaza Marryam and et al. [10]: This paper is about the survey of face recognition conducted under varying facial expressions. Different techniques have been used to handle the facial expression and facial recognition. Facial expression are used to describe the mental views of a person.

II. METHODOLOGY

1. Get the data in form of .jpg or jpeg extraction i.e. image and save it into the file.
2. Segment the image into different postures.
3. Set the repository for segmented images.
4. Segmented images includes the following:
   I. Lips posture
   II. Eyes posture
   III. Nose posture
   IV. Forehead posture
   V. Tongue posture
   VI. Cheek posture
   VII. Puppet face
   VIII. Baby bird
   IX. Buddha face
5. Get the Segmented Posture of Lips.
6. Set the value of lips posture as defined in the Repository, e.g. expanded lips shows smiling face or Joy.
7. Sharp the segmented image.
8. Compare the segmented image to Saved Image (as saved in the repository) shown by Fig 1.
9. If (matched){
10. Tag the particular sentiment to it (it includes joy, sad, anger, fear etc.)}.
11. Repeat the process for next image.

III. RESULTS

The size of data set consists of 3000 images and the result shows 73% of individual having their lips expression as "contempt". The sample of result consisting of 15 records is shown in table 1. To achieve the accuracy manual detection is used. Every input image is checked twice, firstly by manual detection and secondly using SSLED approach.

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The whole methodology is implemented using R programming.

Matching Percentage=100*Sum(length(Img1) + length(Img2))/2*length(Img2)

Img1=Input image

Img2=Comparable Image from Repository

Accuracy= SSLED/Manual=100%

Input No.	Emotion Status	Match%age	SSLED Status	Manual Status
1	Contempt	69.8	TRUE	TRUE
2	Contempt	58.04	TRUE	TRUE
3	Contempt	56.47	TRUE	TRUE
4	Contempt	61.92	TRUE	TRUE
5	Contempt	55.86	TRUE	TRUE
6	Fear	72.04	TRUE	TRUE
7	Contempt	65.82	TRUE	TRUE
8	Fear	71.35	TRUE	TRUE
9	Contempt	62.96	TRUE	TRUE
10	Fear	79.2	TRUE	TRUE
11	Contempt	57.13	TRUE	TRUE
12	Contempt	63.13	TRUE	TRUE
13	Contempt	57.73	TRUE	TRUE
14	Fear	71.35	TRUE	TRUE
15	Contempt	52.78	TRUE	TRUE

Table 1 shows the results of 15 records.

CONCLUSION

Sentimental Analysis becomes the burning issue and with the emergence of image analysis, face detection, recognition and then to perform sentimental analysis on it becomes the major challenge to achieve. We have used pixel intensity analysis over lips expression to detect the sentiments of an individual. To achieve the emotions of an individual from its lips expression a novel approach is used which is SSLED. The accuracy rate is 100% over a data set consisting of 3000 images. It is quite surprising even for us while we are achieving the results; we found that 73% of individuals show contempt emotions before attending a technical fest. There may be the reason that most of the people were non-technical that means future research question may be "how a non-technical individual shows its emotion while attending a technical event".

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