A Literature Review on Technique of Facial Variance to Detect the State of Emotion and Map Productivity

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Abstract *: The face is our primary focus of attention in social life playing an important role in conveying identity and emotions. Emotion is a mental state which involves a lot of behaviors, actions, thoughts and feelings. Emotions play fundamental role during communication, team engagement and productivity . Emotion recognition is the process of identifying human emotion, most typically from facial expressions. Different types of facial expressions are Joy, Sadness, Fear, Disgust, Surprise, and Anger. In this paper, various existing facial expression recognition techniques are studied and reviewed. This paper mainly focuses face detection for facial emotion recognition process. This Paper discusses Viola –Jones and Image Cropping techniques to extract and identify the mouth regions. The proposed segmentation techniques are applied and compared to find which method is suitable for mouth region splitting, and then mouth region can be extracted by contrast stretching and image segmentation techniques. After the mouth region extraction, the facial emotions are classified based on white pixel values in the extracted mouth region of face image. Once the emotional variance is detected mapping the total work done by an individual at the state of variance would give productivity index based on emotional variance.*

Key Words: Facial Feature, Image Enhancement, Face Emotions, Emotional Variance, Productivity, Work Done

1. INTRODUCTION

Emotion is a mental state which involves a lot of behaviors, actions, thoughts and feelings. The book, "The Expression of the Emotions in human and Animals" was written by Charles Darwin in 1969, after recognizing the universality among emotions in different groups of people despite the cultural differences. Ekman and Friesen classified six emotional expressions to be universal: happiness, sadness, disgust, surprise and fear. Facial expressions can be considered as the most natural form of displaying human emotions and as a non-verbal communication technique. Implementation of efficient automatic facial expression recognition techniques may yield lot of improvements in the area of Human Computer Interaction. Emotional expressions can occur with or without self-awareness. Presumably, individuals have conscious control of their emotional expressions however; they need not have conscious awareness of their emotional or affective state in order to express emotion. Over the last 200 years, researchers have proposed different and often competing models explaining emotion and emotional expression, going all the way back to Charles Darwin. The different types of expressions namely joy, sadness, surprise, anger, disgust and fear are given below:

- **Joy**-The emotion evoked by well-being, success, or good fortune or by the prospect of possessing what one desires: delight: the expression or exhibition of such emotion.
- **Sadness**-Sadness is an emotional pain associated with, or characterized by, feelings of disadvantage, loss, despair, grief, helplessness, disappointment and sorrow. An individual experiencing sadness may become quiet or lethargic, and withdraw themselves from others.
- **Surprise** -Surprise is defined as to cause of someone to feel in amazing feelings.
- **Anger-**Anger can occur when a person feels their personal boundaries are being or going to be violated.
- **Disgust-**Disgust is a feeling of dislike. Human may feel disgust from any taste, smell, sound or tough.
- **Surprise** -Surprise is defined as to cause of someone to feel in amazing feelings.

The above mentioned emotions make a difference I any individuals total productivity as we know that mood is the base for productivity.

2. Literature Survey

The main aim of this research work is to classify the emotional expression of the human face. As the initial task is to extract the facial image, a survey on various existing research works to segment the face expression images is reviewed and discussed.

Table 1.1 Literature Review **S.No**	**Name Of The Author**	**Method**	**Techniques**
1	**Manasa B (2016) et.al**	Face-Feature Extraction Method	Region-Based Segmentation
2	**Deepika Ishwar (2015) et.al**	Face-Feature Extraction Method (Using Eye And Mouth) Using BezierCurve	Skin-color,Region-Based Segmentation
3	**A.D.Chitra (2015) et.al**	Canny Edge Detection Method	Edge – based segmentation
4	**Xiaoming CHEN (2015) et.al**	Color-Space, Edge Detection Method	Edge – based segmentation
5	**RashmiS. Deshpande**	Gabor Filter, local feature based matching method	Filtering techniques
6	**Prasad M(Dec 2014) et.al**	Facial features, Feature extraction method	Segmentation Susan threshold edge detection
7	**Monika dubey, prof. Lokesh Singh**	Feature extraction method	Region-Based Segmentation
8	**Anuradha savadi(July 2014) et.al**	Face detection	Facerecognition techniques
9	**Shen xian-geng(2015)et.al**	Feature extraction method, Morphology operations	Erosion & Dilation
10	**Rohini patil(oct 2014)**	Feature extraction method	Emotion classification based on eye and lip using network

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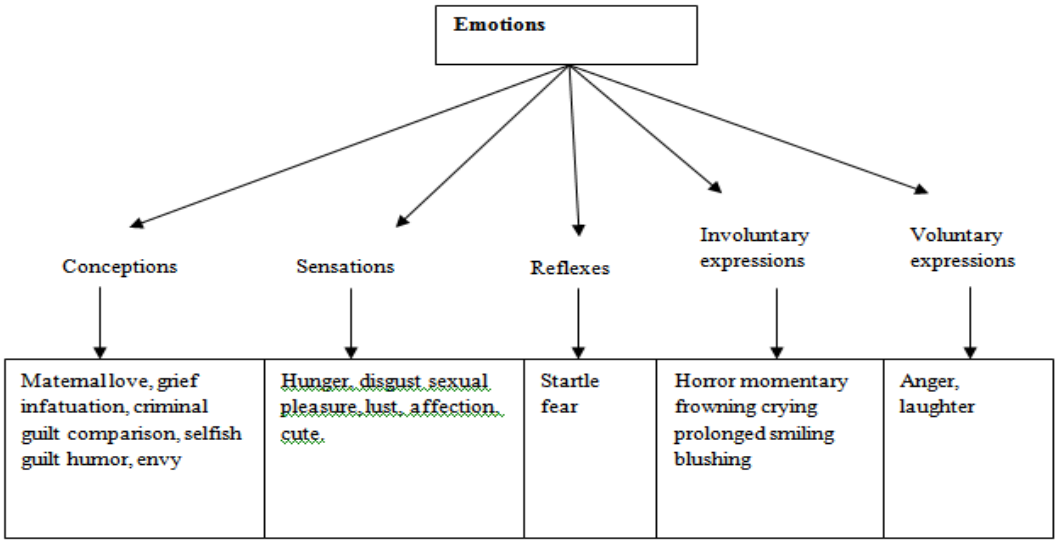
3. Facial Expression

Emotional expressions in psychology are observable verbal and nonverbal behaviors that communicate an internal emotional or affective state. Examples of emotional expression are facial movements such as smiling or scowling, or behaviors like crying or laughing. The emotions are categorized as below[1].

Figure 1.1 Emotion Basic Diagrams



The Types of Emotions are listed in Table 1.2	**Person Behaviors**
Emotions	
Conceptions	Direct your behavior
Sensations	Direct your behavior
Reflexes	Help you avoid threats
Involuntary Expressions	Direct the behavior of others
Voluntary Expressions	Direct the behavior of others

Conceptions Maternal love is a positive effect triggered by the conclusion "my child is happy". Maternal grief is a negative effect triggered by the conclusion "my child is dead".

Sensations

Pleasing taste is a positive effect triggered by the taste of food. Hunger is a negative effect triggered by the absence of food. Disgust is a negative effect triggered by the smell of toxins, such as fecal matter.

Reflexes

Reflexes are triggered by conclusions or sensory stimuli. Fear can be triggered by the conclusion "a man is pointing a loaded gun at me". Fear can also be triggered by the sight of a snake.

Involuntary Expressions

Involuntary expressions are triggered by a conception, sensation or reflex. The reflex of fear triggers the involuntary expression of horror.

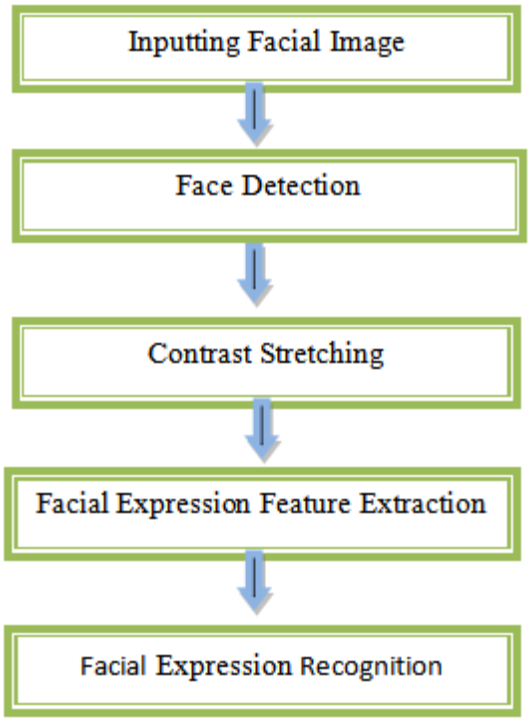
Voluntary Expressions

Voluntary expressions are triggered by habitual decision. Anger is a habitual response to feeling revenge. Laughter is a habitual response to feeling humor. These expressions seem involuntary because they are deeply ingrained habits, like walking or talking.

4. Methodology and proposed work

In this thesis, face detection and facial emotion can be recognition based on input Image. The research work is implemented in four stages; image preprocessing, segmentation and identify the emotion. Apply segmentation technique to extract facial variance. Median filter and contrast stretching are applied in the preprocessing stage. Productivity mapping is done on the specific mood the individual is at.

Figure 1.2 Flow Diagrams for Emotion Extraction and productivity mapping



5. Conclusion

The research work is focused to detect the expressions from the facial images by extracting the mouth regions. Mouth region is detected by means of Viola Jones and image cropping. Then Edge based segmentation and Morphological operations applied to extract the mouth region. By calculating the area of the mouth region and from the shape and size region the expression is detected. The facial images of different age persons are taken and the results are evaluated and work done in the state of the emotion can be mapped.

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