

## A Survey on Different Types of Techniques uses for Face Expression Recognition

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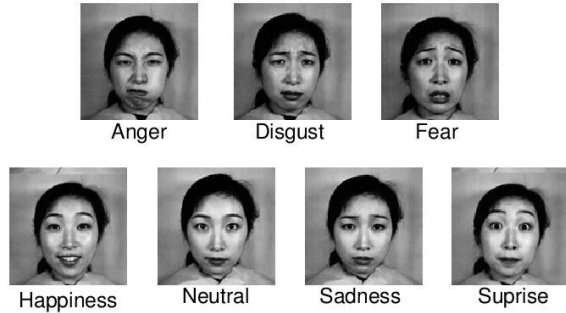
**Abstract-** Face expressions play most significant role to understand intention of others. Now a day face expression recognition has become very important and interesting topic for research. It is very important to interact human and machine. Human facial expressions varies according to age and cultures, so it is difficult to recognize human expressions. To recognize the expression of a human face first it is required to identify the distinctive facial highlights, for example, the developments of eye, nose, lips, and so forth and afterward characterize them contrasting and prepared information utilizing a reasonable classifier for expression recognition. There are many different types of techniques used to recognition of face expression. This paper present the most important technique for feature extraction and classification to recognize face expressions . Moreover, reduce the information measurement by choosing the exceptionally discriminative features. The proposed structure is fit for giving high acknowledgment exactness rate even within the sight of impediments, brightening, and commotion. These techniques have enormous contribution in face expressions recognition to improve recognition rate . The objective of this paper improve recognition rate and accuracy by

using different types of techniques. The exhibition of the proposed system is superior to existing strategies.

**Key words:** Face expressions recognition, Support vector machine ,Feature extraction ,Histogram of Oriented Gradient (HOG).

### I. INTRODUCTION

Facial expression recognition play a vital role in human being to express situations and understand the intentions of others .It is important feature to recognize human emotions. Facial expression are a predicament of feeling like emotions, thoughts and different modes. The face expressions are commonly sorted in the six basic universal expressions such as surprise, sadness, happiness, fear, disgust and anger also neutral. However, dominant expression recognition remains a challenging act. Face expression recognition has wide miscellaneous applications such as video conferencing, medical, telecommunication, automatic counseling system ,music for mood, lie detection and other latest and growing application of facial expression recognition is artificial intelligence in which robots should have the capability to read human expressions and then reply according to necessity. The objective of face expressions recognition system is built of this special human sapience in machine.FER architecture divided into three parts ,Face detection is first part ,which detect expression from an image known as preprocessing, second is features extraction and third is classification which classify basic expressions.



## II. PREPROCESSING

Preprocessing is essential part to increase the performance quality of the facial expressions recognition system and this phase effectuate before feature extraction process. Image preprocessing stage comprise apart processes such as improve image clarity , suppress unwanted features, geometric transformation, enhances facial features and expression frames to improve quality.

## III.FACE DETECTION

Face Detection is the first and important stage for face expressions recognition. It is the process of detecting and localizing faces in an image. The method of face detection in images is sophisticated cause of variability present in human faces like gesture, expressions, position, skin color, hairs present on face, disparity in camera quality condition ,gain, and image resolution.

## IV. FEATURE EXTRACTION

Feature extraction is the important stage which extract useful information from huge data of an

image.

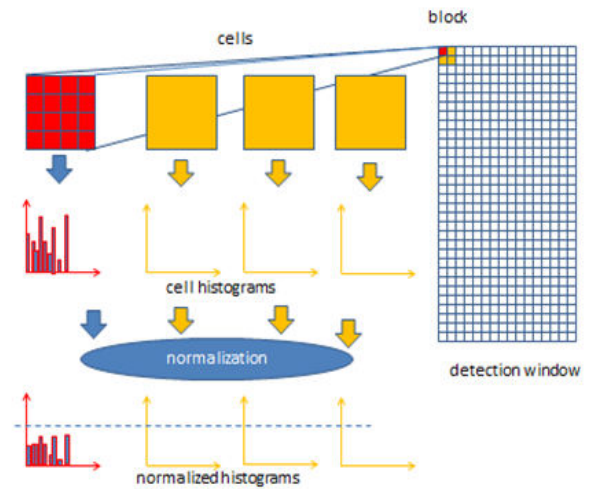


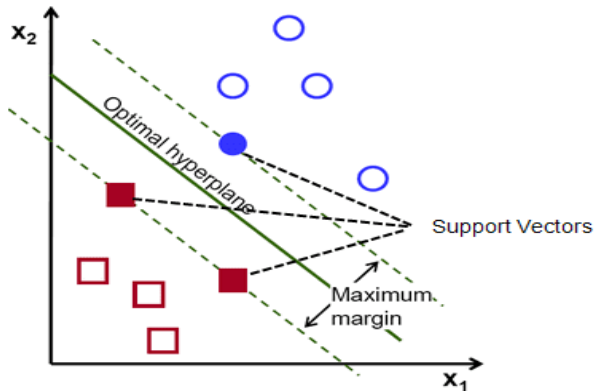
Fig 1.HOG steps [19]

The HOG technique has major advantages over other feature extracting techniques. It divide image into small cells and count the orientation of localized segments in an image. It compute a histogram of each cell and invariant to geometric and photometric transformations . These changes would only egress in abundant spatial regions. There are three fundamental feature choice methodologies: filters ,wrappers ,and implanted methods[18]. HOG use to improve image's contrast.

## V.CLASSIFICATION

Classification is final step of face expression recognition system ,the classifier categorize the face expressions .Its accuracy based on local neighbors. In this paper Support vector machine uses as a classifier and analyze data used for classification which has two types of approaches . They are one against one and one against all approaches. One against all classification implies it build one example for each category. One against one classification means build one example for each pair of categories . It utilize kernels function for its better outcome. Kernel function use for nonlinear data, it take low dimensional feature space input and give high dimensional output. Then input data in non-separable form, when data passed through kernel to convert into high dimensional it is separable and can classify.

SVM lies in supervise machine learning, used for classification and regeneration .Recognition rate and accuracy of SVM based on hyperplane (decision boundary) it means maximum margin of hyperplane have maximum accuracy and less error rate.



Two types of database is use in this paper JAFFE and RaFD. JAFFE(Japanese female facial expression) database has 213 static images and 256\*256 resolution with 7 different facial expressions by 10 japanese female model. It contain less complexity and higher recognition rate. It collect data from 10 subjects and all of them are female.

Table 1 Face expression database

Database	JAFFE	RaFD
Total Expressions	207	469
Resolution	256*256	681*1024
Subjects	10	67
Images	213	8054
Complexity	Less	High

In face expression recognition system various different challenges such as position variations ,illumination, lightning ,and image quality. These challenges create a problem to feature extractions. The differences also rise in facial features and facial expressions between civilization” like Russian and

Fig.2 SVM

## VI.DATABASE

Database is the most essential stage to develop new expression recognition and detection system, it is used for calibrating new system. The significant objective of database is to catch emotional and conversational expressions. The face expression database is divide into two classes: First is Ekman and Friesen called the six basic emotions –happy ,sad, fear, disgust ,surprise and anger ,second is face expression cover wider range of human age variations expression. Image are classified as young ,middle and older age women[5].

Europeans” and age clusters “crooked, youngsters and kids ”is the major defiance. Those system can only be used for recognition of static and dynamic images, need to improve to make suitable for real life applications .The algorithm process not involved the face detection section which need to improve early .

HOG is feature extraction method ,which having larger contribution in facial expression recognition .The SVM classifier is applied on HOG extracted features for expression detection. By implement these designed techniques on real time applications increase accuracy. Combination of HOG with other features also improve recognition rate. JAFFE database has less complexity and high accuracy .SVM classifier gives better result in accuracy and recognition.

## VII. METHODOLOGY

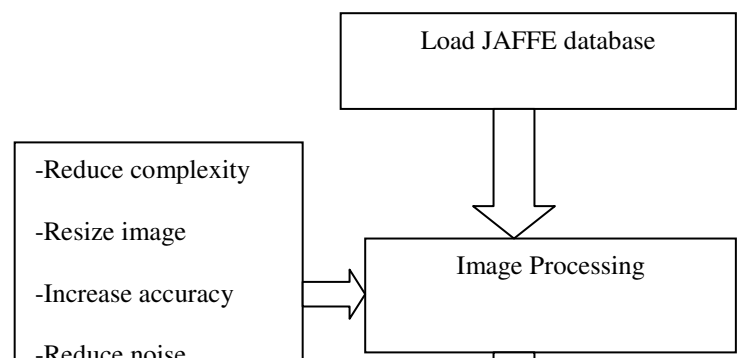


Table 2. Literature survey of Face Expressions Recognition

Serial no.	Author Name	Title	Method	Conclusion
1	Rachoori Keerthi et.al	Emotion Recognition System using Facial Expressions	-Experiment were carried out on JAFFE -LBP method is used .	This paper introduced LBP method.
2	komal D.khawale et.al	To recognize human emotions Based on facial expression recognition	-Good recognition rate with JAFFE, Cohn-Kanade and RAFD	Recognition accuracy for RAFD is almost 99.33%
3	<sup>MehangB</sup> .Patel, Dipak L.Agrawal	Facial expression recognition system	-Proposed approach having high robustness	This paper uses hybrid feature extraction technique
4	Jyoti kumari, R. Rajesh, K. M. Pooja	Facial Expression Recognition	-Experiment were carried out on JAFFE database	The accuracy rate of expressions increase.
5	kunika Verma , Ajay khunteta	FER using Gabor Filter and Multi-Layer Artificial neural network	-Viola –jones detection algorithm is used -JAFFE database	In this paper the proposed method is robust. Improve accuracy from 85.7%to high.
6	Zeng Yiming,Wujun	FER Algorithm based on LDN and SVM	-JAFFE database -Histogram Equalization	This paper introduce LDN and JAFFE
7	PriyankaN.Maraskolhe, Dr.A.S. Bhalchandra	Analysis of FER using HOG	-Histogram of oriented gradient -K-NN ,SVM	These proposed methods increasing accuracy and robustness of FER.
8	Aneta Kartali,Milos Roglic et.al	Real Time Algorithms for Facial Emotion Recognition :A Comparison of Different Approaches	Recognition rates are higher with CNN and HOG	CNN has overall superior accuracy for “sadness”
9	OlufisayoEundayo, Serestina Viriri	Facial Expression Recognition :A Review of Methods, performances and limitations .	-HOG -SVM	HOG take more time to extract features.
10	Ketki R.Kulkarni, Sahebrao B. Begal	Facial Expression Recognition	Gabor filter –SVM	This paper presents analysis of automatic FER by compensating effect of age
11	Byoung Chul Ko	A Brief review of Facial Emotion Recognition Based on Visual Information	-Using PCA -LBP	By using 2D, 3D images and video sequences human face expressions have been studied .facial expressions give better result.

## RESULT

These proposed works different types of techniques for feature extraction ,classification and different databases .These different techniques like JAFFE, RaFD and CK+ databases for face detection and LBP,PCA, gabor filter and viola-jones algorithm for feature detection. For classification of face expressions used SVM,K-NN,C-NN classifiers .C-NN classifier is complex , not exist for real time applications and embedded devices. The constraint of model based strategies is because of the way that it is hard to structure a deterministic physical model that precisely speaks to all the facial geometrical properties and muscle exercises

## VIII.CONCLUSION

This paper propone a brief review of face expression recognition and present an effective techniques for facial expression recognition is implemented. Histogram of oriented gradient (HOG) feature extraction and JAFFE, RaFD database achieve superior performance in face expression recognition. The support vector machine classifier is applied on features extracted by HOG .HOG improve recognition rate and accuracy when it is combine with other feature .The performance of face expression recognition system using histogram of oriented gradient and support vector machine is higher as compared to other techniques. In future, these techniques implement on robot face to automatic expression recognition.

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