



Analysis of Mental Illness Using Facial Expressions

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ABSTRACT: Mental illness is now a day's become very serious issue. There are a number of mental disorders are present .If that mental disorder become very critical then there must be a problem to handle that patient. This paper is mainly focusing on how to avoid mental disorder by early detecting it via facial expression. The facial expression of the image are extracted using local binary pattern and hog feature vector. Then SVM is used to classify them in different mental disorder. This paper is based on prediction. The early detection may help to cure the mental illness. Facial Expression is the first sign used to identify the patients mental condition used by most of the psychiatrist. Most of the patient doesn't speak to doctors or don't want to share anything with others at that time this research will be useful.

KEYWORDS: Local Binary Pattern, Hog feature vector, SVM

I. INTRODUCTION

Analysis of mental illness using facial expression is useful for early detection of mental disorder by looking at their facial expression. there are a number of types of mental disorders.

[1]This research include some mental disorder and these are:-

1)Anxiety disorders: The patients have fear in mind about something. The heart bits are increasing compared to normal person. Sweating is another symptom in these patients. They cannot control the response.

2)Mood disorders: In this disorder patient become sad,or extreme happy and extreme sad.

a)Depression:-Main cause of depression is stress fall into mood disorder.

b)Bipolar Disorder:-Change in mood causes bipolar order so it is also one of the type of mood disorder.

3)Psychotic disorders: Caused by lack of contact with reality or delusion, hallucination so it is called as psychotic disorder.

1)Schizophrenia:-thought, emotions, behaviour is changes all the time in patitents and they precept which is not in reality.so this disorder is called psychotic disorder.

Out of all these mental disorder this research focuses mainly on Anxiety disorder, mania or bipolar disorder, schizophrenia, depression .Some images are used to detect which kind of mental illness ,it may have or may be caused in the near future by looking their facial expressions.The early detection can help to solve future problems.

II. RELATED WORK

In [1] Author describes briefly the mental disorder and its types .He also mentioned the symptoms of each and every disease. In [2] this paper ,I have evaluated Local Binary Patterns by some important parts of a human face, for a person independent as well as the person dependent facial expression recognition. Extensive experiments on JAFFE database are conducted. In [3] the author is used local binary pattern with a boosted LBP feature for feature extraction and SVM is used to classify the image in correct category. In [4] author encode textual information about image pattern to give more accurate result than conventional LBP features.In [5] author discriminant kernel locally linear embedding (DKLLE), is used for facial expression recognition. In [6] author explains feature extaction techniques for face recognition.In [7] author uses HGPP for detection of object accurately.In [8]author uses textual feature extraction from Local facial region for facial expression recognition..In[9] author first use LBP & then Linear programming to



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categorize the emotions. In [10] author uses a sequence of frames as input & classify them using SVM to detect facial expressions. In [11] author uses Gabor filter & Gabor coding for expression recognition. In [12] author uses FACS to detect facial expression automatically.

III. PROPOSED ALGORITHM

A. DESIGN CONSIDERATIONS:

- Input image from folder.
- RGB to gray conversion
- Multi color channel separation
- Image enhancement using histogram equalization, adaptive histogram equalization
- Feature extraction using HOG, Local Binary Pattern, Shape based
- Classification using SVM
- Output.

B. DESCRIPTION OF THE PROPOSED ALGORITHM:

The aim of the proposed algorithm is to analyze mental illness using facial expression that could help for early detection of mental condition of the patient.

Step 1: Input image from folder:-You can take image from the folder. The image is converted into gray level. & Red, Green, Blue colors is separated from the image. The image is enhanced using histogram equalization and adaptive histogram equalization.

Step 2: Feature Extraction

1) **[5] Local Binary Pattern:** -It is used to extract features and texture based classification of images. The whole image is divided into number of pixels. In LBP we compare all the pixels with its neighbors in clockwise direction. If the center value is greater than its neighbors pixel value, then we put the value 0 otherwise 1. After that this gives 8 digit binary number. Which then can be converted into the decimal number. The image obtained by computing the histogram Gabor filter is used to extract features.

2) **HOG:** -the histogram of oriented gradients descriptor is used to normalize the intensity. It decomposes the image into blocks. It is also used to detect the object. when combining with L.B.P it gives more accurate results. Shape based feature extraction is used to extract the features

3) **Classification Using SVM:**-Support Vector Machine is used to classify the images by using supervised learning. svmtrain function is used to classify them. Classification is done through multisvm. Classes are predefined and all the images are categorized in proper classes.

IV. PSEUDO CODE

```
%%%LOCAL BINARY PATTERN%%%  
% Preallocate/instantiate array for the local binary pattern.  
  
localBinaryPatternImage = zeros(size(enh));  
for row = 2 : rows - 1  
    for col = 2 : columns - 1  
        centerPixel = enh(row, col);  
        pixel7=enh(row-1, col-1) > centerPixel;  
        pixel6=enh(row-1, col) > centerPixel;  
        pixel5=enh(row-1, col+1) > centerPixel;  
        pixel4=enh(row, col+1) > centerPixel;  
        pixel3=enh(row+1, col+1) > centerPixel;  
        pixel2=enh(row+1, col) > centerPixel;  
        pixel1=enh(row+1, col-1) > centerPixel;  
        pixel0=enh(row, col-1) > centerPixel;
```

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```
localBinaryPatternImage(row, col) = uint8(...  
    pixel7 * 2^7 + pixel6 * 2^6 + ...  
    pixel5 * 2^5 + pixel4 * 2^4 + ...  
    pixel3 * 2^3 + pixel2 * 2^2 + ...  
    pixel1 * 2 + pixel0 * 1);  
end  
end  
figure,imshow(localBinaryPatternImage, []);  
title('Local Binary Pattern');
```

IV. EXPERIMENT RESULT

Input image from dataset & by applying proposed algorithm we can get which kind of mental disorder the patient has can be predicted by looking its facial expression from image. For this research only 4 disorders are tested like anxiety, depression, bipolar disorder, schizophrenia. For experiment Local Binary Pattern & HOG feature vector is used in feature extraction and SVM is used for classification purpose.

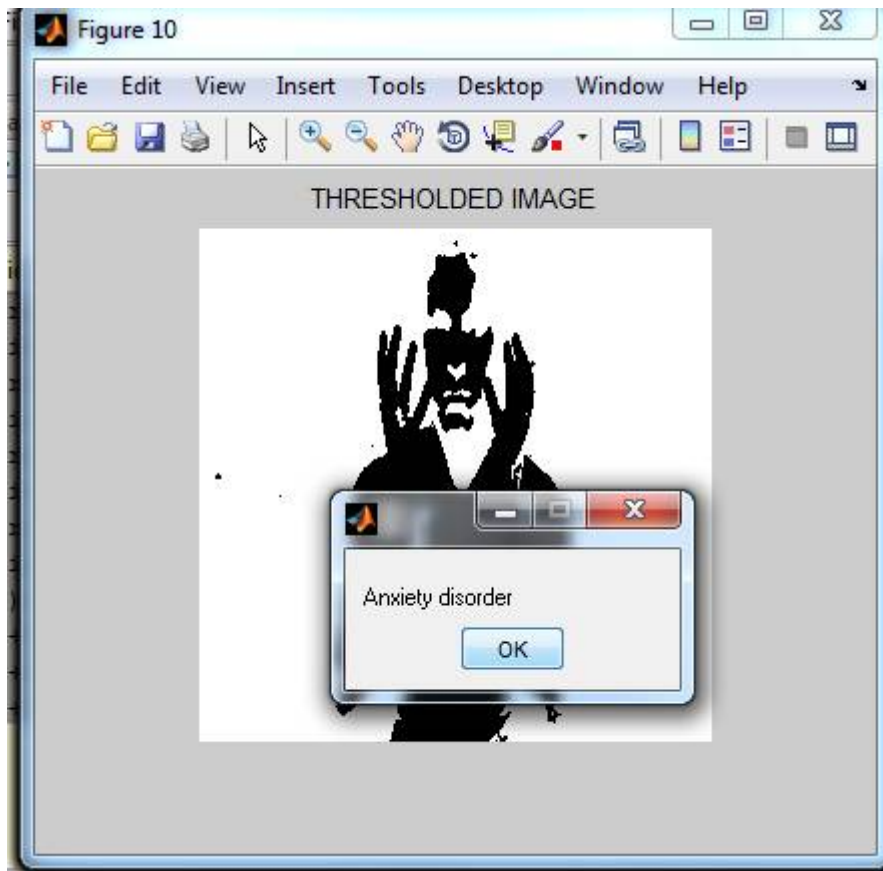


Fig.Result of image taken from dataset(i.e Anxiety mental disorder)



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VI. CONCLUSION AND FUTURE WORK

From this research we can conclude that early detection can solve the measure mental disorder problem. but from this research we can not give guarantee that this facial expression taken from images categorize correct result but this technique could helpful to detect disease in preventive conditions as well as recognizing disorder from image facial expression. In future work speech and real time video if added then it will give more accurate result for the same purpose

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BIOGRAPHY



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