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Depression Detection using Machine Learning and Deep Learning

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Abstract: In natural psychological equilibrium, tension may be generally perceived as disturbance. If a person is unable to reconcile the expectations imposed on him/her with his/her capacity to deal to them, so it generates tension and produces burden on mental health. There are many two types of difficulties. Depression may be generally described as psycho-logical equilibrium disruption. One of major research fields of biomedical engineering is Depression detection, as proper Depression prevention could be easy. Several bio signals (i.e. Mri, Rgb, oxygenation, Frs etc.) are available. Which are useful in identifying levels of Depression since these signals indicate distinctive changes in the induction of Depression. In this project, because of the easily accessible recording, we use ECG as the primary candidate. By modifying the function number and kernel type, multipleSVM model types have been checked.

Keywords: CNN, Feature Extraction, Depression Detection, Face Recognition.

I. INTRODUCTION

Depression and anxiety disorders are highly prevalent worldwide. Attention to the adverse effects of depression on patient health, as well as its associated economic burden has been warranted. To support objective depression assessment, the affective computing community engaged signal processing, computer vision and machine learning approaches for analyzing verbal and non-verbal behavior of depressed patients and made predictions about what patterns should be indicative of depressed state. These studies have analyzed the relationship between objective measures of voice, speech, non-verbal behavior and clinical subjective ratings of severity of depression for the purpose of automatic depression assessment. Despite majoradvances have been achieved in recent years, there are still several open research directions to be solved in the study of depression: Audio and video features from individual only concern the paralinguistic information, such as speaking rate, facial action units (AUs), etc, rather than the linguistic information from the speaking con- tent, which can reflect the sleep status, emotional status, feeling and other life status of the individual. It is important to explore more effective audio, visual, linguistic and other multi-modal features, and design multi-modal fusion framework for depression recognition.

II. PROBLEM STATEMENT

Automatic detection of depression has attracted increasing attention from researchers in psychology, computer science, linguistics, and related disciplines. As a result, promising depression detection systems have been reported. In this proposed work these efforts by presenting the first cross modal review of depression detection systems and discusses best practices and most promising approaches to this task.

Depression was before detected with the ECG, blood report, svm. whether there is any disease. But now we are checking by recognizing the full face of the person. So we predict whether the person is depressed or not. Day to day, if the person is happy in it, then it shows how happy it is and how long it will take to predict the show. It has been done before but it has been done by checking the person's ECG, blood report, whether there is any disease. But now we are Detecting depression using facial emotions.

III. LITERATURE SURVEY

Artificial intelligence approaches, such as machine learning, have been used in several studies on the early classification of depression. Akshada Mulay, Anagha Dhekne, Rasi Wani and Shivani Kadam they implemented Automatic depression level detection through visual input in that they took visual input to predict the depression. Amna Amanat , Muhammad Rizwan , Abdul Rehman Javed , Maha Abdelhaq , Raed Alsaqour , Sharnil Pandya and Mueen Uddin in their proposed system they detected depression using textual data. . Wonkoblap.A in proposed a deep neural network method to analyze depression in social media. They used the Twitter dataset for analysis. Ibitoye A.O in [25] examined

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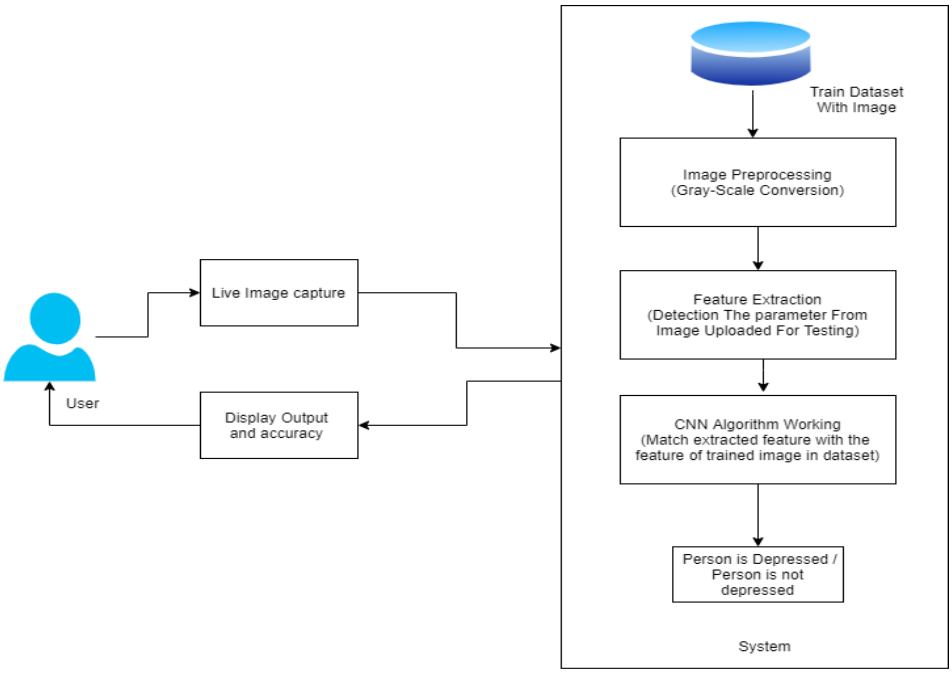
two studies that employed the predictive ability of supervised machine-learning classifiers to analyze the interaction of emotions. They classified depression-related posts on social media using classification methods.

IV. EXISTING SYSTEM

Depression is a risk indicator of Dementia. People suffering from Dementia tend to notice a decline in their cognitive abilities such as thinking and remembering. According to the World Health Organization (WHO), depression affects more than 300 million individuals across the world. Depression can badly affect personal well-being, family affairs, and workplace educational institutions, and lead to personal injuries. Depression is one of the major causes of mental disorder, or incapability. Early recognition and treatment of depressive symptoms can significantly improve the chances of controlling the diseaseof depression and minimize the negative impact of depression on the well-being, health and the social–economic life of a person. Identification of depressed and non-depressed individuals from online social media is a very crucial task. Social media information, communication, and posts describe the user's sentimental condition. However, their sentimental status will be vigorous and can lead to uncertain detection of depression. The most prevalent procedures employed at present are clinical interviews and questionnaire surveys conducted by hospitals or agencies, where psychiatric assessment tables are used to establish mental disorder prognosis.

V. SYSTEM ARCHITECTURE



In above diagram user will upload the image and future that image will be processed using image preprocessing in that the uploaded image will be converted into gray scale image and it is enhanced. After that the image is sent for feature extraction in this step the particular part which we need is extracted from the uploaded image. For example in our project we extracted the structure of eyes, eyebrows and lips.

Further the CNN algorithm is applied on extracted image. In this algorithm there are three steps

1. Convolutional layer
2. Pooling layer
3. Fully connected layer

The first layer is used to extract the various features from the input images. In this layer, the mathematical operation of convolution is performed between the input image and a filter of a particular size 48 x 48.

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The second layer is used to apply pooling operation on the image. The pooling operation consists in reducing the size of the images while preserving their important characteristics**.** The pooling layer reduces the number of parameters and calculations in the network**.** This improves the efficiency of the network and avoids over-learning. The next layer is fully connected (FC) layer. The fully-connected layer is always the last layer of a neural network, convolutional or not so it is not characteristic of a CNN. This type of layer receives an input vector and produces a new output vector. To do this, it applies a linear combination and then possibly an activation function to the input values received.

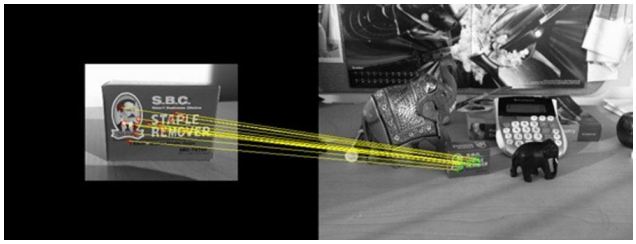
VI. METHODOLOGY

Image Preprocessing:

Image Preprocessing (IP) is a computer technology applied to images that helps us process, analyze and extract useful information from them. Image pre-processing is the term for operations on images at the lowest level of abstraction. These operations do not increase image information content but they decrease it if entropy is an information measure. The aim of pre-processing is an improvement of the image data that suppresses undesired distortions or enhances some image features relevant for further processing and analysis task.

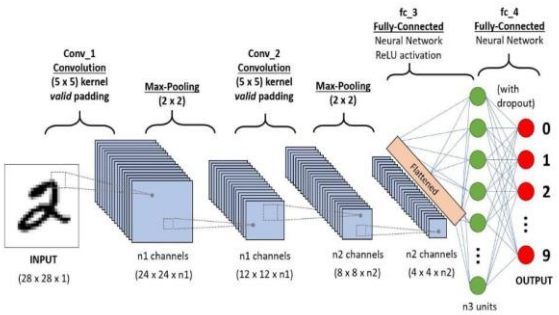
Feature Extraction:

Feature extraction refers to the process of transforming raw data into numerical features that can be processed while preserving the information in the original data set. It yields better results than applying machine learning directly to the raw data. Feature extraction for image data represents the interesting parts of an image as a compact feature vector. In the past, this was accomplished with specialized feature detection, feature extraction, and feature matching algorithms.



CNN Algorithm:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.



A CNN sequence to classify handwritten digits

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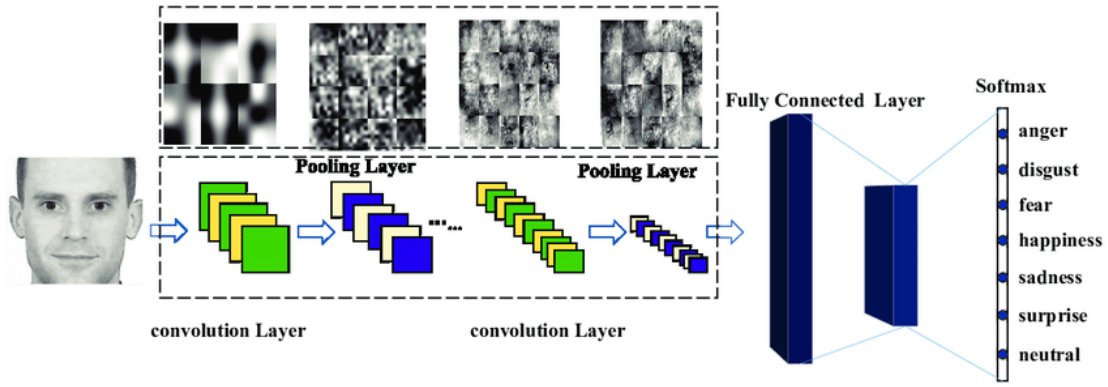
Layers in a Convolutional Neural Network

A convolution neural network has multiple hidden layers that help in extracting information from an image. The three important layers in CNN are:

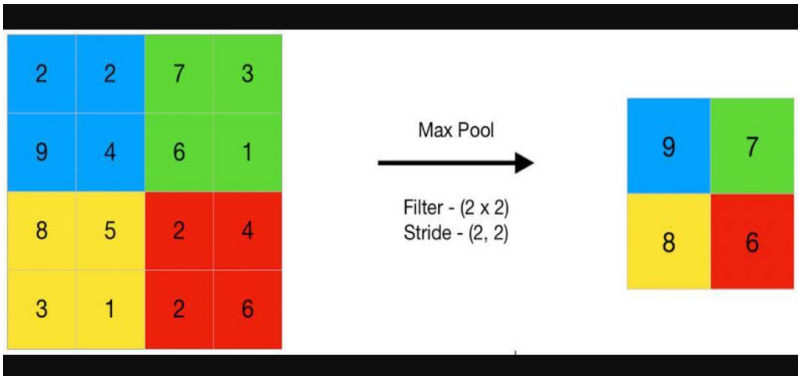
1.Convolution layer

This layer is the first layer that is used to extract the various features from the input images. In this layer, the mathematical operation of convolution is performed between the input image and a filter of a particular size MxM.



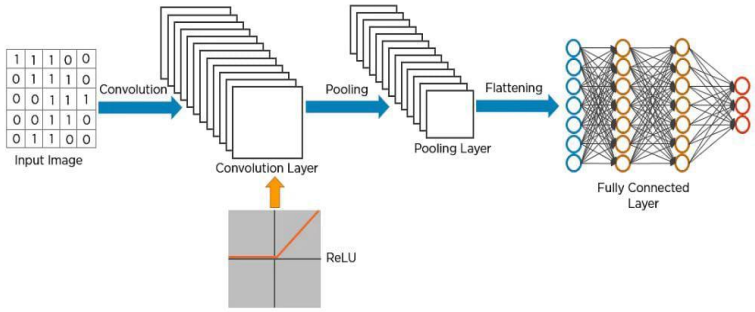
2. Pooling Layer

Pooling is a down-sampling operation that reduces the dimensionality of the feature map. The rectified feature map now goes through a pooling layer to generate a pooled feature map.



3. Fully Connected (FC) layer

This consists of the weights and biases along with the neurons and is used to connect the neurons between two different layers. These layers are usually placed before the output layer and form the last few layers of a CNN Architecture.
In this, the input image from the previous layers are flattened and fed to the FC layer



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VII. CONCLUSION

In previous system they have diagnosed and detect the depression using ECG signals for that they need to go to hospital to detect depression. But in proposed system we captured live image and detected the depression. We implemented various algorithms like CNN, Feature extraction, Image Pre-processing. By using these algorithms we detected depression of a person using image capturing. And we got maximum accuracy using CNN algorithm which lies under deep learning. The real aim of this project is to develop an application in which various kind of psychological aspects are diagnosed and cured.

REFERENCES

[1]. Mulay, A., Dhekne, A., Wani, R., Kadam, S., Deshpande, P., & Deshpande, P. (2020). Automatic Depression Level Detection Through Visual Input. 2020

[2]. Amna Amanat 1 , Muhammad Rizwan 1,*, Abdul Rehman Javed 2 , Maha Abdelhaq 3 , Raed Alsaqour 4,*,Sharnil Pandya 5 and Mueen Uddin 6 "Deep Learning for Depression Detection from Textual Data"

[3]. Dong, Y.; Yang, X. A hierarchical depression detection model based on vocal and emotional cues. Neurocomputing 2021, 441, 279–290.

[4]. Uddin, M.Z.; Dysthe, K.K.; Følstad, A.; Brandtzaeg, P.B. Deep learning for prediction of depressive symptoms in a large textual dataset. Neural Comput. Appl. 2022, 34, 721–744. [CrossRef].

[5]. Ibitoye, A.O.; Famutimi, R.F.; Olanloye, D.O.; Akioyamen, E. User Centric Social Opinion and Clinical Behavioural Model for Depression Detection. Int. J. Intell. Inf. Syst. 2021, 10, 69.

[6]. H. Davies et al., "Facial expression to emotional stimuli in non-psychotic disorders: A systematic review and meta-analysis," Neurosci. Biobehav. Rev., vol. 64, pp. 252–271, May 2016.

[7]. M. Kaletsch et al., "Major depressive disorder alters perception of emotional body movements," Front. Psychiatry, vol. 5, p. 4, Jan. 2014.

[8]. Wongkoblap, A.; Vadillo, M.; Curcin, V. Depression Detection of Twitter Posters using Deep Learning with Anaphora Resolution: Algorithm Development and Validation. JMIR Ment. Health 2021.