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Artificial Intelligence Based Mental Health System Prediction

Sanjana Gavhane[1], Siddhi Pawar[2], Sameer Mulla[3], Rahul Gupta[4], Shalini Wankhade*(GUIDE)

[1] *B.E, Computer Engineering, Sinhgad Academy of Engineering ,Maharashtra, Pune*
[2] *B.E, Computer Engineering, Sinhgad Academy of Engineering, Maharashtra, Pune*
[3] *B.E, Computer Engineering, Sinhgad Academy of Engineering, Maharashtra, Pune*
[4] *B.E, Computer Engineering, Sinhgad Academy of Engineering, Maharashtra, Pune*

Abstract

Depression is the most prevalent mood disorder worldwide having a significant impact on well-being and functionality, and important personal, family and societal effects. The early and accurate detection of signs related to depression could have many benefits for both clinicians and affected individuals. The current work pointed toward creating and clinically testing a system ready to distinguish visual indications of melancholy and backing clinician choices. Programmed misery appraisal dependent on viewable signs is a quickly developing examination space. The present comprehensive audit of existing methodologies as detailed in more than sixty distributions during the most recent ten years centers around picture handling and AI calculations. Visual indications of misery, different techniques utilized for information assortment, and existing datasets are summed up. The survey diagrams techniques and calculations for visual element extraction, dimensionality decrease, choice strategies for arrangement and relapse draws near, just as various combination procedures. A quantitative meta-investigation of announced outcomes, depending on execution measurements hearty to risk, is incorporated, recognizing general patterns and key irritating issues to be considered in ongoing investigations of programmed sadness appraisal using viewable signs alone or in mix with obvious signals. The proposed work additionally completed to anticipate the downturn level as indicated by current contribution of face pictures utilizing profound learning

KeyWords:*Convolutional Neural Network, Deep Learning, Dataset, Depression*

1.INTRODUCTION

People who are discouraged are absolutely uninformed about their upset state of mind. They can't distinguish the reason for steady despondency in them and in the long run such understudies fall into a perspective where they begin having self-destructive propensities. In some cases students do know that they are suffering from depression, but they are hesitant to seek any kind of help from anyone mainly due to the wrongly conceived notion of 'humiliation' associated with depression. It is smarter to distinguish the indications of misery at introductory phases of sadness. Misery whenever recognized in the underlying stages, a straightforward one hour talk with a guide might be of gigantic assistance for the understudy. This may absolutely change the negative perspective of that understudy into a positive one. Such an understudy can be given great directing of how to manage mental pressure and can be directed to follow the correct way to progress. The main type of non-verbal interchanges is looks of an individual. Many investigations have been done for discovering the looks that are connected with misery. The current work is chiefly attempted to discover the presence of misery in understudies by concentrating on their facial elements. This framework primarily involves distinctive picture handling methods for face identification, highlight extraction and characterization of these elements as discouraged or non-discouraged. The system will be trained with features of depression. Then videos of different students with frontal face will be captured using a web camera. Then the facial features of these faces will be extracted for prediction of depression. Based on the level of depression features the student will be classified as depressed or non-depressed.

- Facial mood detection according to time series image inputs
- Predict mood level based on score or weight with class label.
- Successfully implement the test model based on training set as supervised learning approach.
- Execute the proposed system maximum accuracy.

2. LITERATURE SURVEY

Many investigations have been conducted to distinguish the exact looks that are connected with melancholy. A review has been led for discovering Action Units (AU) connected with various feelings showed by discouraged patients [1]. The presence of AU12 which is related with feeling grin was low in exceptionally discouraged patients. The presence of AU14 connected with feeling scorn and AU10 connected

with feeling disdain was additionally present alongside AU12. The video information for this review was gathered through clinical meetings of discouraged patients just as non-discouraged patients. The outcomes showed that AU14 connected with feeling hatred demonstrated generally exact for wretchedness location

Highlights connected with eye development to comprehend the eye action of the discouraged and elements connected with head present development to comprehend the head development conduct of the discouraged has been done in [2]. The grouping of the elements connected with eye movement showed higher importance in recognizing serious gloom. Discovery of discouragement from facial highlights should be possible by estimating 'Multi-Scale Entropy' (MSE) on the patient meeting video. [4] MSE assists with discovering the varieties that happen across a solitary pixel in the video. The entropy levels of profoundly expressive, non-discouraged patients were high. The entropy level was low for discouraged patients who were less expressive of their feelings.

Another review introduced a method which utilizes investigation of facial calculation alongside examination of discourse for gloom location [3]. This work says that the articulations related with misery are viewed as in lower frequencies in more modest span recordings. Consequently longer time recordings should be caught for successful sorrow discovery. Datasets are additionally made by catching recordings of patients while noting clinical meetings. Interviews recorded were for both for discouraged patients just as non-discouraged patients. Recordings are likewise recorded from the analysis of misery till the patient has improved. [1][4]. Studies showed that there is a huge connection between facial highlights and vocal conduct of the discouraged [5].

In specific investigations, patients were given wearable devises to screen their actual wellbeing, passionate conduct and social communication for recognizing sadness [6]. A few analysts have gathered datasets by showing people film-strips to catch the looks of subjects watching them. Information is likewise gathered by giving an undertaking of perceiving negative and positive feelings from various facial pictures [7]. Rather than dissecting a video for sorrow recognition outline by outline, better outcomes have been got for discovery of misery when the video is considered overall. [8] For this the patient's face district is first instated physically. Then, at that point, KLT (KanadeTomasi-Lucas) tracker is utilized to follow the face all through the video. The KLT tracker extricates ebb and flow data from a picture, for example for a miserable articulation the sides of the mouth would be calculated down. Video based methodology showed more precision as it sums up the face locale all the more precisely thus the moment developments inside the face area are likewise considered for discouragement location.

The understudies experiencing sorrow would show less mindfulness in homerooms. Assuming the understudies' feelings are planned to the exercises done in homeroom, their enthusiastic state can be seen if they are discouraged or not, and in light of this the educator can help the understudy by focusing harder on that specific understudy. [11] If various appearances in a similar scene show a similar positive or negative opinion, it would assist with understanding the entire circumstance of the scene, regardless of whether subjects in the scene are cheerful or whether something wrong is occurring in the scene [12].

3. PROBLEM STATEMENT

The proposed research to design and implement a system for depression level prediction using deep learning, the visual features has extracted from users face and predicts the scale of depression.

4. PROPOSED SYSTEM

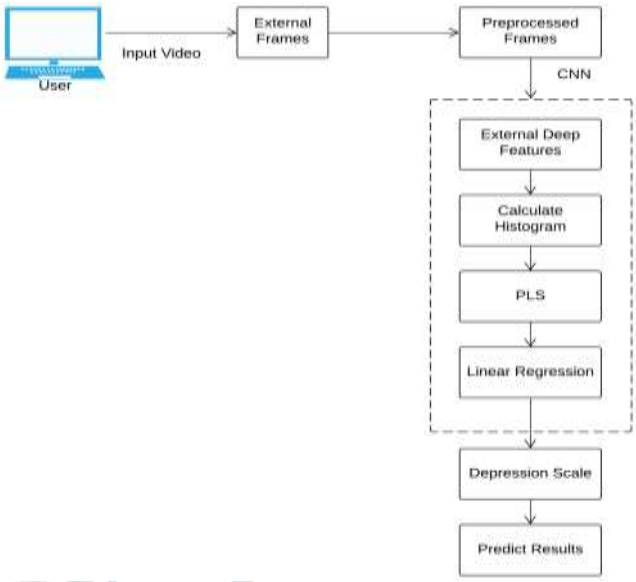


Fig: - System Architecture

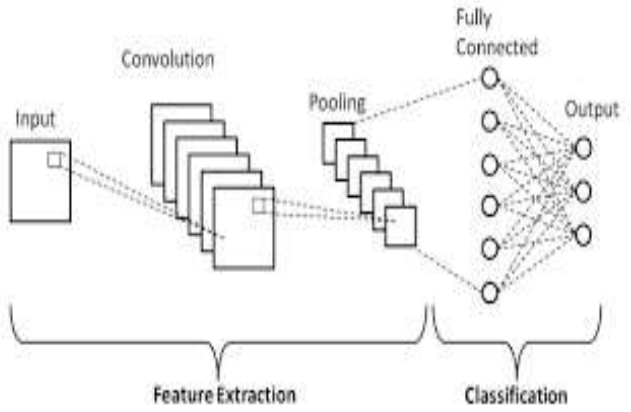
The proposed system is bulid in python using techniques of CNN ,The system will be able to predict the mental stress of the people.Following is the methodology used in proposed system

- The image data were collected from kaggle.
- The collected dataset is divided into 2 parts. i.e :- 80% for training and 20% for testing

Various Techniques like preprocessing, feature extraction are applied Convolutional Neural Techniques used for classification and Web application is developed using php and bootstrap for frontend and Python for backend. The user captured image is passed and captured images feature are extracted. Extracted Features will be matched with the trained model, depending on nearby match the predicted output is been obtained

Algorithm Used CNN

- CNNs are used for image classification and recognition because of its high accuracy.
- The CNN follows a hierarchical model which works on building a network, like a funnel, and finally gives out a fully-connected layer where all the neurons are connected to each other and the output is processed.
- Hence we are using Convolutional Neural Network for proposed system



A CNN is made up of four parts.

- Convolution
- Non-Linearity (ReLU)
- Pooling or Sub Sampling
- Fully Connected Layer

Convolution

Is the multiplication of elements one by one. The principle is simple to grasp. The computer scans a section of the image with a dimension of 33 and multiplies it to create a filter. A feature map is the result of the element-wise multiplication. This process is repeated until the entire image has been scanned. It's worth noting that the image size is lowered after convolution.

Non-Linearity (ReLU)

The output is subjected to an activation function at the end of the convolution operation to allow for non-linearity. The Relu is the most used activation function for convnet. All pixels with a negative value will be replaced with a value of zero.

Pooling Layer

The goal of pooling is to minimize the input image's dimensionality. The procedures are taken to lower the operation's computing complexity. The network has fewer weights to compute as a result of reducing dimensionality, which minimizes overfitting. You must define the size and stride at this point. The maximum value of the feature map is a common approach to pool the input image. Take a look at the image below. The "pooling" function will screen a four-submatrix of the 44-feature map and return the highest value. The pooling algorithm takes the greatest value of a 22 array and moves it two pixels.

Fully Connected Layer

As in the previous course, the final stage is to construct a typical artificial neural network. All neurons from the previous layer are connected to the following layer. To classify the number on the input image, you utilize a softmax activation function.

5. EXPERIMENTAL RESULTS

The below figure are the obtained results for face detection and input speech, where a speech is passed as an input and system extracts each word from the speech, eg : HELLO is an input speech , its extracted in alphabets such as “H”, “E”, “L”, “L”, “O”.

Fig 5.1:- Speech Recognition

Fig 5.2:- Face Detection

6. CONCLUSION

This system plays a communicative role in interpersonal relations and helps in precisely predicting the mental health of a person.

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