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Depression Prediction Using Emotion and Speech Analysis to Prevent Suicide

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ABSTRACT: Suicide might be considered as one of the most serious social health problems in the modern society. Suicidal ideation or suicidal thoughts are people's thoughts of committing suicide. It can be regarded as a risk indicator of suicide. India is among the top countries among in the world to have annual suicide rate. Social networks have been developed as a first rate factor for its users to communicate with their interested buddies and proportion their captions, photose, and videos reflecting their moods, emotions and sentiments. To increase and put in force a version which takes a facial expression images as an enter and symptoms. On the basis of that it predicts the repute of that patient whether or not he/she has been detected or now not detected for depressed. We can train version using photographs & will use it for prediction. Image captioning can be accomplished after prediction for higher visualization of report. We will also use text mining (NLP) technique to predict melancholy the usage of signs furnished with the aid of person.
At final we are able to make final choice primarily based on above two techniques. To generate detailed dashboard of user disease status and to design webapp for above system. We will use CNN algorithm for speed up detection of depressed character instances and approach to become aware of high quality answers of mental health troubles. We suggest system learning method as an efficient and scalable technique. We document an implementation of the proposed method. We've evaluated the efficiency of our proposed technique the usage of a set of various psycholinguistic features. We show that our proposed method can extensively improve the accuracy and category blunders price.

KEYWORDS: Suicide rate, Emotions, Convolutional Neural Network.

I. INTRODUCTION

Suicide is an important issue in the Indian context. More than one lakh (one hundred thousand) lives are lost every year to suicide in our country. In the last two decades, the suicide rate has increased from 7.9 to 10.3 per 100,000. There is a wide variation in the suicide rates within the country. The southern states of Kerala, Karnataka, Andhra Pradesh and Tamil Nadu have a suicide rate of > 15 while in the Northern States of Punjab, Uttar Pradesh, Bihar and Jammu and Kashmir, the suicide rate is < 3.

This variable pattern has been stable for the last twenty years. Higher literacy, a better reporting system, lower external aggression, higher socioeconomic status and higher expectations are the possible explanations for the higher suicide rates in the southern states.In 2016 the number of suicides in India had increased to 230,314. Suicide was the most common cause of death in both the age groups of 15-29 years and 15-39 years. About 800,000 people die by suicide worldwide every year, of these 135,000 (17%) are residents of India, a nation with 17.5% of world population.

II. RELATED WORK

India's suicide rate stood at 16.5 suicides per 100,000 people in 2016, according to the WHO report. This was higher than the global suicide rate of 10.5.

The objective of this project is to design a system which involves extraction of facial features, and detection of stress using emotions expressed through face using the Convolutional Neural Network (CNN) algorithm.

This system is basically used to classify positive and negative emotions and detects the stress based on usual threshold value. This system detects the emotions and helps to prevent rate of suicide.In this project, Face is captured using the camera. This detected face is processed and the emotions are classified as either positive or negative

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emotions. The detected image is processed to identify the face of the subject using Convolutional Neural Network (CNN) algorithm.

Literature Survey-

Sr. No.	Paper	Author	Method
1	Emotion recognition and drowsiness detection using python	Anmol uppal , shweta tyagi , rishi kumar , seema sharma	K-nearest-neighbor (KNN)
2	Automatic facial expression recognition system.	Balasubramani A, kalaivanan K vanan, karpagalakshmi RC, monikandan R	Neural networks
3	Short Research Advanced Project: Development of Strategies for Automatic Facial Feature extraction and Emotion Recognition.	David Restrepo∗, Alejandro Gomez ´	Neural networks
4	Facial emotion recognition in real-time and static images.	Shivam Gupta	Support Vector Machines (SVMs)
5	A Literature Survey on motion Recognition System Using Facial Expressions	Rachoori Keerthi, A. Obulesh, Pallam Ravi, Deepika.S	K-nearest-neighbor (KNN)
6	Facial Emotion Recognition.	Ma Xiaoxi, Lin Weisi , Huang Dongyan, Dong Minghui, Haizhou Li	Support Vector Machine (SVM) and Deep Boltzmann Machine (DBM)

III. PROPOSED ALGORITHM

A. *Design Considerations:*

- Assumptions and dependencies
- Functional requirements
- Face Detection
- Emotion Detection
- Methodology
- Feature Extraction
- Emotion Recognition.
- Set Stress Threshold

B. *Description of the Proposed Algorithm:*

In this project, Face is captured using the camera. This detected face is processed and the emotions are classified as either positive or negative emotions. The detected image is processed to identify the face of the subject using Convolutional Neural Network (CNN) algorithm.

Step 1Convolutional Neural Network(CNN):

A Convolutional neural network (CNN) is a neural network that has one or more convolutional layers and are used mainly for image processing, classification, segmentation and also for other auto correlated data. A convolution is essentially sliding a filter over the input.

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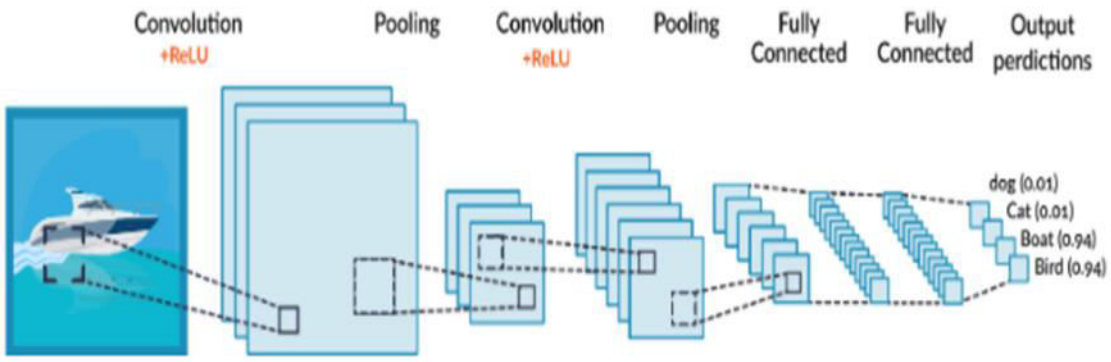

Step 2A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

IV. PSEUDO CODE

RECEIVE INPUT DATA, PROCESS THE INFORMATION, AND GENERATE OUTPUT

Step 1: Load the input images in a variable (say X).
Step 2: Define (randomly initialize) a filter matrix. Images are convolved with the filter

$$Z1 = X * f$$

Step 3: Apply the Relu activation function on the result

$$A = Relu(Z1)nf$$

Step 4: Define (randomly initialize) weight and bias matrix. Apply linear transformation on the values

$$Z2 = WT.A + b$$

Step 5: Apply the Relu function on the data. This will be the final output

$$O = Relu(Z2)$$

V. SIMULATION RESULTS

The predictor is relatively successful at predicting test data from the same dataset used to train the classifiers .Fig.1

In Face Detection is the first and essential step for processing, and it is used to detect faces in the images.. A facial detection system uses biometrics to map facial features from a photograph or video. It compares the information with a database of known faces to find a match. Face detection systems use computer algorithms to pick out specific, distinctive details about a person's face.These details, such as distance between the eyes or shape of the chin, are then converted into a mathematical representation and compared to data on other faces collected in a face database .fig.2 Emotion detection is used to analyze basic facial expression of human. Emotion recognition system is constructed, including face detection, feature extraction and facial expression classification.then Face of the subject is captured using the camera module. This detected face is processed and the emotions are classified as either positive or negative emotions. The detected image is processed to identify the face of the subject using Convolutional Neural Network (CNN) algorithm.fig.3 Facial feature extraction is the process of extracting face component features like eyes, nose, mouth, etc. from human face image.Facial feature extraction is very much important for the initialization of processing techniques like face tracking, facial expression recognition or face recognition.Fig.4Implementation of Facial Detection – The preliminary step before image processing.

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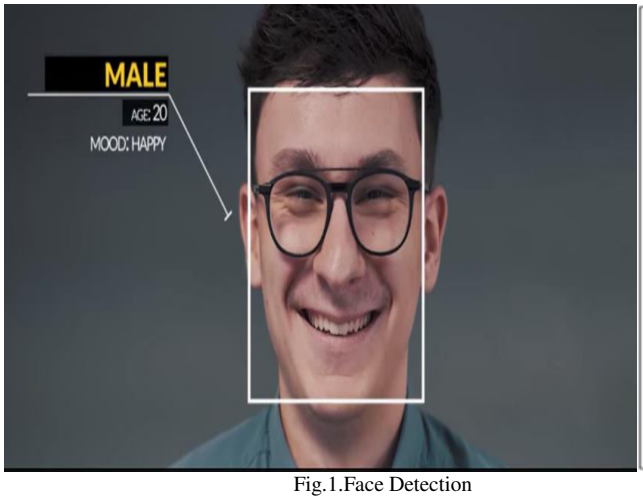

Fig.1.Face Detection

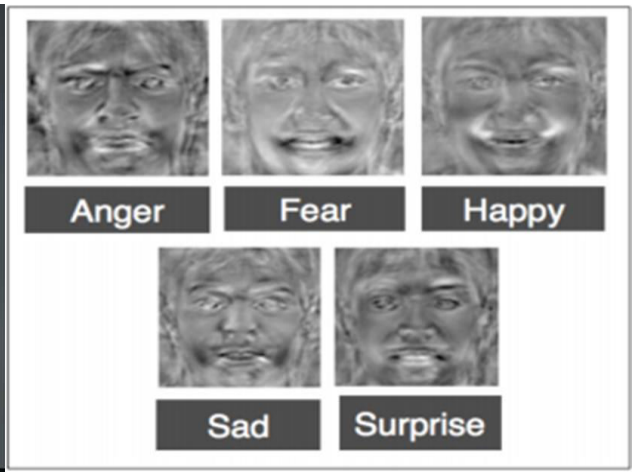

Fig. 2. Emotion Detection

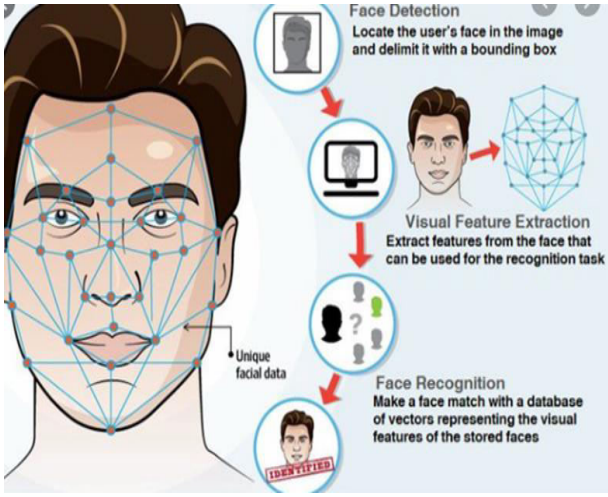

Fig. 3. Feature Extraction

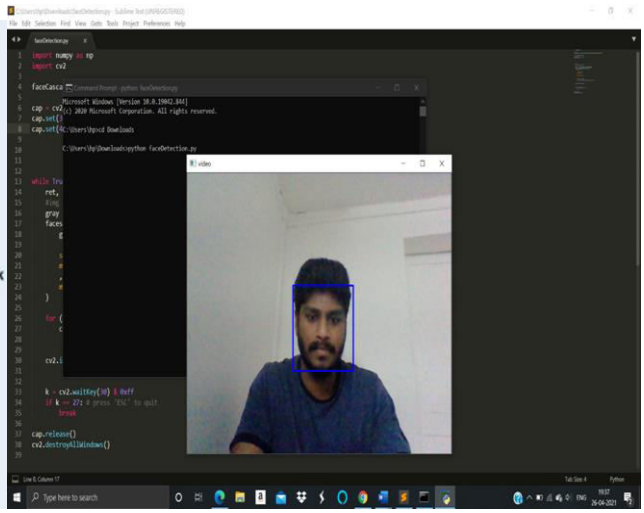

Fig 4. Implementation

VI. CONCLUSION AND FUTURE WORK

The predictor is relatively successful at predicting test data from the same dataset used to train the classifiers. However, the predictor is consistently poor at detecting the expression associated with contempt. This is likely due to a combination of lacking training and test images that clearly exhibit contempt, poor pre-training labelling of data, and the intrinsic difficulty at identifying contempt. The classifier is also not successful at predicting emotions for test data that have expressions that do not clearly belong exclusively to one of the seven basic expressions, as it has not been trained for other expressions. Future work should entail improving the robustness of the classifiers by adding more training images from different datasets, investigating more accurate detection methods that still maintain computational efficiency, and considering the classification of more nuanced and sophisticated expressions.

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