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Stress Detection using Vocal Expression & Text Mining to understand Mental Condition

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Abstract: *Depression is likely to be one of the most important social health issues in today's culture. Suicide was considered by mentally sick or depressed persons. It can be used as a suicide risk indicator. India is one of the countries with the highest annual suicide rate in the world. The goal of Face Emotion Recognition (FER) is to identify a person's emotions in order to lower the suicide rate. The (CNN, 2.17) algorithm is used to extract facial features and assess stress utilising emotions communicated through the face as a threshold. This system is primarily used to categorise good and negative emotions, as well as to identify stress using a standard threshold value.*

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.*

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1. 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.

2. RELATED WORK

Literature survey is the most important step in any kind of research. Depression Detection using Emotion Artificial Intelligence.Facial emotion recognition in real-time and static images. Short Research Advanced Project: Development of Strategies for Automatic Facial Feature Extraction and Emotion Recognition .Emotion recognition and drowsiness detection using Python .Depression Detection by Analyzing Social Media Posts of User.

3. METHODOLOGY

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.

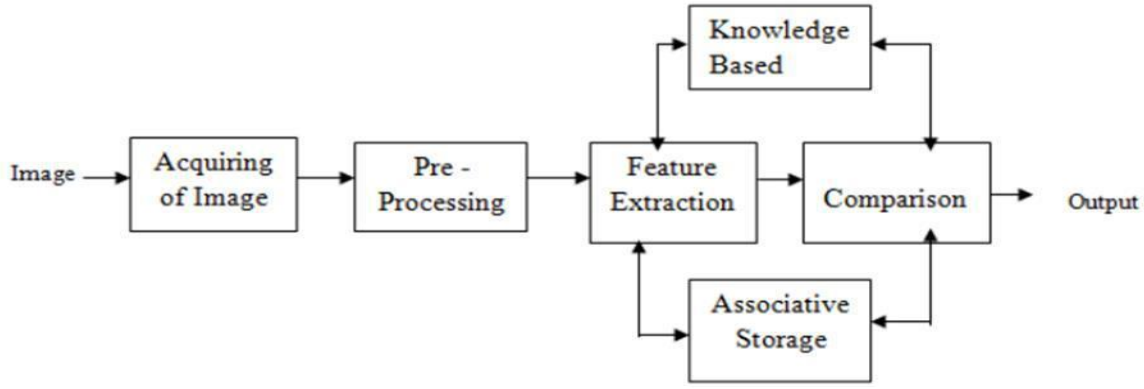


Fig.1: Methodology Of the system

4. EXISTING APPROACH

The existing systems are capable of detecting depression using Dataset which consist of information regarding Blood pressure, Patients previous medical history.They use SVM, KNN which become inefficient when larger datasets are involved. Datasets trained are either bag of words without any day to day phrases or the images.

5. PROPOSED APPROACH

In proposed system we are using people's videos and their text inputs. System uses CNN for processing video data and NLP + Naïve Bayes Classifier for text processing. If user found depressed, then further categorization of depression is done through video interview & accordingly he/she is provided with motivational material.

6.Mathematical Model

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 t ransformation on the values

$Z2 = WT.A + b$

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

$O = Relu(Z2)$

- **Algorithm Details**

1) Algorithm 1/Pseudo Code

- **Image Processing:**

In computer science, image processing is the use of computer algorithms to perform image processing on digital images. We used image processing for detecting the faces from camera and to capture emotions on the detected images.

Steps for Image Detection :

Step 1:

Confirm the upper limit of the number of faces to be detected.

Step 2:

Adjust the scaling of the images according to the Device's Camera.

Step3:

Give access of the device's camera (to on and off) and pass the camera port as input to OpenCV library's

VideoCapture method.

Step4 : Confirm the frequency of frames needed from the video and capture them within adjusted intervals.

2) Algorithm 2/Pseudo Code

Deep Convolutional Neural Network (DCNN):

Input: Test Dataset which contains various test instances TestDBLits [], Train dataset which is build by training phase

TrainDBLits[] , Threshold Th.

Output: HashMap ≤class label, SimilarityWeight ≥all instances which weight violates the threshold score.

Step 1: For each read each test instances using below equation

$$testFeature(m) = \sum_{m=1}^{n} (.\ featureSet[A[i] \dots \dots A[n] \leftarrow \text{TestDBLits})$$

Step 2 : extract each feature as a hot vector or input neuron from testFeature(m) using below equation.

$$\text{Extracted\_FeatureSetx[t}\dots\dots\text{n]} = \sum_{x=1}^{n} (\text{t}) \leftarrow testFeature\ (\text{m})$$

Extracted FeatureSetx[t] contains the feature vector of respective domain.

Step 3: create the number of Convolutional

For each read each train instances using below equation.

$$trainFeature(m) = \sum_{m=1}^{n} (.\ featureSet[A[i] \dots \dots A[n] \leftarrow \text{TrainDBList})$$

Step 4 : extract each feature as a hot vector or input neuron from testFeature(m) using below equation.

$$\text{Extracted\_FeatureSetx[t}\dots\dots\text{n]} = \sum_{x=1}^{n} (\text{t}) \leftarrow testFeature\ (\text{m})$$

Extracted FeatureSetx[t] contains the feature vector of respective domain.

Step 5 : Now map each test feature set to all respective training feature set GAPS

$$weight = calcSim\ (\text{FeatureSetx} \,||\, \sum_{i=1}^{n} \text{FeatureSety[y]})$$

Unable to classify sentiment for heterogeneous images like nature images, animal face images etc.

Traditional CNN is takes more time to train each object and testing respectively. Good accuracy for human face images only not others.

Only localize features has consider for sentiment classification is existing research it affect on overall accuracy of error rate.

- Data mining:

Text mining (also referred to as text analytics) is an artificial intelligence (AI) technology that uses natural language processing (NLP) to transform the free (unstructured) text in documents and databases into normalized, structured data suitable for analysis or to drive machine learning (ML) algorithms.

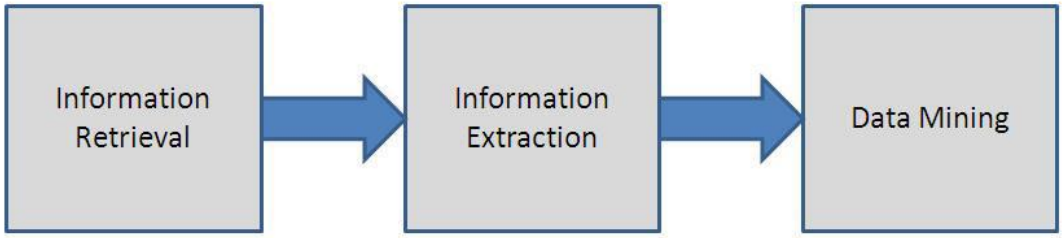


Fig:data mining stages

STAGE 1: information retrieval

The first stage of text or data mining is to retrieve information. This might require using a search engine to identify a corpus of texts that are already digitised or it might necessitate digitisation of physical texts in publications or manuscripts.

STAGE 2: information extraction

The second stage is the mark-up of text to identify meaning. In most cases this will involve adding metadata about the text into a database (i.e., author, title, date, edition etc.), while in others it might involve keying in all person names or locations mentioned in the text (for example)..

STAGE 3: data mining

The final stage is to text mine the text(s) using various tools. The purpose is to find associations among pieces of information that draw out meaning and enable researchers to discover new information which might otherwise be difficult to discover.

7. FIGURES

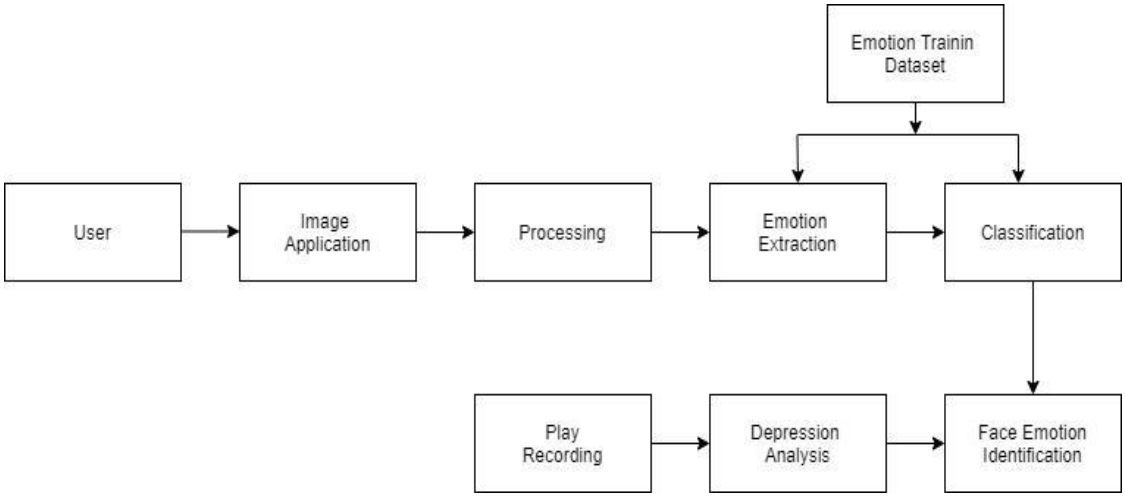
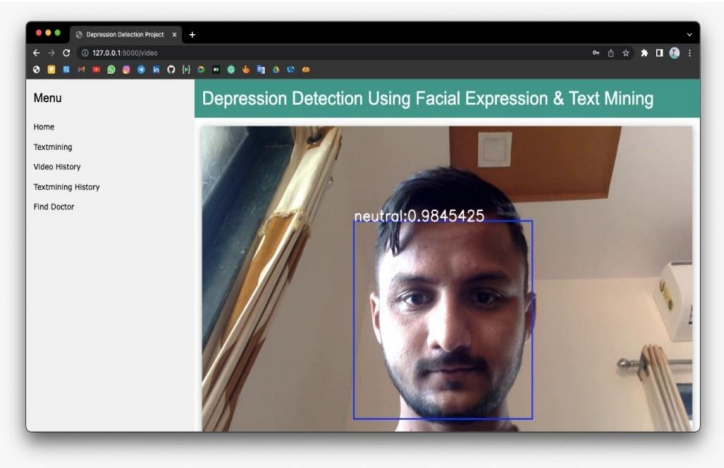
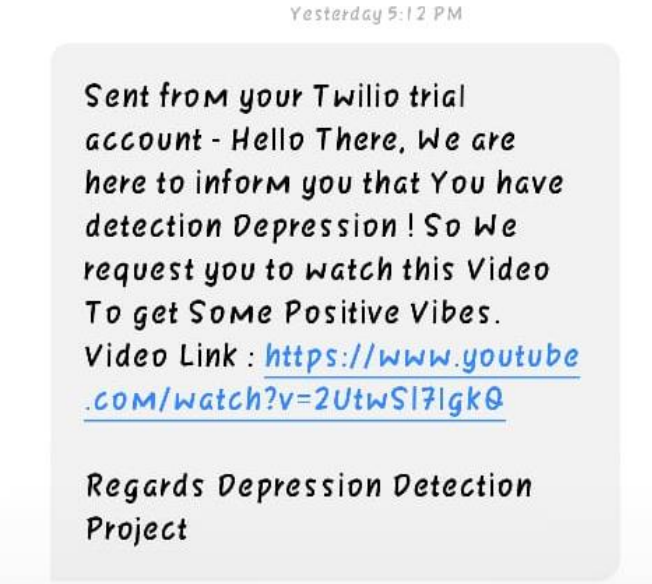
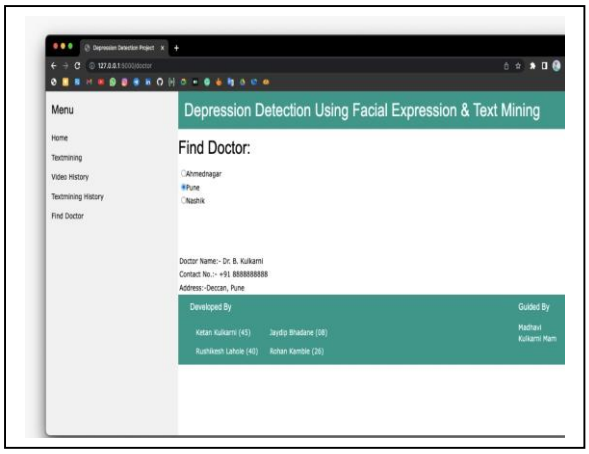


Fig.2: Architecture Diagram







7. CONCLUSION & FUTURE SCOPE

CONCLUSION

Thus, the proposed system has met all the requirements of depression detection through video and text with satisfactory accuracy considering both the forms of datasets. And also considers some basic actions to help the labeled depressed person**.**

FUTURE SCOPE

Having observed that people tend to express their feelings on social media, this type of software integration can lead to early detection of depression. If software used explicitly for Depression Detection (without integration on other platforms) then provides a remote service making it easier for people to assess their mental health. Will be helpful as Psychiatrist's tool for dealing with patients effectively.

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