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Depression Prevention using Emotion Detection and Text Mining using Machine Learning

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***Abstract*—**

Suicide is one of the most serious social health problems that exist in today's culture. Suicidal ideation, also known as suicidal ideation, refers to people's plans to commit suicide. It can be used as a measure of suicide risk. India is one of the leading countries in the world with an annual suicide rate. Social networks were developed as a prime factor for their users to communicate with their interested friends and share their captions, photos and videos reflecting their moods, emotions and feelings. Raise and enforce a version that takes facial expression images as input and symptoms. Based on this, this patient's reputation predicts whether or not he was detected as depressed. We can train the version using photos and use it for prediction. Image captions can be done after prediction for better visualization of the message. We will also use a text mining technique (NLP) to predict melancholy using characters furnished by means of a person.

In the final, we are able to make the final selection primarily based on the above two techniques. Generate a detailed dashboard of the user's disease status and design a web application for the above system. We will use a CNN algorithm to speed up the detection of depressed character occurrences and access to be aware of high-quality responses to mental health issues. We recommend the system learning method as an efficient and scalable technique. We document the implementation of the proposed method. We evaluated the effectiveness of our proposed technique using a set of different psycholinguistic features. We have shown that our proposed method can significantly improve the accuracy and cost of the fault category. Keywords: emotion recognition, depression, convolutional neural networks, text processing, image processing, sentiment analysis

Keywords: Security, Reliability, Data Integrity, Block chain, health care, brain tumor.

I. Introduction

In the Indian way, suicide is a big deal. Suicide kills over thousands of people (100,000) every year in our country. The suicide rate has increased from 7.9 to 10.3 per 100,000 population over the past two decades. There are many suicides in the world. Kerala, Karnataka, Andhra Pradesh and Tamil Nadu are among the southern regions with the highest suicide rates. In the last two decades, this trend has continued. The high suicide rate in southern states can be explained by higher education, a stronger reporting system, lower external violence, higher socioeconomic status, and higher ambition. The number of suicides in India rose to 230,314 in 2016. Suicide was the leading cause of death in both the 15-29 and 15-39 age groups. About 800,000 people commit suicide worldwide each year, of which 135,000 (17%) are Indian nationals, representing 17.5% of the world's population. "Suicide by suspension" (53.6%), "poisoning" (25.8%), "drowning" (5.2%) and "immersion" (3.8%) were the most common forms of suicide throughout the year, according to the report . India had the highest suicide rate in the Southeast Asian region in 2016, according to a new study by the World Health Organization (WHO). India's official statistics for the past

three years show the number and causes of suicides in the country. , have not yet been identified, disrupting suicide prevention strategies and efforts to implement WHO recommendations in the region. The study used data from the 2016 WHO Global Health Estimates to present national and regional suicide rates. India is a region of Southeast Asia and a region of lower middle income countries in terms of region and income. The suicide rate in India (16.5) was higher than in the surrounding regions (13.4) and in the immigrant group (16.5) (11.4).

II. Literature Survey

The number of researches on stress factors is increasing [9 - 12]. Choudhury et al. [13] suggest that depression is a true measure of personal and social well-being. A large number of people suffer from the negative effects of depression, but only a small percentage receive adequate care each year. They also looked at the possibility of using social media to identify and assess any symptoms of major depression in people. They evaluated the ethical credits associated with social interactions, emotions, dialect and semantic forms, self-explanatory descriptions of systems, and notes on stress-relieving drugs in their writing on the Web. Choudhury et al. [14] considered online communication as a promising public health tool and focused on using Twitter to build predictive models of the effect of childbirth on young mothers' behaviors and attitudes.

They used the Twitter post to track 376 maternal changes in relation to communication, emotion and information. [15] Twitter has been found to be increasingly being investigated as a tool for diagnosing psychological problems. Depression and social ills are examples of poor mental health in many people During their research, it was found that it is possible to determine the level of anxiety in people who want to commit suicide. Using human codes and a machine learning algorithm, we were able to find similar tweets. Organized Computer Classroom Several studies have shown that optimal use of user-generated content (UGC) will help determine people's psychological well-being. For example, Aldarwish and Ahmad [17] found that the use of social networking sites (SNS) is increasing nowadays, especially among younger generations. Clients can share their wishes and feelings on social networks because they are available. Using emotions, psycholinguistic processes, and drug names extracted from posts made by people in these groups, Nguyen et al. [20] used machine learning and mathematical methods to differentiate online messages between stress and control groups. Park et al. [21] look at people's attitudes and behaviors toward social networking websites to determine whether they are depressed. They organized a moderately structured one-person meeting with 14 active Twitter users, half of whom were depressed and the other absent. Alternatively, they focus on a number of ways to address potential communication strategies that may better suit depressed users and include information to help depressed users address their issues through social networking websites [22]. Holleran [9] found the first evidence that depression has a significant impact on the global Facebook epidemic. Wang et al. [19] and Shen et al. [25] investigated various factors related to stress and developed a multimodal stress model to identify depressed users.

While some of the aforementioned researches have looked at emotional processes, transitional processes, and language style to diagnose depression, the current literature contains the following flaws: SVM, KNN, Decision Tree, and Ensemble have all been used independently in several studies. There are no known studies that have examined differences in strategy outcomes using both methods in the same database. There are not many studies that have used the above machine learning strategies to detect depression using Facebook data. To correct the above errors, we are trying to diagnose depression from Facebook comments on this page; we also improve the approach to social media-based measures of stress by explaining different aspects of Facebook users' comments. We used machine learning methods to find depressed people using certain tests, this fallen CNN trial was also planned.

III. A.Problem Definition:

Designing a system that involves the removal of facial features, as well as the detection of pressure based on facial expressions using the Convolutional Neural Network (CNN) algorithm and separating positive and negative emotions and receiving pressure based on the normal limit value.

IV. Proposed Methodology:

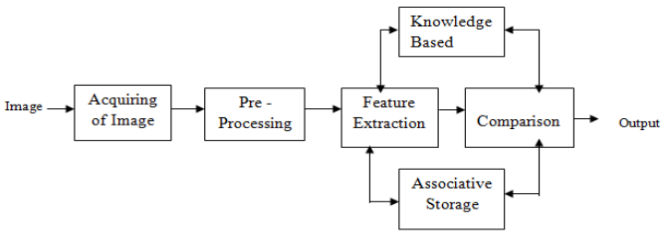


Fig.1 Methodology Of the system

This is plotted and an increase in the negative emotion can be inferred as increase in stress.

- Face Detection

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.

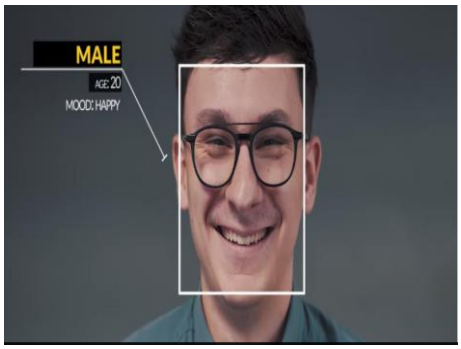


Fig. 2 face detection

These details, such as distance between the eyes or shape of the chin, are then converted into a mathematical epresentation and compared to data on other faces collected in a face database.

- Emotion Detection

Emotion detection is used to analyze a person's basic facial expression. An emotion recognition system is constructed, including face detection, feature extraction, and facial expression classification. The process of dividing an image into multiple parts is known as segmentation. Creates different sets of pixels in the same image. Image segmentation makes it easier for us to further analyze and extract meaningful information from it. It is also described as "The process of labeling each

pixel in an image so that it shares the same properties". The process results in pixels sharing a common property..

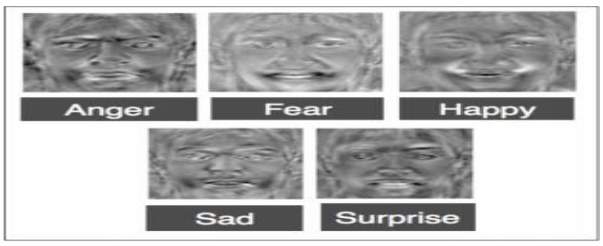


Fig 3 Emotion Detection

- Feature Extraction

Facial feature extraction is the process of extracting face component features like eyes, nose, mouth, etc. from human face image.

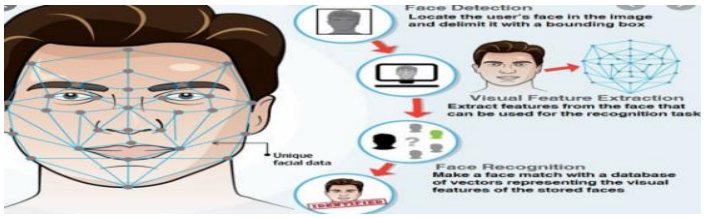


Fig. 4. Feature Extraction

Facial feature extraction is very much important for the initialization of processing techniques like face tracking, facial expression recognition or face recognition.

- Emotion Recognition

The emotions are to be extracted from the detected face. The image that is captured from the camera module, contains the facial features. The detected face is pre-processed (i.e.) cropped and resized. The detectors defined prior can be utilized to identify the emotion and sort them. It must be noted that viola-jones algorithm uses adaboost algorithm with cascading classifier, wherein a series of weak classifier's classification with a satisfactory threshold is combined to give an acceptable outcome.

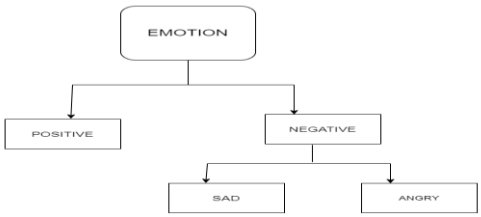


Fig.5 Emotion Recognition

- **Mathematical Model**

Accept input data, process information and generate output

Step 1: Load the input images into a variable (say X)

Step 2: Define (randomly initialize) the filter matrix. The frames are convolved using the filter Z1 = X * f

Step 3: Apply the Rel activation function to the result

A = Relu(Z1)nf

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

Z2 = WT.A + b

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

O = Relu(Z2)

• Algorithm details

1) Algorithm 1/Pseudocode

• Image processing:

In computer science, image processing is the use of computer algorithms to process images on digital images. We used image processing to detect faces from the camera and to capture emotions in 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 scale of the images according to the device camera.

Step 3:

Provide access to the device's camera (on and off) and pass the camera port as input to the OpenCV library's VideoCapture method.

Step 4: Confirm the frequency of the desired frames from the video and capture them at the set intervals.

2) Algorithm 2/Pseudocode

Deep Convolutional Neural Network (DCNN):

Input: A test data file that contains various test instances TestDBLits [], A training data file that is created by the training phase of TrainDBLits[], Threshold Th.

Output: HashMap ≤ class label, SimilarityWeight ≥ all cases whose weight exceeds the threshold score.

Step 1: Use the equation below for each read of each test instanceStep 2 : extract each feature as a hot vector or input neuron from testFeature(m) using below equation.

$$\text{Extracted\_FeatureSetx}[t.....n] = \sum_{x=1}^{n}(t)$$

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

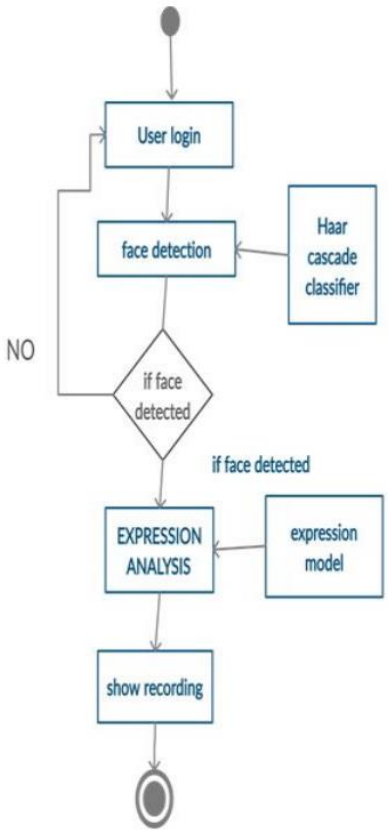
Step 3: create the number of Convolutional

For each read each train instances using below equation.

Algorithm Used:

1. CNN(Image Processing & DL)
2. NLP(Text mining)

v. Flow Chart of the System



vi. Advantages

The doctor identify the disease earlier and improve patient outcomes drastically. Today, advanced Medical Imaging offers numerous benefits to both the healthcare providers and the patients. CNN is the best approach for medical image processing to find accurate and quick result. Following some advantages of our system is helpful for:

1. Better Diagnosis
2. Complicated Surgeries
3. Affordable Health Care Costs
4. Safe & effective
5. File-sharing Ecosystem & Data Privacy

- High Accuracy.
- Less efficient.

vii. Applications

- Leaf Disease Detection.
- Medical image processing

viii. Conclusion

The prediction was successful compared to the prediction of test data from the same database used to train the variants. However, the predictor remains weak in finding the utterance associated with contempt. This may be due to a combination of a lack of training and test images that clearly show contempt, mislabeling of prior training data, and intrinsic difficulties in identifying contempt. Also, the classifier cannot predict the sensitivity of the test data to more than one of the seven key terms because they are not trained on other terms. Future work should include improving the power of classifiers by adding more training images from different datasets, exploring more accurate detection methods that still retain mathematical performance, and considering the classification of friendly and complex expressions..

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