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Finding Psychological Instability Using Machine Learning

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ABSTRACT: Automatic depression assessment based on visual and vocal cues is a rapidly growing research domain. The present exhaustive review of existing approaches as reported in over sixty publications during the last ten years focuses on image processing and machine learning algorithms. Visual manifestations of depression, various procedures used for data collection, and existing datasets are summarized. The review outlines methods and algorithms for visual feature extraction, dimensionality reduction, decision methods for classification and regression approaches, as well as different fusion strategies. A quantitative meta-analysis of reported results, relying on performance metrics robust to chance, is included, identifying general trends and key unresolved issues to be considered in future studies of automatic depression assessment utilizing visual and vocal cues alone or in combination with cues. The proposed work also carried out to predict the depression level according to current input of videos using deep learning as well as NLP.

KEYWORDS: visual, NLP, depression level

I. INTRODUCTION

In many situations humans who are depressed are totally ignorant of their disturbed mental condition. They are unable to identify the cause of constant unhappiness in them and eventually such users/peoples fall into a state of mind where they start having suicidal tendencies. In some cases peoples 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 better to identify the signs of depression at initial stages of depression. Depression if identified in the initial stages, just a simple one hour talk with a counselor may be of immense help for the people. This may totally change the negative state of mind of that student into a positive one. Such a student can be given good counseling of how to deal with mental stress and can be guided to follow the right path to success. The most important form of non-verbal communications is facial expressions of a person. Many studies have been done for finding out the facial expressions that are related to depression. The current work is mainly undertaken to find out the presence of depression in college students by studying their facial features. This system mainly uses

different image processing techniques for face detection, NLP for speech identification, feature extraction and classification of these features as depressed or non-depressed. The system will be trained with features of depression. Then videos of different students/peoples 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.

II. RELATED WORK

The concept of image inpainting was first introduced by Bertamio et al. [1]. The method was inspired by the real inpainting process of artists. The image smoothness information interpolated by the image Laplacian is propagated along the isophotes directions, which are estimated by the gradient of image rotated by 90 degrees. Exemplar Based method proposed by Criminisi et al. [2] used a best exemplar patch to propagate target patch including missing pixels. This technique uses an approach which combine structure propagation with

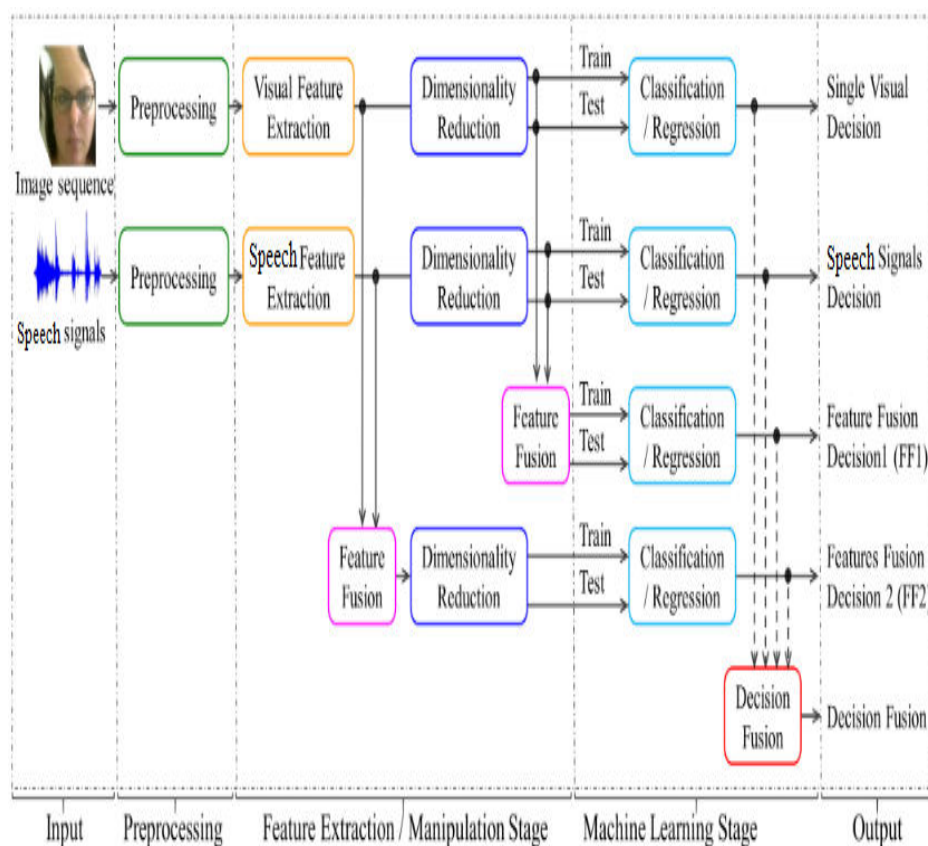
texture synthesis and hence produced very good results. In [3], the authors decompose the image into sum of two functions and then reconstruct each function separately with structure and texture filling-in algorithms. Morphological technique is used to extract text from the images presented in [4]. In [5], the inpainting technique is combined with the techniques of finding text in images and a simple algorithm that links them. The technique is insensitive to noise, skew and text orientation. The authors in [6] have applied the CCL (connected component labelling) to detect the text and fast marching algorithm is used for Inpainting.

The work in this paper is divided in two stages. 1) Text- Detection 2) Inpainting. Text detection is done by applying morphological open-close and close-open filters and combines the images. Thereafter, gradient is applied to detect the edges followed by thresholding and morphological dilation, erosion operation. Then, connected component labelling is performed to label each object separately. Finally, the set of selection criteria is applied to filter out non text regions. After text detection, text inpainting is accomplished by using exemplar based Inpainting algorithm.

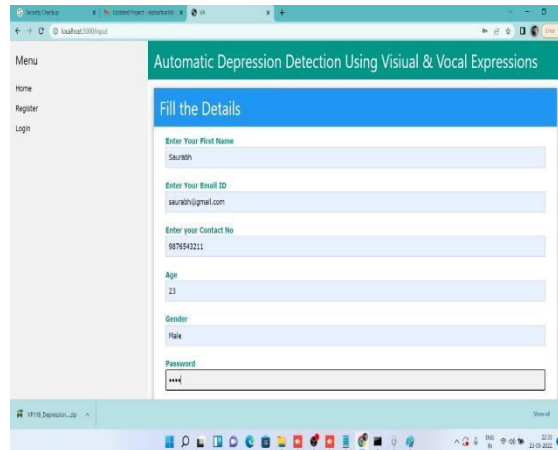
III. METHODOLOGY

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

IV. EXPERIMENTAL RESULTS

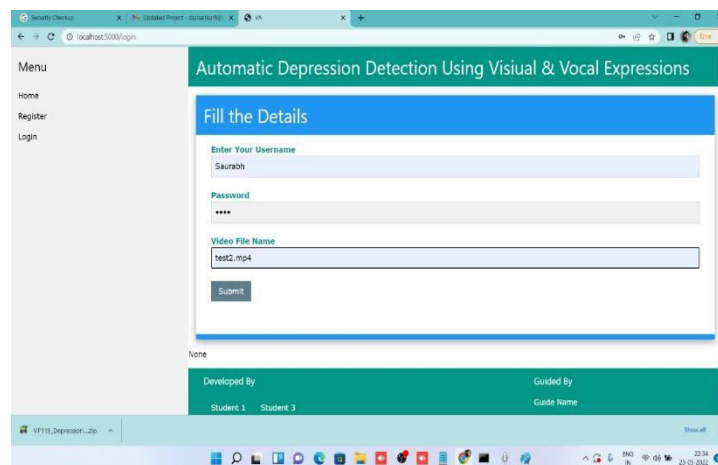


V. RESULT



The screenshot shows a web browser window with the URL localhost:5000/register. The page title is "Automatic Depression Detection Using Visual & Vocal Expressions". On the left is a menu with "Home", "Register", and "Login". The main content area is titled "Fill the Details" and contains the following form fields:

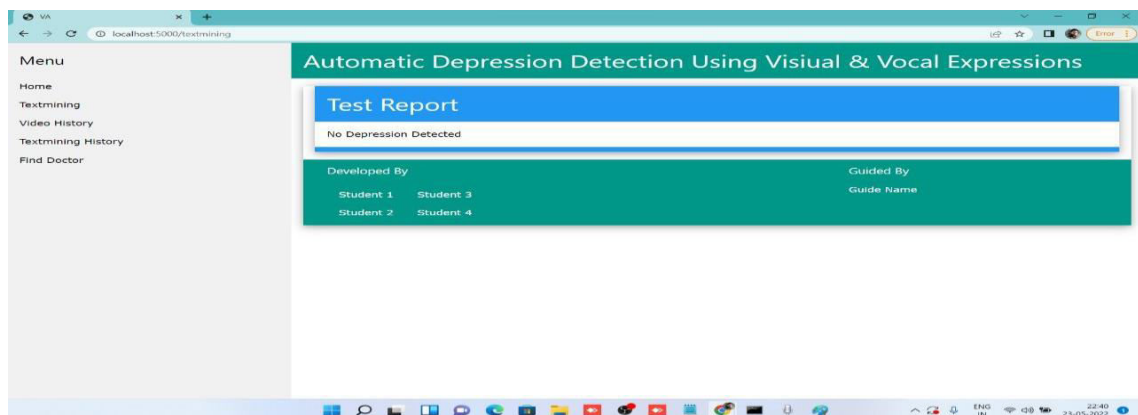
- Enter Your First Name: Saurabh
- Enter Your Email ID: saurabh@gmail.com
- Enter your Contact No: 9876543211
- Age: 23
- Gender: Male
- Password: ****



The screenshot shows a web browser window with the URL localhost:5000/login. The page title is "Automatic Depression Detection Using Visual & Vocal Expressions". On the left is a menu with "Home", "Register", and "Login". The main content area is titled "Fill the Details" and contains the following form fields:

- Enter Your Username: Saurabh
- Password: ****
- Video File Name: test2.mp4

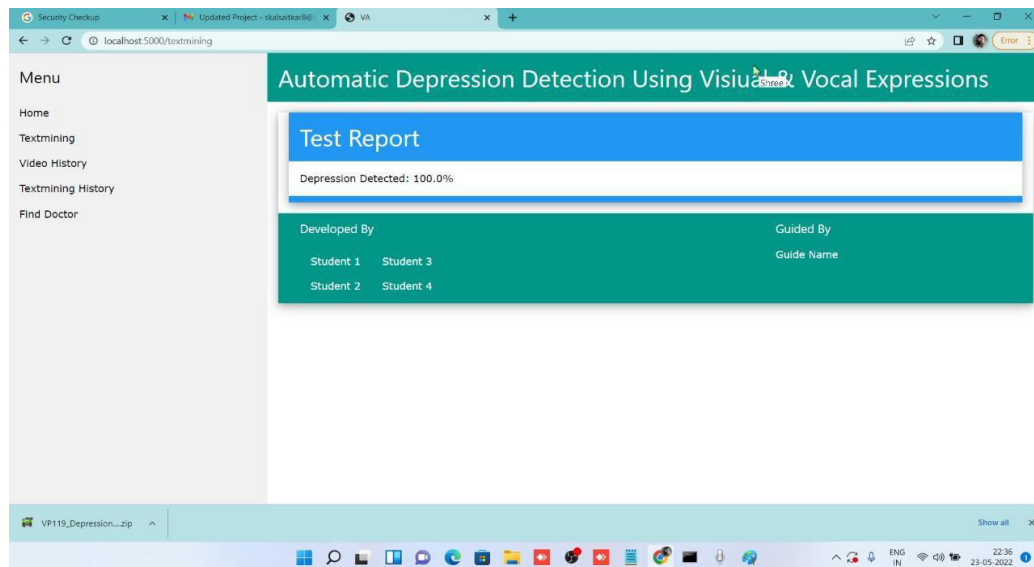
Below the form is a "Submit" button. At the bottom of the page, there is a footer section with the text "Developed By" and "Guided By", each followed by a table of student names.



The screenshot shows a web browser window with the URL localhost:5000/textmining. The page title is "Automatic Depression Detection Using Visual & Vocal Expressions". On the left is a menu with "Home", "Textmining", "Video History", "Textmining History", and "Find Doctor". The main content area is titled "Test Report" and contains the following text:

No Depression Detected

Below the report, there is a footer section with the text "Developed By" and "Guided By", each followed by a table of student names.



VI. CONCLUSION

In conclusion, we presented a novel approach to optimize word-embedding for classification tasks. We performed a comparative evaluation on some of the widely used deep learning models for depression detection from tweets on the user level. We performed our experiments on publicly available datasets. Our experiments showed that our CNN-based models perform better than RNN-based models. Models with optimized embedding have managed to maintain performance with the generalization ability.

For future work, we will evaluate against more RNN-based models, in particular with more focus on attention mechanisms. We will investigate other kinds of mental disorders, such as PTSD.

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