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Application for Possible Mental Health Screening in Adolescents

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Abstract: ***Despite being around technology that eases life, provides opportunities, and connects people across the globe. Due to the competitiveness. Many individuals especially adolescents find themselves struggling with various mental health issues. Stress, depression, and post-traumatic stress disorder (PTSD) are some of the issues mostly found in adolescents. Even though the knowledge of these disorders is widely spread amongst the masses. Individuals still hesitate to discuss these issues with parents, friends, and colleagues. Hence the article particularly concludes about an application that helps individuals to know about their condition by simply taking few tests. Application tries to provide an assessment based on recommended questionnaires and an emotion recognition feature. Hence after the questionnaire the user can consult an expert to confirm the disorder and get further medications.***

Keywords: Mental health, stress, post-traumatic stress disorder, Depression, adolescents.

I. INTRODUCTION

Today there is a lot of pressure on adolescents (age group – 10 to 19) regarding their career, studies, and extracurricular activities. But every adolescent is not capable to handle this pressure and thus, cannot cope up with this pressure. This results in various mental disorders. Also, in the recent years due to covid-19 epidemic lot of tragic events took place which had great impact on the psychology of adolescents. Hence the study refers to few questions normally asked by experts to assess the patients.

Convolutional neural network, a deep learning algorithm that uses computer vision to differentiate with various images and thus helps to find out the emotion in the image that is given as an input is used to complete the emotion recognition part. The application also uses OpenCV, which is open-source library for computer vision and image processing tasks in machine learning.

Image processing involves capturing images, storing, analysing them and implementation of various algorithms. The questionnaires used help to assess the severity of the conditions using various logics that are used to calculate a score that helps individuals assess severity of disorders they may be suffering through. Hence an effort is been made to help the adolescents gain a hint of the disorder they may be suffering while protecting their privacy and confidence.

II. LITERATURE SURVEY

For literature survey various research papers have been used. [1] The facial components, particularly the key components will always show sign of change their position when the feeling of person is changed. As a result, a similar element in various pictures all most part of distinctive positions. [2] To recognize and classify the human faces various methods are required but deep learning technique outperforms other methods by its large capabilities of different datasets and fast computation capabilities. Usually, the process of face recognition and classification involves various steps such as pre-processing, detection, orientation, extraction of features and classification of emotion. These tasks are easily performed with deep learning keras model which outperforms the handy computations. Deep learning technique is a standard paradigm to represent the working of human brain with neurons. [3] Modern age lifestyle has a psychological impact on people's minds that causes emotional distress and depression. [4] Depression is a prevailing mental disturbance affecting an individual's thinking and mental development. According to WHO, approximately 1 billion people have mental disorders [5] and over 300 million people suffer from depression worldwide. [6] Traditional stress detection relies on psychological questionnaires. [7] Indeed, stress symptoms can affect your body, your thoughts and feelings, and your behaviour. Being able to recognize common stress symptoms can help you manage them. Stress that is left unchecked can contribute to many health problems, such as high blood pressure, heart disease, obesity, and diabetes. [8] There is strong evidence that the current severe acute respiratory syndrome coronavirus two (SARS-CoV-2) pandemic can be considered a global traumatic event. [9] The current pandemic has exposed distressful situations among many. Prior to the global pandemic, a general population survey across 24 countries estimated that 70% of individuals would experience at least one potentially traumatic event (PTE) in their lifetime.

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III. METHODOLOGY

A. Name Registration.

A simple interface after opening the application. Which will instruct the user to insert the first name and last name. Hence in this way the application database will register the user identity. This will be used for noting down the further details filled by the user.



Fig. 1 The user's name registration interface

B. Emotion Recognition

The Detect My Emotion button opens the camera of the device and hence allows to capture the image of the user where the emotion is recognized. Hence the image recognition part goes through capturing the image of the user. Hence after the image gets captured.

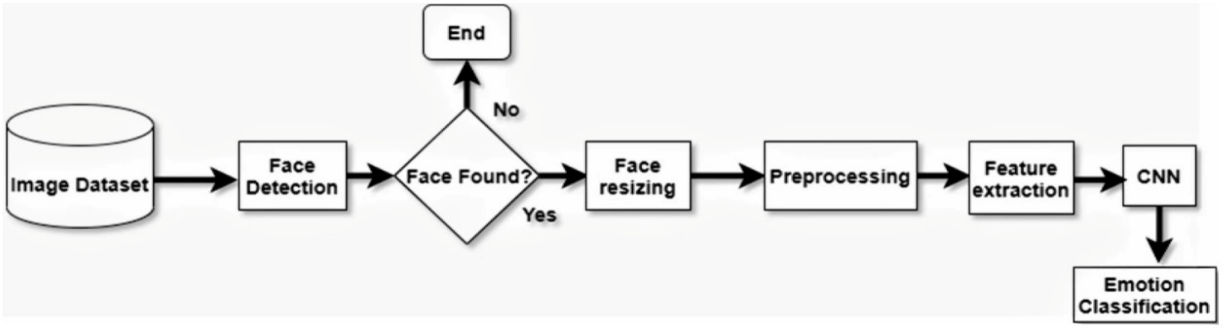


Fig. 2 Emotion recognition process

Hence the image is saved in the database. After saving the image. If the program detects a face in image, it will proceed further. Later the face will be resized by the program and the pre-processing and later feature extraction part will occur.

Feature extraction plays an important role in the classification of an image. In many applications feature extraction of images is used. Colour, skin, facial structure, edges, etc. are the features that can be used in emotion classification.

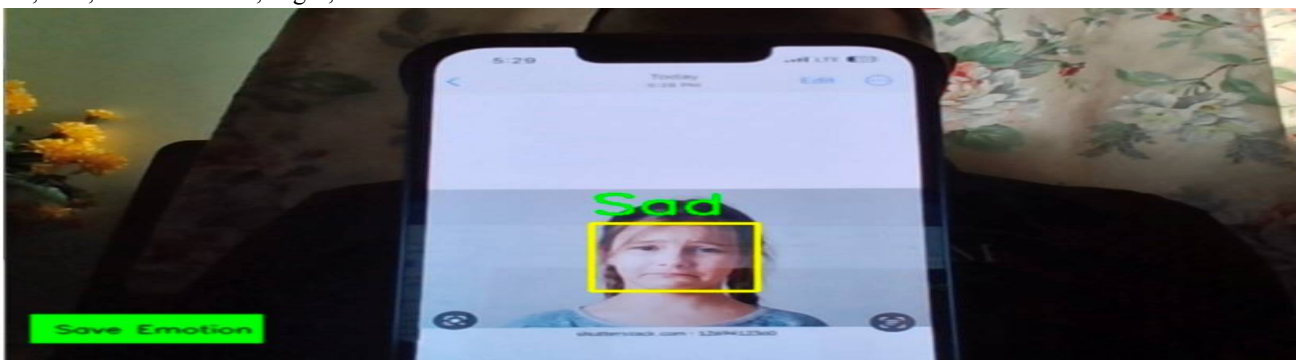


Fig. 3 Detection of emotion

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Then the emotion is saved in the application database. The entry of the user is saved in two tables in the structured query language database.

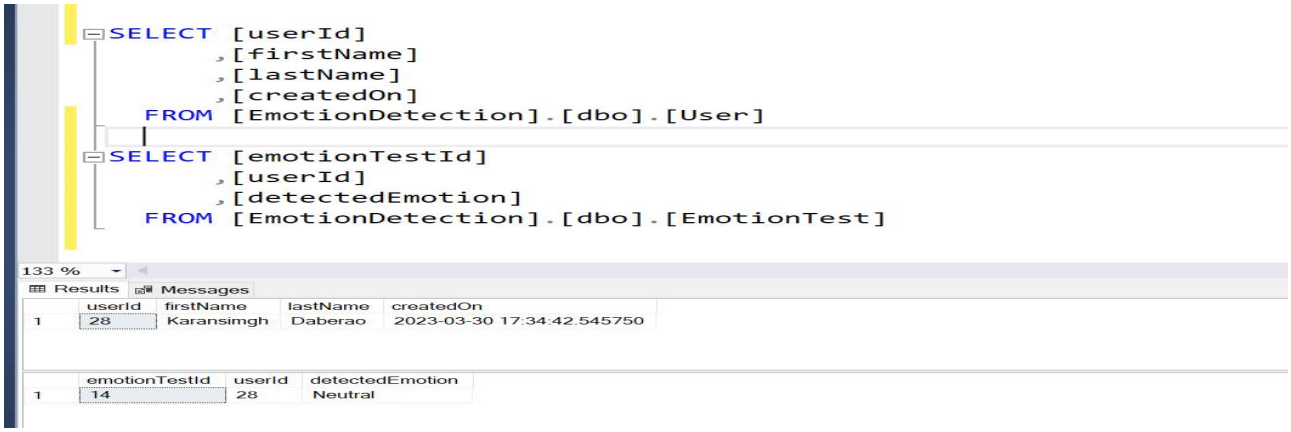


Fig. 4 Image of database where emotion and name is stored.

C. Convolutional Neural Network (CNN)

The phrase "convolutional neural network" refers to a network that uses the convolution mathematical technique. Convolutional networks are specialised varieties of neural networks that substitute convolution at least one layer for conventional matrix multiplication. Then closely the connectivity pattern between neurons mirrors the structure of the animal visual cortex, convolutional networks were inspired by biological processes. Only in the constrained area of the visual field known as the receptive field do individual cortical neurons respond to inputs. Different neurons' receptive areas partially overlap one another to fill the whole visual field. Comparatively speaking to other image classification algorithms, CNNs employ a minimal amount of pre-processing. This means that, unlike traditional methods where these filters are hand-engineered, the network learns to optimise the filters through automatic learning. This feature extraction's independence from prior information and human interaction is a significant benefit. Convolutional Neural Networks have been used for tracking objects from a camera, locating text in an image, and enabling object detection.

CNNs take a less conventional approach towards regularization. It takes advantage of the hierarchical pattern in data and assemble patterns of increasing complexity using smaller and simpler patterns embossed in their filters.

D. Questionnaire

The user then can choose upon the questionnaire test that user is intended to give for the analysis. Hence a page appears which asks user to select the disorder the user feels like suffering from. The page appears below. That also provides a radio button which allows user to only select one disorder.

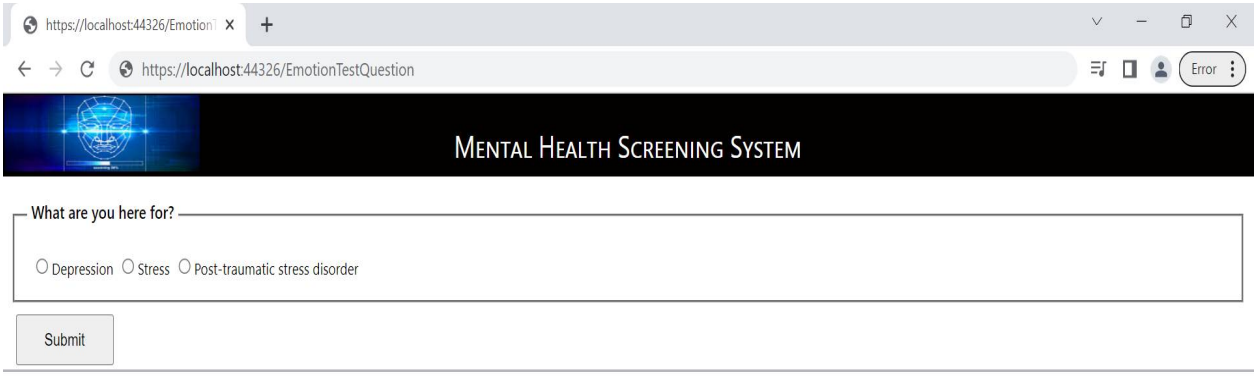


Fig. 5 application page

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E. Application flow and analysis

The application flow provides a clear understanding about the working. After the image recognition the emotion data is stored in a common database.

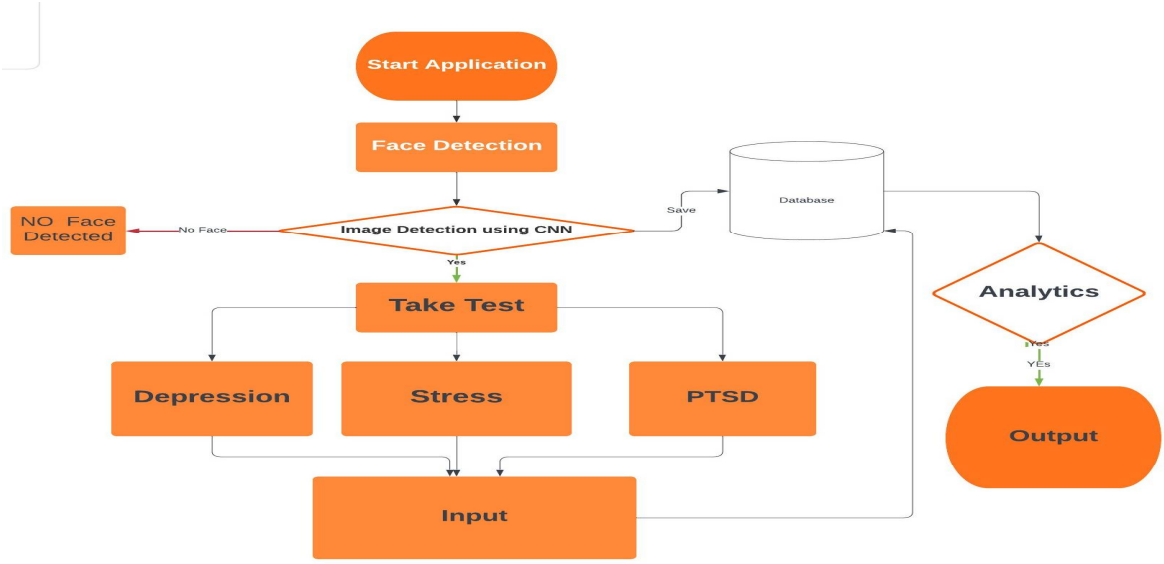


Fig. 6 Application flow

Hence the application data is also stored in the database. Later the analysis part uses the questions answered by the user and the answers provided by the user after clicking each of them after reading provides the information about the severity of disorder the user may be facing. The logic notes down the score for each answer for a question the user provides. Where if the user provides answers like not at all, rarely or the answer labelled last. The logic will consider it as a zero. Rest all the answers provided will have a positive score to calculate the corresponding score that is provided in the logic. Later on the input provided is given to the database which then provides the analysis.

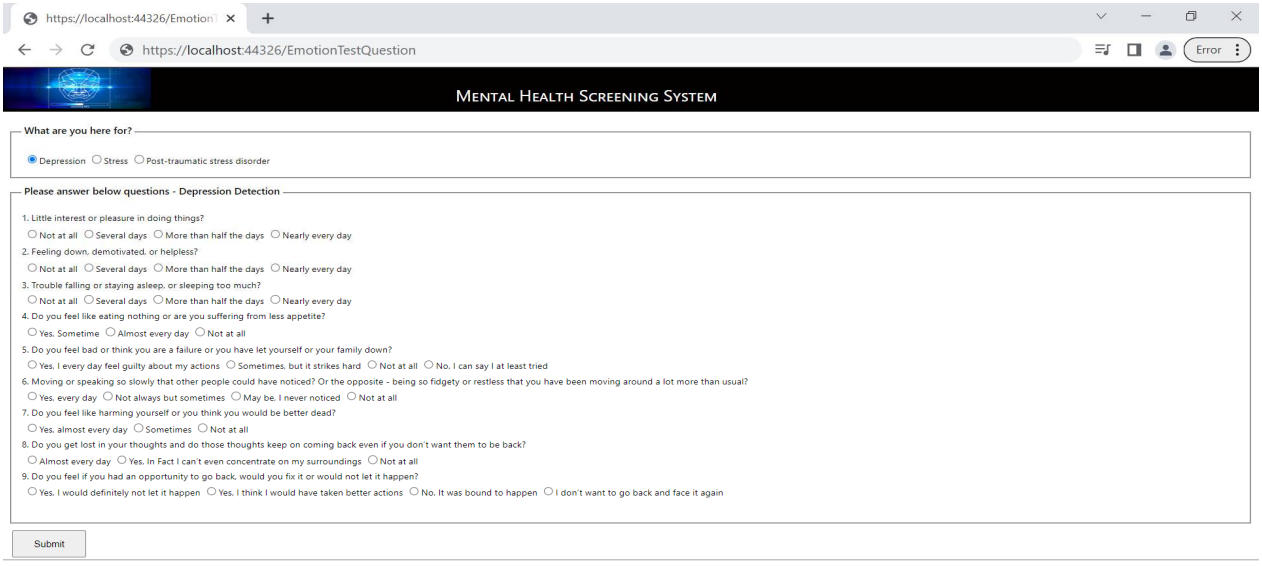


Fig. 7 Questionnarie for analysis

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IV. RESULTS AND DISCUSSION

The results of the following application show the score based upon the input that user has provided. But it is user responsibility to provide true answers to the questions asked. If the score of the input is below 4. The user has mild symptoms of the disorder which can be handled by the user itself through meditation and various techniques that are easily available. But if the score is above 7 the user needs to consult an expert for further guidance and medications. The provided discussions are private and hence user does not need to hesitate.

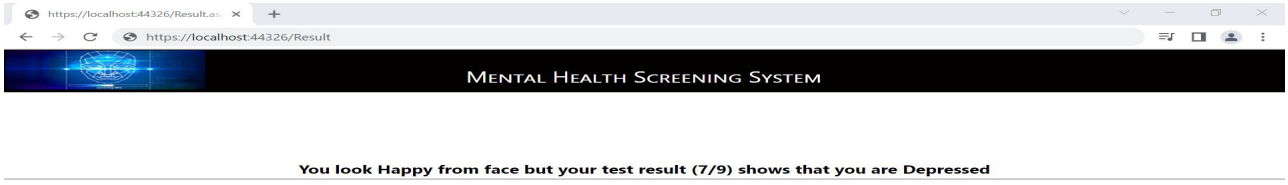


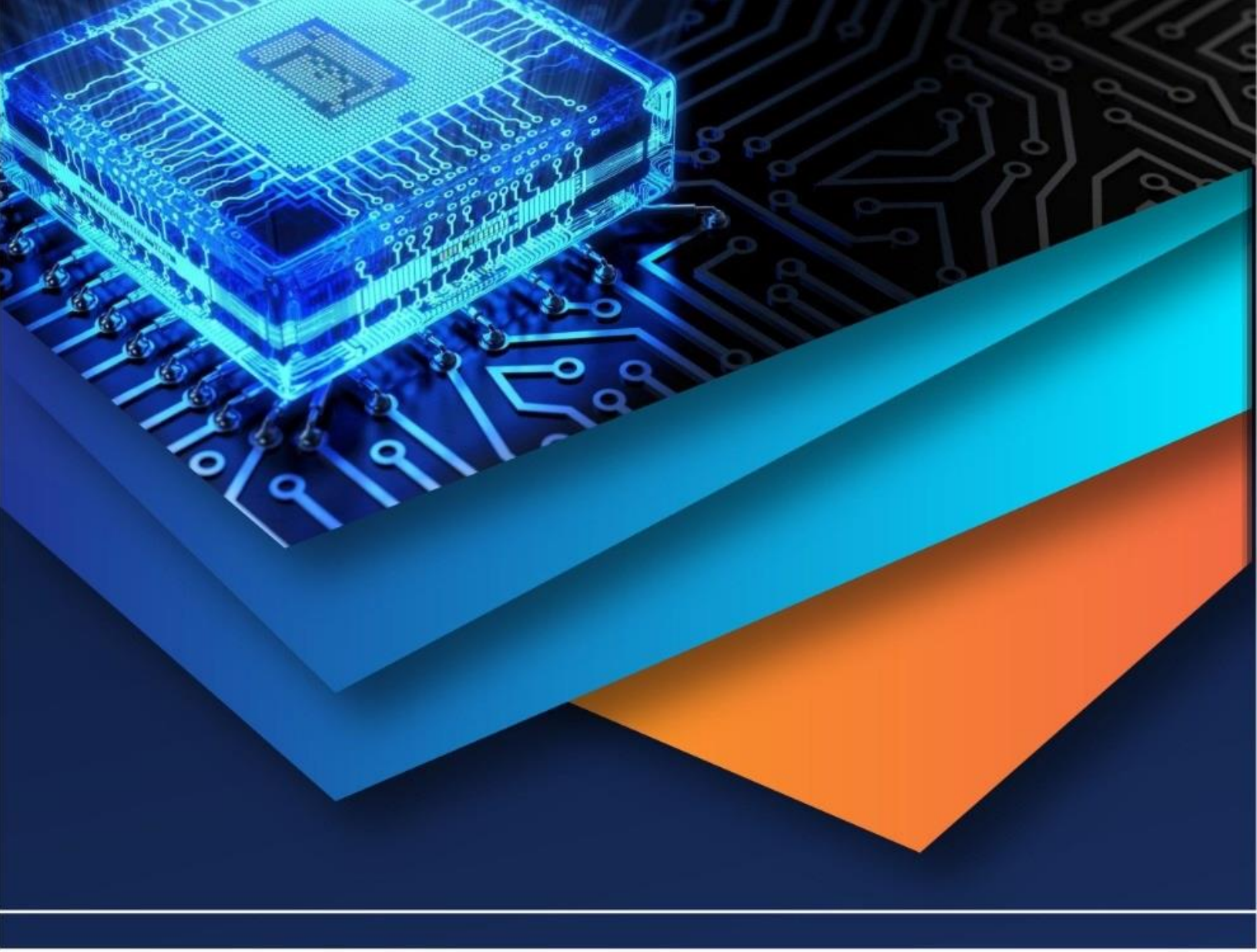
Fig. 8 Results

V. CONCLUSION

The article discusses about mental health , emotion recognition and classification which uses various techniques that are in to
The paper and taken in consideration. But the deep learning model is one of the most accurate and worth considerable. Also, an effort has been made to address the issue of mental health by providing questionnaire which are still relevant for analyzing the severity of disorder faced by the patients. Though the application does not claim to provide accurate result about the disorder. The application tends to provide an easy interface where user can gauge the severity and can later consult the expert. This application also tries to protect the user mental health privacy and helps user get hint of the issue.

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