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MENTAL HEALTH PREDICTION VIA FACIAL EXPRESSION & QUESTIONNAIRE

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Abstract: This project aims to develop an innovative approach for predicting user mental health by combining facial expression analysis and traditional questionnaires. Leveraging advancements in facial recognition technology and machine learning algorithms, the system interprets facial expressions to identify emotional states, while users concurrently complete standardized mental health questionnaires. The multimodal dataset, consisting of facial expression data and self-reported questionnaire responses, will be subjected to deep learning techniques to extract meaningful patterns and correlations. A panel for suggestions and improvement is also proposed.

Keywords: Automated, CV2, Face Detection, Recognition, Machine Learning, Mental Health

I. INTRODUCTION

Noetic health refers to a person's emotional, psychological, and convivial salubrity. It involves the individual's faculty to handle stress, relate to others, make decisions, and cope with the challenges of life. Good phrenic health contributes to one's overall functioning, productivity, and facility to compose and maintain paramount relationships. Apperceiving phrenic health involves assessing sundry aspects of an individual's celebrations, feelings, and deportments. Here are some key designators and factors that contribute to the apperception of phrenic health:

Emotional Salubrity:

- Mood: Conventional fluctuations in mood are mundane, but sedulous feelings of woefulness, hopelessness, solicitousness, or irritability may designate a noetic health concern. • Jubilance and Contentment: The faculty to experience ecstasy, congeniality, and contentment in daily activities is essential for noetic salubrity. Behavioral Patterns: Transmutations in Demeanor: Paramount transmutations in demeanor, such as withdrawal from convivial activities, incremented isolation, or salient alterations in slumber and orally consuming patterns, can be designations of noetic health issues.
- Substance Use: Dependence on or misuse of substances like drugs or alcohol may be indicative of underlying phrenic health challenges.

Cognitive Functioning:

- Thought Patterns: Eccentric or assiduous thought patterns, such as extravagant worry, intrusive noetic conceptions, or arduousness concentrating, can be denotements of phrenic health issues.
- Perception of Authenticity: Distorted perceptions of authenticity, hallucinations, or delusions may betoken certain noetic health disorders.

Interpersonal Relationships:

- Convivial Functioning: Arduousness in composing and maintaining relationships, strained interactions with family and friends, or assiduous conflicts may signal noetic health concerns.
- Communication Skills: Challenges in expressing oneself or understanding others can be indicative of emotional or psychological distress.

Physical Symptoms:

- Unexplained Physical Ailments: Chronic physical complaints without clear medical causes may have roots in noetic health issues. For example, headaches, stomachaches, and unexplained pain.

Self-Perception:

- Self-Esteem: Low self-esteem, exorbitant self reproval, or feelings of frivolousness may be associated with phrenic health challenges.

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- Sense of Purport: Lack of motivation, a sense of purposelessness, or a loss of interest in aforetime relished activities can be warning signs.

Functioning in Daily Life:

- Occupational and Academic Functioning: Struggling to perform at work or school, arduousness concentrating, and decremented productivity can be speakers of noetic health issues.
- Daily Activities: Inability to carry out daily tasks and responsibilities may suggest phrenic health challenges. Ethical considerations, including privacy and data security, are paramount in the design and implementation of the project. User consent, anonymization of data, and adherence to relevant privacy regulations are integral components of the research methodology. Additionally, the project acknowledges potential biases in the training data and strives to address them to ensure fairness and accuracy in mental health predictions. Integrating facial expression analysis and questionnaires offers a holistic perspective on user mental health, allowing for a more nuanced and personalized approach to prediction. This research contributes to the growing field of mental health technology, paving the way for innovative tools that could assist healthcare professionals in early detection, personalized intervention, and improved overall wellbeing for users.

II. LITERATURE REVIEW

In this paper a novel framework that mental health professionals can employ to tackle challenges using data science. While numerous research papers have delved into public mental health, only a few have focused on the application of data science in this field. Recently, data science has revolutionized the management, analysis, and utilization of data in the healthcare industry[1].

In this a new method for early detection of mental health issues as an alternative to traditional approaches like questionnaire-based data collection or sensor-based monitoring, which can be both time consuming and expensive. However, utilizing Online Social Networks (OSNs) for mental health problem detection demands extensive adoption, innovative algorithms, and computational linguistics to delineate its limitations and challenges[2].

It introduce a system designed to predict whether a player is experiencing psychological conditions such as anxiety and depression by integrating game and player data with a self-esteem measure. Data from two questionnaires, GAD and SWL, were collected alongside game and player information, and several state-of-the-art simulations were conducted. Four different machine learning classifiers were tested using a 10-fold cross validation approach on a dataset of internet gamers. Among these algorithms, the Decision Tree classifier demonstrated the highest precision for all predicted parameters. Specifically, for the GAD and SWL questionnaires, the decision tree achieved precisions of 100% and 84.71%, respectively[3].

The work on Machine Learning Algorithms, Techniques, and Inferences. Machine learning serves as a data analysis approach enabling the automated creation of analytical models. It falls within the realm of AI, emphasizing the idea that computers can learn from data, discern patterns, and make decisions with minimal human intervention. The project tests several ML algorithms based on parameters that will be further utilized to evaluate the model[4].

The proactive use of SMS for predicting mental health issues, aiming to enhance treatment outcomes. They employ Natural Language Processing (NLP) to detect mental health status from text messages, providing a comprehensive examination of various supervised classifier algorithms[5].

III. METHODOLOGY

Predicting mental health using facial expressions and questionnaires is an interesting and evolving area of research. While I can provide some general information on how these methods might be used, it's essential to note that mental health prediction is a complex task, and any approach should be approached with sensitivity to ethical and privacy considerations.

Facial Expression Analysis:

Facial Recognition Technology: Advanced facial recognition technology can analyze facial expressions to identify emotions such as happiness, sadness, anger, and fear. Machine learning algorithms can be trained on datasets of facial expressions linked to mental health conditions to make predictions.

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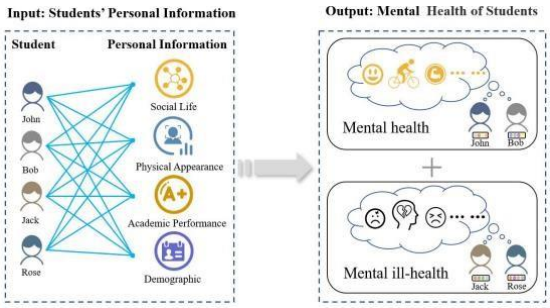

Figure 3.1 Research Problem Faced

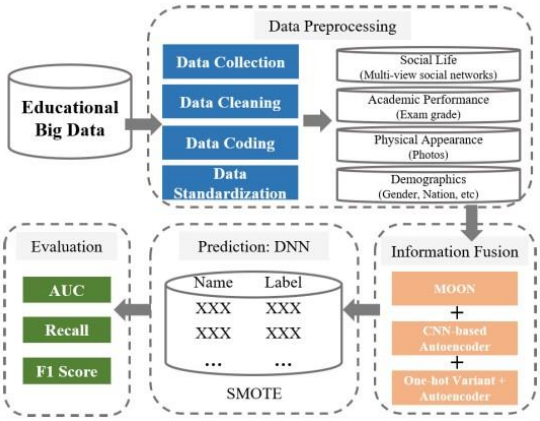

Figure 3.2 Experimental result of the research

Deep Learning: Deep learning techniques, such as convolutional neural networks (CNNs), can be employed for facial feature extraction and emotion recognition. These models can learn intricate patterns in facial expressions associated with different mental health states.

Questionnaires and Surveys:

Psychometric Tools: Traditional psychometric tools and standardized questionnaires, such as the Patient Health Questionnaire (PHQ-9) for depression or the Generalized Anxiety Disorder 7 (GAD-7) scale, are widely used in mental health assessments.

Integration of Data:

Multimodal Approach: Combining facial expression analysis with questionnaire responses can provide a more comprehensive understanding. Integration of various data sources, including self-reports, physiological data, and behavioral observations, can enhance the accuracy of predictions.

Project Modules:

Module 1: Face & Expression Detection: Predicting mental health based on facial expressions is a complex task, and it's important to approach it with caution, considering ethical and privacy implications. Facial expressions can provide insights into emotions, but mental health is a multifaceted aspect that involves a combination of various factors.

Step 1: Install Necessary Libraries:
Step 2: Load Pre-trained Models: Load pre-trained models for face detection and facial expression recognition.
Step 3: Capture Video Stream: Capture the video stream using your webcam.
Step 4: Process Frames: Read frames from the video stream, detect faces, and predict expressions.

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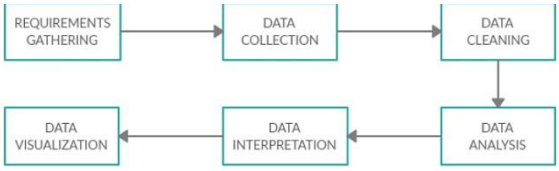

Figure 3.3 Data Flow Diagram

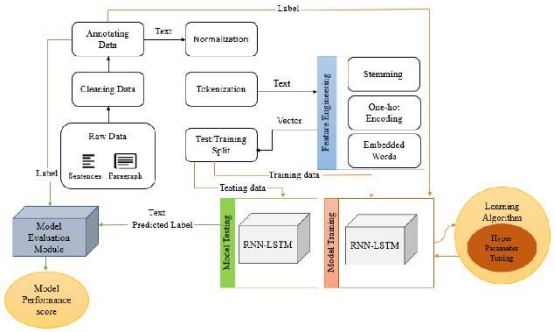

Figure 3.4 Block Diagram

Module 2: Questionnaire and Prediction

In this module, user will get into a questionnaire module generated according to their facial expression and after going through it the final output i.e. the mental health of the student and some suggestions and precautions will be provided.

IV. RESULT

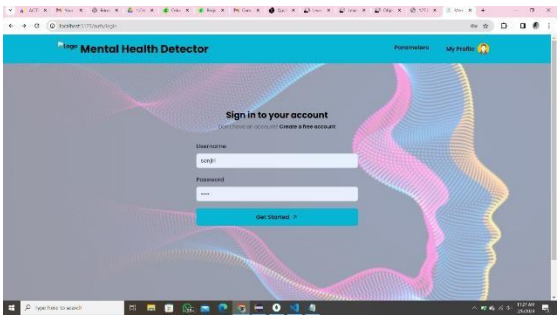

Figure 4.1 Sign in Page

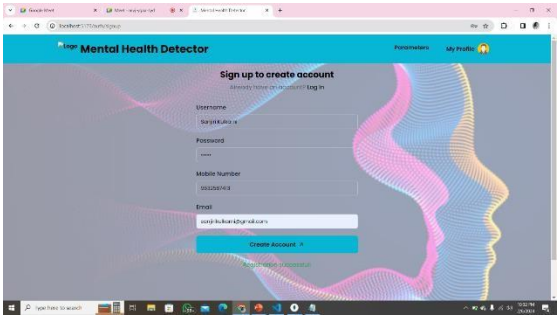

Figure 4.2 Create Account Page

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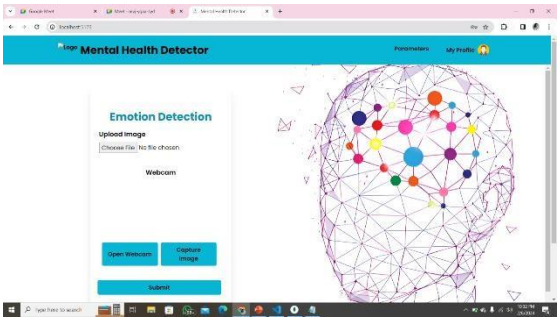

Figure 4.3 Website Dashboard

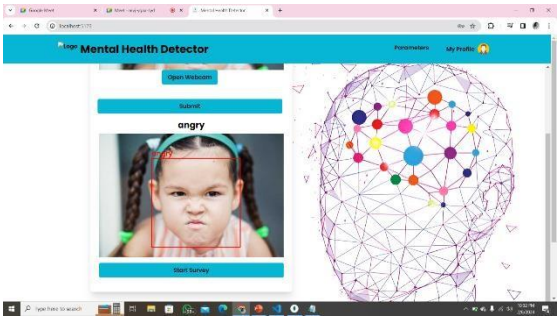

Figure 4.4 Angry Emotion Detection through Image

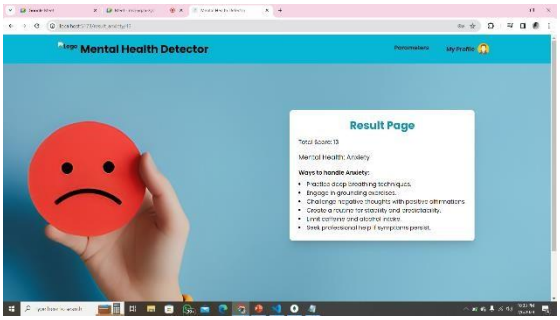

Figure 4.5 Mental Health Prediction Result Page

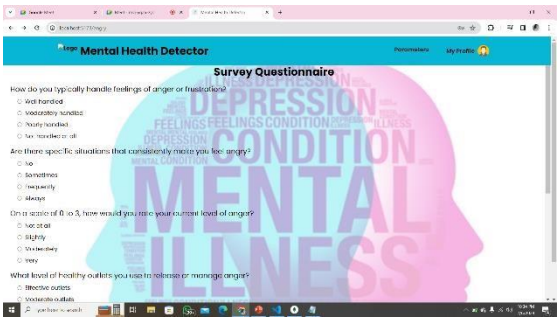

Figure 4.6 Mental Health Prediction via Questionnaire

V. CONCLUSION

Even if we use lavish experiments to show how well the suggested method performs, this study still has some space for improvement. Campus gregarious networks are first seen as static, weightless, multi-view networks. In real life, though, convivial networks are dynamic and each link has a distinct weight. There is still much to be discovered about adequately describing the friendly network of students. Apart from the social networks on campus, other social networks, such those inside families and preceptor-student interactions, also significantly influence psychological well-being. Further studies should take a more thorough look of convivial networks. Furthermore, the questionnaire is used, as previously indicated,

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to compile a multi-view gregarious network of students; however, this approach is time- and money-consuming and only partially relevant to extremely large-scale data.

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