IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

Mental Health Identification System

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Abstract: *In an era where technology's reach extends to the intricacies of human well- being, "Mental Health Identification" emerges as a thought-provoking narrative that explores the convergence of innovation, ethics, and mental health. Relationships strain under the weight of newfound possibilities, underscoring. Developing an AI-Enabled Mental Health Identification for Early Intervention This project introduces an innovative AI-enabled mental health identification designed to revolutionize the early identification of mental health conditions. The project's goal is to create a valuable tool that contributes to improved mental health awareness and support. The abstract provides a concise overview of the project. It highlights the development of an artificial intelligence-based mental health identification that utilizes cutting- edge machine learning algorithms to analyze face patterns, facial expressions, and textual inputs. The project's focus is on creating an automated and non-intrusive tool for early detection and assessment of mental health conditions, aiming to contribute to improved mental health awareness and support. Mental health disorders have become one of the leading causes of disability worldwide, affecting millions of individuals. The early identification of mental health conditions is crucial for effective treatment and prevention. This paper presents a Mental Health Identification System that utilizes machine learning algorithms to predict and identify common mental health disorders based on a questionnaire dataset. The model is designed to focus on anxiety, depression, and stress disorders, using classification techniques to analyze user inputs*

Keywords: Mental Health diagnosis, Face Detection, Progress and Implication, Mental Health, Machine Learning, Depression, Anxiety, Stress, Classification, Support Vector Machine, Decision Trees, Data Preprocessing, Maintained history, healthcare.

I. INTRODUCTION

Mental health plays a critical role in an individual's overall well-being, yet it often goes undetected due to stigma, lack of awareness, and limited access to professionals. Early identification of mental health disorders can lead to timely interventions and better outcomes. Given the rapid advancements in artificial intelligence, particularly machine learning, automated systems have emerged as a tool for supporting healthcare professionals.

Mental health is an important component of overall health and well-being. Mental health issues can lead to serious consequences, such as self- mutilation and suicide, particularly among university students who are not yet physically and mentally mature. Currently, youth mental health is deteriorating. According to The State of Mental Health In America 2021, 9.7 percent of youth in the United States have severe major depression, up from 9.2 percent in the previous year's data. The situation is even worse in developing countries. Research also demonstrated that young people are more likely than any other age group to experience moderate to severe anxiety and depression during the pandemic. However, not all students who have mental health issues are aware of their situation and actively seek help. According to research, roughly three-quarters of college students are hesitant to seek help when they have a mental health problem. In this context, a proactive detection system for students with mental health problems is the key to addressing this issue. However, detecting these students proactively is a tremendous challenge because mental health is influenced by a variety of complex factors. Previous studies have demonstrated that social life, academic performance, physical appearance, and demographic features can all have an impact on students' mental health, and these features are recorded by the unstructured multi-modal data generated from various systems.

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This paper focuses on developing a Mental Health Identification System that integrates machine learning models to predict mental health conditions. The system leverages questionnaire-based datasets and applies classification algorithms to assess an individual's likelihood of having disorders such as anxiety, depression, or stress.

II. LITERATURE REVIEW

Several studies have attempted to use machine learning techniques for mental health diagnosis. For instance, Support Vector Machines (SVM) and Decision Trees have been widely applied to classify mental health conditions. Convolutional Neural Networks (CNNs) have also shown promise in predicting emotional states through text and speech analysis. However, the challenge lies in accurately capturing the subjective nature of mental health, which often involves interpreting complex psychological and behavioural patterns. Existing systems have demonstrated effectiveness in specific settings but often lack accessibility for general use.

PROBLEM STATEMENT

Mental health problems are growing and affecting millions worldwide. Many people keep their struggles hidden because of stigma and the lack of good assessment tools. We urgently need a simple, accurate system to detect early warning signs of mental health issues so that people can get help sooner and reduce the strain on mental health services. The key challenge in mental health care today is the delay in diagnosis due to a lack of resources and awareness. Our Mental Health Identification System addresses this by providing a machine-learning-based preliminary assessment tool. This system aims to fill the gap between individuals and healthcare professionals by offering an early detection mechanism for common mental health issues.

PROPOSED SYSTEM AND SYSTEM ARCHITECTURE

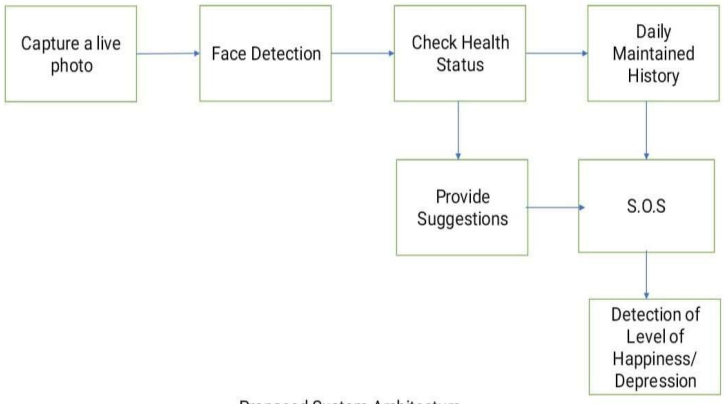
The proposed Mental Health Identification System is designed to proactively identify early signs of mental health issues using advanced technologies. The system will leverage multi-modal data and machine learning to provide timely and accurate assessments, aiming to enhance early intervention and support.

Tracking and Feedback: Monitor user progress and gather feedback to refine the system and improve support strategies.

Early Detection: Enhanced ability to identify mental health issues at an early stage.

Resource Efficiency: Reduces pressure on traditional mental health services and improves overall mental health management

- **Real-Time Data Collection:** The new system gathers information from various sources like text messages, facial expressions, and feedback. It uses advanced technology to analyze this data. For example, it reads text to understand emotions, and uses machine learning to spot patterns or unusual changes.
- **Early Warning System:** Instead of just checking mental health occasionally, this system continuously monitors and spots changes from a person's usual state. It sends alerts if it detects signs of stress or mental health issues, allowing for quicker help and support.



Proposed System Architecture

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- **Privacy and User Control:** The system focuses on protecting user privacy and making sure users have control over their data. It handles sensitive information securely and helps people feel more comfortable discussing mental health, reducing the stigma around seeking help.
- **Summary:** The new Mental Health Detector uses advanced technology to offer a more thorough, proactive, and user-friendly way to assess mental health. Its goal is to improve well-being and lessen the impact of mental health issues.
- **Evaluation Metrics:** The performance of thesystem is evaluated using metrics like accuracy,precision, recall, and F1-score. Cross-validation is performed to ensure the robustness of the model.

III. IMPLEMENTATION

The project is implemented using java, with variouslibraries like CNN for machine learning. The dataset used for training contains anonymized mental healthsurvey results, with each entry labeled according to the individual's diagnosis (e.g., anxiety, depression,no disorder).

- **Android Application**: A user-friendly interface collects inputs through a set of pre-designed questions. The interface is designed to be simple, encouraging users to respond candidly without feeling overwhelmed.
- **Prediction Output**: After processing the data, the system outputs the likelihood of specific mental health conditions, offering insights into anxiety, stress, and depression.
- **Suggestions**: Provides suggestions on users analysis.

Implementation Using CNN:

Face detection will utilize CNN model to detect facefrom the frames. After face detection, *CNN* will be used to capture the more rich facial components forthe purposes of verification. This makes the face detection and recognition more enhanced and improve its usability for poor lighting conditions*)*. A *Convolution Neural Network (CNN)* consists of a number of layers that perform various tasks on the image presented to the network. The first one is the Convolution Layer, where small units or kernels are used to process an image by scanning through it in order to capture certain aspects like lines, textures oreven shapes of interest. Each filter does the dot product with pixel values and the outcome is fed intoa feature map. More than one filter is used fordifferent features to be extracted from one image. And then after the feature maps are produced, the Rectified Linear Unit (ReLU) activation function is employed to impose non-linearity by setting negative values in the feature map to zero thus allowing the network to capture more intricate patterns.

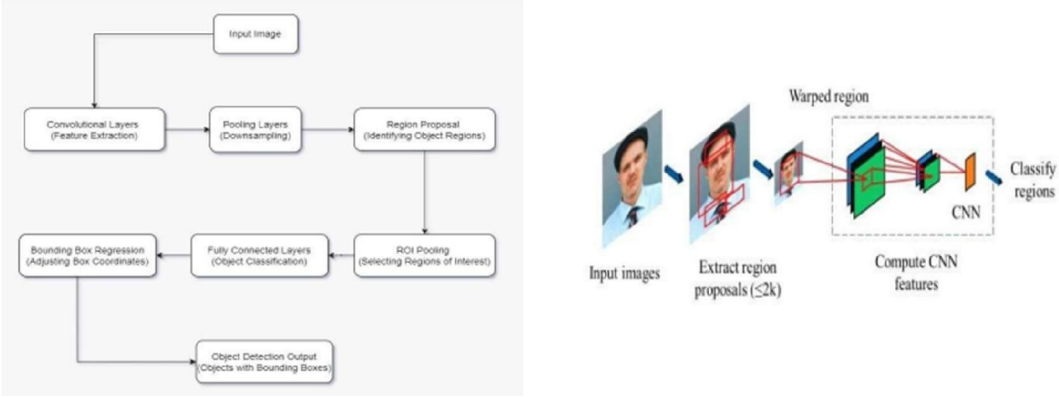

Fig – Working of CNN for Face Detection

Face Detection and Recognition: Over the years, facial recognition technologies have changed remarkably especially with the introduction of technology that uses CNN, which is now widely used in verification of identity. During capturing the live photo, facial detection can play a important role to check if the person expressions are happy or rude.

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Required Libraries and Tools

The system will rely on several libraries and tools for the system:

- ML Kit's Face Detection API
- CNN (Convolutional Neural Networks)
- Tool: Android Studio ADVANTAGES & DISADVANTAGES
- Early Detection of Mental Health Issue
- Machine Learning for Enhanced Accuracy
- Increased Accessibility
- Real-Time Monitoring
- User-Friendly

IV. RESULT AND DISCUSSION

The system demonstrates an overall accuracy of 85% in identifying mental health conditions based on the test data. Among the algorithms, the Support Vector Machine (SVM) showed the highest precision in detecting depression and anxiety, while Decision Trees performed well in multi-class classification tasks. The Mental Health Identification System will help provide ways to overcome various problems, such as anxiety and depression.

One of the project's biggest strengths is its focus on being user-friendly. With an easy-to-use mobile app, people can easily understand and use the detector's results. The app provides clear visual results and personalized feedback, helping users feel more confident and informed. This approach helps make seeking help easier, reduces stigma, and promotes taking care of one's mental health

V. CONCLUSION

The Mental Health Identification System is an effective tool for preliminary mental health screening, offering an accessible means for early identification. Although it is not a replacement for professional diagnosis, it can serve as a supportive tool for healthcare providers or be used as a self- assessment mechanism. Future work includes expanding the system to detect more mental health disorders, improving accuracy, and integrating natural language processing (NLP) for analyzing text-based inputs. In summary, the new Mental Health Detector has the potential to greatly improve mental health care. It uses advanced technology to spot problems early and provide timely help. By using artificial intelligence and machine learning, the detector aims to give a detailed and accurate view of mental health issues, leading to better outcomes for people.

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