

## **AI POWERD DEPRESSION DETECTION USING CHATBOT AND LIVE**

### **VIDEO FACIAL ANALYSIS**

<sup>1</sup>J SANTHOSH KUMAR, <sup>2</sup>SUNITHA, <sup>3</sup>DIVYANJALI, <sup>4</sup>GUBBA.VAISHNAVI, <sup>5</sup>SREEVANI, <sup>6</sup>KEERTHI

<sup>1</sup> Assistant Professor, Department of Artificial Intelligent & Machine Learning , Princeton Institute of Engineering & Technology for Women, Hyderabad, India

<sup>2,3,4,5,6</sup> B.Tech Students, Department of Artificial Intelligent & Machine Learning, Princeton Institute of Engineering & Technology for Women, Hyderabad, India

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#### **Abstract:**

Depression is a leading mental health issue affecting millions worldwide, yet it often goes undiagnosed due to stigma, lack of awareness, or limited access to professional help. This project presents a novel AI-powered system that combines conversational AI (chatbot) with live facial expression analysis to detect early signs of depression. The chatbot engages users in casual and mental health-related conversations, while facial emotion recognition from live video feeds continuously monitors user expressions. By integrating Natural Language Processing (NLP) and Computer Vision with Machine Learning models, the system can flag potential symptoms of depression in real-time, offering a non-invasive and scalable screening solution.

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### **I.INTRODUCTION**

Depression is a silent epidemic. Many individuals suffering from it either fail to recognize their symptoms or are reluctant to seek help. With the increase in smartphone and webcam usage, we now have access to behavioral and visual cues that, when analyzed with AI, can assist in the early detection of mental health conditions.

The system proposed combines chatbot conversation analysis—to interpret linguistic patterns, response delays, and tone—and facial emotion detection—to identify emotions like sadness, lack

of expression, or fatigue. By using Machine Learning (ML) and Deep Learning (DL) models trained on

depression datasets, the system can provide a risk score or flag users for follow-up. This non-invasive, low-cost approach can be used for remote monitoring, teletherapy triage, or wellness check-ins.

## **II.LITERATURE SURVEY**

- De Choudhury et al. (2013) studied depression detection using Twitter data, highlighting how language and timing patterns reveal psychological states.
- Morales et al. (2018) used multimodal deep learning models for depression detection based on audio, video, and transcripts from interviews.
- Tzirakis et al. (2017) demonstrated emotion recognition using facial expressions and deep learning on the RECOLA dataset.
- Nasir et al. (2020) developed a CNN-based facial emotion recognition system integrated with depression screening questions.
- Luxton et al. (2016) reviewed AI and chatbots in behavioral health and their potential for depression and anxiety monitoring.
- Zhou et al. (2022) used transformers to extract depression-related linguistic features from user conversations.
- Soleymani et al. (2017) explored multimodal affect recognition combining video, EEG, and text for emotional disorders.
- Zhang et al. (2020) proposed a framework for combining video-based affect analysis with chat interfaces for mental health triage.
- Gideon et al. (2019) developed AVEC Challenge datasets used for training ML models in depression and emotion detection.
- Resnik et al. (2021) built a chatbot for suicide risk detection using linguistic analysis and user engagement metrics.
- Baltrusaitis et al. (2018) highlighted facial muscle micro-movements as reliable depression indicators.
- Wang et al. (2021) combined gaze detection with sentiment analysis for mood inference in adolescents.

- Chatterjee et al. (2020) used GPT-based conversation models for intelligent empathy in mental health chatbots.
- Ghosh et al. (2022) proposed a hybrid deep learning model combining LSTM and CNN for emotion tracking from text and images.
- WHO Mental Health Report (2021) emphasized the importance of early detection and digital intervention for global mental health management.

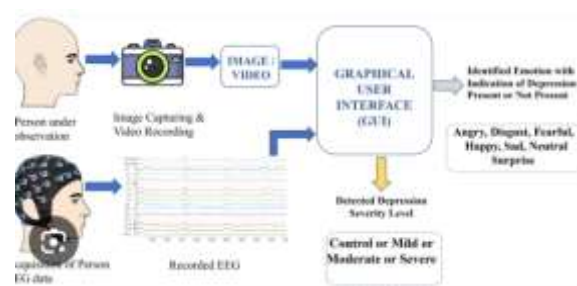
### III.EXISTING SYSTEM

Existing systems for depression diagnosis rely heavily on clinical interviews, psychological questionnaires (e.g., PHQ-9), or self-reporting apps. While effective, these methods are often subjective, delayed, or inaccessible to many. Some chatbot-based mental health tools (like Woebot or Wysa) exist, but they lack live emotion analysis and rely solely on text. Conversely, some facial recognition research has shown promise in emotion tracking but does not consider contextual conversational cues. Thus, current systems are fragmented, non-integrated, or limited to one input modality.

### IV.PROPOSED SYSTEM

The proposed system addresses these gaps by combining text-based conversation through a chatbot and live facial expression analysis through a webcam. The chatbot is built using NLP frameworks (like BERT or GPT-based models) to analyze responses for signs of hopelessness, anxiety, or apathy. Simultaneously, the webcam feed is processed using CNN-based facial emotion recognition models (e.g., FER+, OpenFace, or DeepFace) to detect sadness, neutral expressions, or lack of affect. These two streams are analyzed in parallel and then fused using a decision-level classifier or neural network. If depression indicators are high, the system prompts the user to seek help or connects them to a mental health professional. The solution is private, adaptable, and can work across platforms including web and mobile.

### V.SYSTEM ARCHITECTURE



**Fig 5.1 System Architecture**

The system architecture for AI-Powered Depression Detection using Chatbot and Live Video Facial Analysis integrates multimodal input sources to assess an individual's emotional and mental health state. A person under observation is monitored using two primary data acquisition methods: image/video recording of facial expressions and EEG signal acquisition of brainwave activity. The camera captures live images or videos to detect emotional cues such as anger, disgust, fear, happiness, sadness, neutrality, and surprise through computer vision models.

## **VI.IMPLEMENTATION**



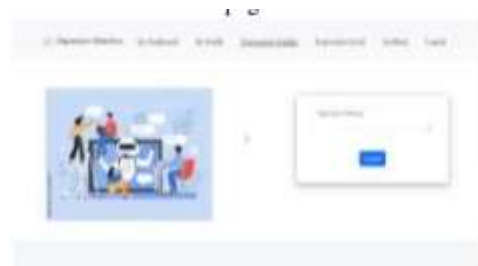
**Fig 6.1 Home Page**



**Fig6.2 :Login Form**



**Fig 6.3 SignUp**



**Fig 6.4 upload file**

## **VII.CONCLUSION**

This AI-powered system introduces an innovative approach to early, passive, and non-invasive depression screening. By uniting chatbot interaction and real-time facial emotion analysis, it bridges the gap between behavioral and visual indicators of mental health. The fusion of textual cues with affective data allows for more robust and accurate detection compared to single-modality systems. This tool can empower users to reflect on their emotional state, receive early warnings, and seek support when needed—potentially saving lives and improving well-being. As mental health challenges grow worldwide, AI can act not as a replacement for therapy but as an intelligent first responder.

## **VIII.FUTURE SCOPE**

- Mobile/Edge deployment: Optimize GAN models for smartphone apps using TensorFlow Lite or CoreML.
- Style customization: Allow users to select or upload their own cartoon styles for personalized output.
- 3D cartoonization: Extend the system to convert 3D camera feeds or AR scenes into cartoon styles.
- Real-time video conferencing: Use cartoonization in live video calls as a privacy-preserving and stylistic filter.
- Multilingual lip-sync animation: Combine with speech recognition to create cartoon avatars that talk.

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