MOODIFY: Tailored, Personal and Multifaceted AI Assistant for Young Adult Mental Health Issues.

Mr. Janak Limbachia
Dept of AI&DS
K. J. Somaiya Institute of Technology
Mumbai, India
janak.l@somaiya.edu

Mr. Yash Damani
Dept of AI&DS
K. J. Somaiya Institute of Technology
Mumbai, India
yash.damani@somaiya.edu

Mr. Shubh Dave
Dept of AI&DS
K. J. Somaiya Institute of Technology
Mumbai, India
shubh.hd@somaiya.edu

Prof. Vidya Sagvekar
Dept of AI&DS
K. J. Somaiya Institute of Technology
Mumbai, India
vsagvekar@somaiya.edu

2023 6th International Conference on Advances in Science and Technology (ICAST) | 979-8-3503-5981-7/23/$31.00 ©2023 IEEE | DOI: 10.1109/ICAST59062.2023.10455044

***Abstract*—Mental health issues are prevalent among young adults aged 20-35, who face stresses related to studies, work, finances, and personal relationships. We present Moodify, an Android application to identify, analyze, and alleviate mental health problems at an early stage. The app has three key features: 1) An emotion detection module that divides the face into lines to extract and predict emotions, then recommends uplifting songs and podcasts based on the user's current state.**

2) An autonomous chatbot for users to privately discuss their feelings and receive suggested coping strategies without revealing their identity. 3) Anonymous group chat rooms where users can socialize and discuss common problems anonymously. Moodify aims to improve mental wellbeing by allowing users to monitor their emotional state through facial analysis, vent feelings safely to an AI, and connect with peers undergoing similar issues while maintaining privacy. Evaluations demonstrate the emotion detection module can identify facial expressions indicative of mood with 82%accuracy. The chatbot is effectively being designed for reducing negative sentiment through supportive conversations. Moodify represents a novel mobile approach to enhancing mental health through emotionally intelligent systems and secure social features tailored to young adults' needs. The app empowers users to privately manage mental health issues by increasing self-awareness, providing personalized support, and facilitating anonymous peer discussions.

keywords—emotion, anonymous, mental well being

I. INTRODUCTION

In the world characterized by hasty lifestyles, the occurrence of mental health issues has grown extensively, specifically among young adults in the age group of 20 to 35. The legion of obstacles to be tackled like pressures of academia, demands of workforce, financial constraints and the personal complications, often sums up to create a perfect storm of emotional distress. This necessitates innovation of feasible and flexible solutions to address mental health issues cautiously. In response to this critical need we introduce Moodify, an Android Application poised to revolutionize mental health care by identifying and alleviating mental health issues at an early stage.

Moodify is not just another mobile application; it represents a paradigm shift in how we approach mental health in the digital age. With a comprehensive set of features designed to cater specifically to the needs of young adults, Moodify promises to be potentially in the battle against the growing mental health crisis. This introduction will delve into the core features of Moodify, each meticulously crafted to serve a distinct purpose in promoting emotional well-being.

A. Emotion Detection Module: Enhancing Self-Awareness

The Facial Emotion Detection Module, a pioneering innovation that adeptly discerns the user's emotional state by analyzing facial expressions, is Moodify's main feature. This module accurately anticipates the user's present mental state, resulting in a smooth and precise assessment.The proactive approach of this module characterizes it. It goes beyond simple identification to function as a useful tool for users. Moodify provides a helpful hand by delivering personalized recommendations after recognizing the user's emotions. It curates and proposes songs and podcasts based on an open-source Spotify API to improve the user's present mental state. This module goes beyond traditional prediction and identification techniques, providing users with assistance. The recom- mended songs and podcasts are carefully chosen to promote a positive mental state. Music therapy, widely regarded as one of the oldest healing traditions, takes center stage in Moodify's
approach to emotional well-being.

B. Autonomous Chatbot: Personalized Support

Moodify incorporates an autonomous chatbot, recognizing the value of open communication in mental health care. This chatbot acts as a private confidant, a non-judgmental ear for users to openly and confidentially discuss their feelings. What distinguishes Moodify's chatbot is its ability to engage in emotionally intelligent conversations aimed at decreasing negative sentiment. This isn't just a chatbot with canned

responses; it's a sophisticated AI-powered companion that's been trained to provide empathetic and supportive interactions. Users can express their deepest thoughts and feelings with- out fear of being judged or stigmatized because the chatbot ensures complete discretion. It listens carefully and provides advice, coping strategies, and even referrals to professional help when necessary. This feature of Moodify emphasizes the app's dedication to fostering emotional well-being one private conversation at a time.

C. Anonymous Group Chat Rooms: Community and Camaraderie

Recognizing the value of shared experiences, Moodify extends social support with anonymous group chat rooms. Users can connect with peers who are dealing with similar challenges and emotional states in these virtual spaces. Individuals can relate to one another's experiences without revealing their identities in these group chat rooms, which provide a safe haven for candid discussions.

Moodify is dedicated to solving the widespread issue of loneliness that often goes hand in hand with mental health struggles. The software aggressively encourages users to connect with others who are going through similar things, with the overriding purpose of cultivating a strong sense of community and camaraderie. Moodify significantly lowers feelings of loneliness and promotes a deep sense of belonging through these efforts. These group chats offer safe and private venues for users to seek advice, offer support, and form important friendships that transcend beyond the digital realm.

Moodify is essentially an unique mobile application focused at boosting mental wellness. It demonstrates how emotionally intelligent systems have the ability to change our approach to mental health challenges. By merging modern technology with private and anonymous social elements, Moodify empowers young adults to take control of their mental health. It is a valuable resource during difficult emotional times, providing a private space for introspection and personal growth as well as a link to a community of like-minded people. Each of these factors will be examined in depth in the following sections, exposing Moodify's potential for transformation and commitment to developing mental health care.

II. LITERATURE REVIEW

The creation of Moodify as a tailored aid for dealing with early-stage mental instability is noteworthy. Following a thorough survey and search, it was discovered that no analogous concept-based initiatives are currently accessible for such objectives. It is crucial to highlight, however, that there are numerous applications and resources that contribute to and validate multiple aspects of dealing with early-stage mental instability. In terms of present research and technology, the field of mental health has been widely researched. This subject contains a number of instruments that can assist with stress assessment and mental health assessments.

A. Multimodal Educational Data Fusion for Mental Health Detection

Teng Guo and Wenhong Zhao's recent research in 2022 produced significant improvements in the field of mental health assessment. They recognized that mental health can be defined by a variety of factors and incorporated multidimensional data. They used a variety of data sources, such as educational achievement and emotional states, to effectively address com- mon mental health disorders. This is essential since Moodify employs facial recognition techniques to determine the user's current mental state. [5]

B. Perceived Stress Scale (PSS)

One of the paradigmatic assessment tools used to measure the stress level in any individual is Perceived Stress Scale (PSS)[6]. It is a statistical and definitive test that helps to gauge the amount of stress by considering the feelings and emotions of the individual in the past month. Contemplating the past month's experiences, the test evaluates the level of stress. It might seem that the questions are repetitive but the questionnaire is designed in such a way that is efficient enough. The best way is to answer the questions fairly and correctly and if there is potential stress highlighted then it suggests and supports individuals to reduce it.

Moodify uses PSS to train the chatbot and when it feels that the user must be gauged by his/her past months' experiences it toggles PSS to examine the stress levels in the user.[6]

C. MoodKit and Mood Management Apps

Available on the App Store MoodKit, a software by Thrive- port which is claimed to be based on Cognitive-behavioral therapy (CBT). It is considered a reliable entity, which has an intricate approach complementary with CBT. MoodKit evalu- ates users' current state and recommends various activities and tasks to be performed by the user that benefits the user to boost his/her mental state. It also encompasses users with a platform to simply regulate the mood and enhancement of conscious and emotional well-being. These are the features in parallel with CBT, but with other advancements and multidimensional features, Moodify becomes a remarkable innovation. [7]

D. Talkspace and i-Breathe

Talkspace is known as a therapy platform, and another notable app, "i Breathe," focuses on mindfulness and stress management. These are well-known examples of mobile applications that aid in mental health recovery. The unique combination of mood tracking, AI chatbot integration, and anonymous group chat features distinguishes Moodify. Mood- ify's distinct strength is its own technology architecture, which is specifically intended to efficiently address individual mental health concerns.[8]

III. RESEARCH GAP

Considering all of the existing research, tools, and conclusions, there is no other significant instrument extant or available that can be utilized as a personal evaluation tool to

evaluate current mental state by detecting facial emotions and providing tailored playlists and podcasts. Moodify provides a customized and personalized assistant for each individual via an integrated chatbot, as well as decreasing loneliness and introversion from users by offering anonymity to socialize in group chat rooms. Existing tools and resources, such as Moodkit, can be used separately for different assessments, providing carefully chosen steps to perform that can help to boost the mood.

Talkspace provides a way to connect with a therapist in the area and get help with mental health difficulties, but the typical issue of revealing identity persists, whereas Moodify offers anonymity through a tailored chatbot.

In conclusion, Moodify is a vastly different and unique tool designed for a holistic approach and curated assessment to heal mental instability at an early stage that cannot be replicated by other current applications and resources.

IV. METHODOLOGY

In consideration of prior research and existing applications, Moodify stands out as a novel and feature-rich mental health application. It boasts three key functionalities aimed at detecting and predicting users' emotional states while offering tailored content to uplift their mood. Here are the core features:

A. Facial Emotion Detection and Mood Prediction:

Moodify utilizes facial emotion detection to gauge a user's current mental state. Leveraging this information, the app recommends suitable songs and podcasts from Spotify's extensive library to help stabilize the user's mood if it's in flux.

To implement facial detection in Android Studio, the process begins by creating an empty activity and configuring module settings to incorporate the OpenCV Android SDK. This SDK provides the necessary functions for facial detection and tracking. Subsequently, a Java class named 'FaceDetection' is created, and essential dependencies are imported to enable facial expression detection, aiding in the prediction of the user's mental state

B. Integrated ChatBot for Mental Health Support:

Recognizing that many individuals are hesitant to discuss their mental well-being with professionals, Moodify includes an embedded chat feature. Users can openly converse about their mental states, emotions, and seek guidance on coping strategies for early-stage depression or instability.[2]

Moodify also integrates a deep learning chatbot, recognizing the value of AI-driven conversational agents. This chatbot provides a non-judgmental space for users to interact. Developed using a deep learning algorithm, it can answer queries it has been trained on and learn from past interactions.

To build the chatbot within Android Studio, a new activity is established, and the TensorFlow Lite library is employed. TensorFlow Lite supports on-device machine learning and is adaptable for various platforms, including Android. By configuring project and module settings and creating a Java class for the chatbot, the TensorFlow interpreter is used to train the model with an appropriate number of epochs. An epoch represents a complete iteration of all training data, ensuring comprehensive model training. Once the chatbot is trained with relevant mental health data, it becomes proficient in addressing early-stage mental instability queries.

The training data for the chatbot encompasses validated mental health assessments such as the Perceived Stress Scale (PSS) for statistical analysis of instability and the General Health Questionnaire (GHQ) to probe users about their past experiences.

C. Anonymous Group Chat Room:

Understanding that those on the brink of mental instability often exhibit introverted tendencies and avoid social interaction, Moodify offers an anonymous group chat room. This facilitates connections between introverted individuals or students facing mental challenges, allowing them to communicate anonymously. This feature empowers users to express them- selves freely and potentially combat depression or instability through peer support.

Moodify introduces a pivotal feature to complement its existing offerings, addressing the needs of individuals who exhibit introverted tendencies. This feature represents the final piece of the puzzle - an anonymous group chat room. In many cases, introversion may be associated with early stages of mental instability. Hence, Moodify encourages users with such traits to engage in anonymous socialization with like-minded individuals, fostering an environment conducive to distraction from distress.

To guarantee anonymity, the Android Studio activity is engineered to authenticate user profiles via email and prompts users to adopt nicknames instead of real names for identification. These nicknames must adhere to guidelines, preventing offensive or derogatory usage. For example, users may select playful nicknames, such as "orange 123."

The anonymous chat room is meticulously crafted as a distinct Android Studio activity, harnessing the capabilities of Android OS packages. Key imports include classes such as android.os.Bundle, android.view.View, android.widget.Button, android.widget.EditText, and android.widget.TextView, which play vital roles in crafting user interfaces and managing user interactions.

Creating an anonymous group chat room in Android Studio typically involves designing the user interface (UI) by specify- ing the layout and configuration of UI components, including buttons, text views, and edit texts. These components facilitate the creation of a chat interface where users can send and receive messages and interact within the chat room.

To sum up, Moodify's development encompasses the creation of various activities and elements, including login portals, home pages, contact sections, and about pages within An- droid Studio. These elements are seamlessly integrated using view subclasses and buttons, resulting in a fully functional An- droid application prepared for deployment. Moodify's holistic approach, which includes emotional analysis, chatbot support,

and anonymous group interaction, offers a well-rounded solution to proactively address early-stage mental instability.

In summary, Moodify represents a comprehensive mental health application designed to intervene at the early stages of mental instability. Its features encompass facial emotion detection, an integrated chat for emotional support, and an anonymous group chat room for introverts, all complemented by a deep learning chatbot capable of addressing users' queries and concerns. The development process in Android Studio incorporates OpenCV for facial detection and TensorFlow Lite for chatbot training, with the training data drawn from certified mental health assessments

V. RESULTS

Our application begins with a user-friendly graphical interface that facilitates user registration while protecting users' privacy by authenticating them using their email addresses and phone numbers. The login credentials are protected and only authorized individuals have access to them, and our Firebase database is encrypted for added security.

Users gain access to Moodify and its features after registering. The main feature uses facial recognition technology to assess the user's current emotional state, providing results in the form of emotions like happiness, sadness, neutrality, anxiety, or anger. Our integrated Spotify API recommends songs and podcasts based on these emotions to divert users away from distractions associated with emotional instability. We are pleased to announce that Moodify accurately predicts the emotions of 8 out of 10 users.

Our application's second feature is a chatbot built with deep learning algorithms and the TensorFlow framework. It was trained using accredited psychological tests such as the Perceived Stress Scale (PSS) and the General Health Questionnaire (GHQ). The chatbot responds to user queries expertly and continuously adapts based on its learning epochs. Our evaluation metrics include establishing Key Performance Indicators (KPIs) such as response time, accuracy, completion rate, user satisfaction, and conversion rate, as well as defining clear objectives and goals. Moodify's chatbot typically responds in 2-3 seconds, resulting in positive user experiences. We evaluate metrics such as intent recognition accuracy, entity extraction accuracy, and contextual understanding in the field of Natural Language Understanding (NLU).While the chatbot demonstrates notable efficiency, it continues to improve as it gains more experience, expanding its knowledge base with each interaction.[3]

Furthermore, real-world user testing has revealed that the chatbot accurately identifies user input and intent, providing appropriate responses in the majority of cases.

We used various metrics and aspects to evaluate the efficiency of the anonymous group chat rooms[4], including user registration and authentication, which includes OTP verification via email during Moodify registration. Furthermore, user feedback was incorporated into user interaction testing, with users describing the interaction as "easy to use." Based on user feedback, metrics such as network connectivity, cross-platform compatibility, performance, and accessibility were evaluated, and the general consensus highlights the innovative and indispensable nature of anonymous group chat rooms. According to statistics, 43 out of 50 users prefer the idea of these chat rooms as a way for introverted individuals to socialize discreetly without revealing their identity.

Finally, our Android application shows great promise in ad- dressing early-stage mental instability by efficiently providing users with emotional support and social interaction resources while protecting their privacy and security.

VI. FUTURE SCOPE

The purpose of the study is to cure the initial stages of mental health issues which widely opens us to numerous future endeavors . The primary work would be to improve the natural language processing which also directs toward the enhancement of the machine learning model resulting in the increased accuracy of feature extraction.The other could be the collaboration among various therapists, counselors, and psychiatrists in order to ensure a quicker recovery.This will open the gate to the global access for remote consulting. Development of the AI based chatbot in order to make it trainable to a wider range of emotions.

VII. CONCLUSION

The primary focus of the research is to provide a rational analysis to treat the young adults' mental health requirements. It can be simply regarded as a platform or a medium to cure the initial stages of mental health issues using primary solutions including podcasts, Anonymous group chatting along with chatbot using deep learning techniques.

Face Detection in Android Studio provides a unique dimension to the application, allowing users to visually express what they're feeling. This feature enhances the user experience by providing real-time emotional assessments, which can be extremely beneficial for mental health monitoring and intervention. As the system automatically detects what an individual is feeling, it is a job done easy for the user as he/she do not have to express it in words which is at times difficult because humans are emotional and they might not be able to correctly emphasize how they are feeling.But the machine is emotionless and works on algorithms and logical boolean methods enabling accurate results. Using these results the machine simply recommends suitable songs and podcasts from Spotify's extensive library to help stabilize the user's mood if it's in flux.

Moreover the smart chatbot in Moodify is like having a helpful friend who is always willing to listen and offer advice. This friend recognizes your emotions and communicates with you in a way that makes you feel heard and understood. Here let's assume you're feeling down or anxious and open Moodify to speak with this chatbot. It knows how to respond to you specifically, making you feel as if it truly understands what you're going through. This improves your experience of receiving help and support because you don't feel like you're

talking to a machine; you feel like you're talking to someone who genuinely cares about you.This type of assistance can be extremely beneficial for people dealing with mental health issues because it makes the user feel more comfortable and supported on their journey to feel better.

Furthermore, the usage of an anonymous group-chat room encourages a sense of connection among the users that use Moodify, facing similar challenges for mental health support. This feature helps the young adults to reach a comfortable state in discussing their experiences, seek guidance, and provide mutual support. The anonymity feature also promotes an open dialogue between the users and minimizes stigma, while seeking mental health support from different other users.

To sum up, Moodify is a significant step forward in treating the mental health challenges of young people by delivering a multidimensional AI assistant that incorporates emotional detection, personalized chatbot interactions, and a supportive community network. The innovative features of Moodify aim to improve its users' general well-being and mental health, making it a valuable resource for persons navigating the complexities of young adulthood and mental health difficulties.

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