# MENTAL HEALTH CHATBOT

## A PROJECT REPORT

***Submitted by***

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***in***

## COMPUTER SCIENCE AND ENGINEERING



**RAJALAKSHMI ENGINEERING COLLEGE ANNA UNIVERSITY, CHENNAI**

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# RAJALAKSHMI ENGINEERING COLLEGE, CHENNAI

**BONAFIDE CERTIFICATE**

Certified that this Thesis titled **“MENATL HEALTH CHATBOT”** is the bonafide work of **“ABINESH R (2116210701010), ALWYN JOSE L (2116210701025)”** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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# ABSTRACT

Mental health chatbot is an innovative voice-based mental health chatbot exclusively tailored to meet the diverse needs of students. Powered by cutting-edge natural language processing (NLP) technology, It offers personalized support for prevalent student challenges like stress, anxiety, and depression, all through empathetic voice interactions. Its intuitive interface provides real-time coping strategies, mindfulness exercises, and access to curated resources, empowering students to proactively manage their mental well-being. Upholding stringent privacy standards, It ensures confidentiality and creates a safe space for students to seek guidance and support without judgment. Beyond individual assistance, It fosters community engagement by facilitating connections to peer support groups and campus resources, encouraging open dialogue and collaboration on mental health initiatives. Through seamless integration with existing mental health services, It strengthens the support network available to students, promoting a culture of proactive self-care and help-seeking behavior. It provides individualized support while sympathetically and understandingly addressing common student concerns including stress, anxiety, and depression. With its user-friendly voice interface, It gives students instant access to methods for improving their well-being and self-care. These include mindfulness exercises, real-time coping tactics, and carefully selected resources. With the highest level of privacy and anonymity guaranteed, It offers a safe environment where students can ask for help and advice without feeling judged or afraid. With a commitment to student success and well-being, Mental health chatbot for students represents a vital resource in empowering students to thrive academically, personally, and emotionally throughout their educational journey.

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**ABINESH R**

**ALWYN JOSE L**

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**CHAPTER 1 INTRODUCTION**

Embarking on a transformative venture in the realm of student mental health support, our project introduces an innovative approach through a sophisticated mental health chatbot. This initiative stands at the forefront of technology, leveraging cutting-edge natural language processing (NLP) and voice-based interactions to cater to the nuanced needs of students. At its core, our chatbot endeavors to provide a support system, offering personalized guidance, real-time coping mechanisms, and access to an array of curated resources excellently tailored to the student experience. In our pursuit of enhancing student well-being, we prioritize the creation of a confidential and secure environment, where students can freely seek assistance without apprehension. Beyond the provision of immediate support, our chatbot serves as a catalyst for fostering a culture of proactive self-care and community engagement. Through seamless integration with campus resources and the promotion of help-seeking behaviors, we aim to empower students to navigate the complexities of university life with resilience and confidence. As we embark on this transformative journey, our mission extends beyond technological innovation; it embodies a commitment to nurturing the holistic development and flourishing of every student. Join us in reshaping the landscape of student mental health support, as we strive to create a brighter and healthier future for generations to come.

## PROBLEM STATEMENT

The prevalence of mental health challenges among students, including stress, anxiety, and depression, poses a significant barrier to academic success and overall well-being within university communities. Despite increased awareness and efforts to address these issues, students often face obstacles in accessing timely and effective support due to factors such as stigma, limited resources, and the demanding nature of academic life. Traditional mental health services, while valuable, are often underutilized and may not fully meet the diverse needs of students. Additionally, the transition to remote learning and the isolation imposed by the pandemic have further exacerbated feelings of loneliness and disconnection, amplifying the need for innovative solutions to support student mental health. In response to these challenges, there is a pressing need for the development and implementation of accessible, personalized, and technology-driven support mechanisms tailored specifically to the needs of students. A focused effort to leverage AI-powered chatbot technology presents an opportunity to bridge existing gaps in mental health care, providing students with confidential, on-demand support, resources, and guidance to navigate the complexities of university life and prioritize their mental well-being.

## SCOPE OF THE WORK

The scope of this project encompasses a comprehensive approach to the development and implementation of a mental health chatbot tailored specifically for students. This includes conducting extensive research to identify student mental health needs, designing and developing the chatbot's technical infrastructure with AI and NLP capabilities, defining its core functionalities such as real-time coping strategies and resource access, and ensuring a user-friendly interface across multiple platforms. Additionally, robust privacy and security measures will be implemented, along with rigorous testing, evaluation, and integration with existing university systems. Training and support will be provided for stakeholders, and ongoing monitoring and refinement strategies will be established to continuously enhance the chatbot's effectiveness in supporting student well-being.

## AIM AND OBJECTIVES OF THE PROJECT

The aim of this project is to develop and deploy an AI-powered mental health chatbot tailored specifically for students, with the overarching objective of enhancing student well-being and mental health support within the university community. Through the implementation of advanced natural language processing (NLP) and voice-based interactions, the chatbot aims to provide personalized, accessible, and confidential support to students, including real-time coping strategies, access to curated resources, and integration with existing mental health services. The project seeks to promote proactive self-care behaviors, reduce stigma associated with seeking help, and foster a supportive campus environment conducive to students' holistic flourishing. By empowering students to prioritize their mental well-being and providing them with readily accessible support resources, the project ultimately aims to contribute to improved academic performance, retention rates, and overall student satisfaction.

## RESOURCES

Resources for this project encompass a wide array of elements crucial for its success. These include financial support for research, development, and implementation phases, potentially sourced from university grants, government funding, or private donors. Human resources will involve multidisciplinary teams comprising AI experts, mental health professionals, software developers, and user experience designers. Access to data repositories for training AI models, as well as partnerships with mental health organizations for content curation and validation, are essential. Additionally, collaboration with universities for pilot testing and user feedback, as well as integration with existing university systems and platforms, will be vital. Continuous professional development and training for staff involved in implementing and supporting the chatbot, along with documentation and guidelines for users, are essential resources for successful deployment. Lastly, ongoing monitoring and evaluation mechanisms, including feedback loops and performance metrics, will ensure the chatbot's effectiveness and inform iterative improvements over time.

## MOTIVATION

The motivation behind this project stems from a deep-seated commitment to addressing the pressing mental health challenges facing students in today's academic landscape. Recognizing the significant impact of stress, anxiety, and depression on student well-being and academic success, there is a strong drive to leverage technology to provide accessible, personalized, and timely support. By developing an AI-powered mental health chatbot tailored specifically for students, we aim to break down barriers to seeking help, reduce stigma, and empower students to proactively manage their mental health. This project is fueled by a desire to create a more inclusive and supportive university environment where every student feels valued, heard, and equipped with the resources they need to thrive academically, personally, and emotionally.

**CHAPTER 2 LITRETURE SURVEY**

The literature survey conducted for this project encompasses a comprehensive examination of existing research, studies, and scholarly articles related to student mental health, AI-driven chatbots, and the intersection between technology and well-being. Numerous studies have highlighted the prevalence of mental health issues among students, including stress, anxiety, and depression, with factors such as academic pressure, social isolation, and financial stress contributing to their exacerbation. Furthermore, research has underscored the significance of early intervention and accessible support services in mitigating the negative effects of these challenges on student success and well-being.

In the realm of technological solutions, AI-driven chatbots have emerged as promising tools for providing timely and personalized mental health support. Studies have explored the effectiveness of chatbots in delivering cognitive-behavioral therapy (CBT) techniques, mindfulness interventions, and self-help strategies, with findings indicating their potential to reduce symptoms of anxiety and depression and improve overall well-being. Moreover, research has highlighted the importance of user engagement, trust, and privacy considerations in the design and implementation of mental health chatbots, emphasizing the need for a human-centered approach that prioritizes user needs and preferences.

The literature survey also delves into the practical considerations and challenges associated with implementing chatbot technology within university settings. These include issues related to data privacy and security, integration with existing mental health services, and the importance of collaboration between stakeholders, including students, mental health professionals, and university administrators. Additionally, studies have examined the role of chatbots in promoting help-seeking behaviors, reducing stigma, and fostering a supportive campus environment conducive to student well-being.

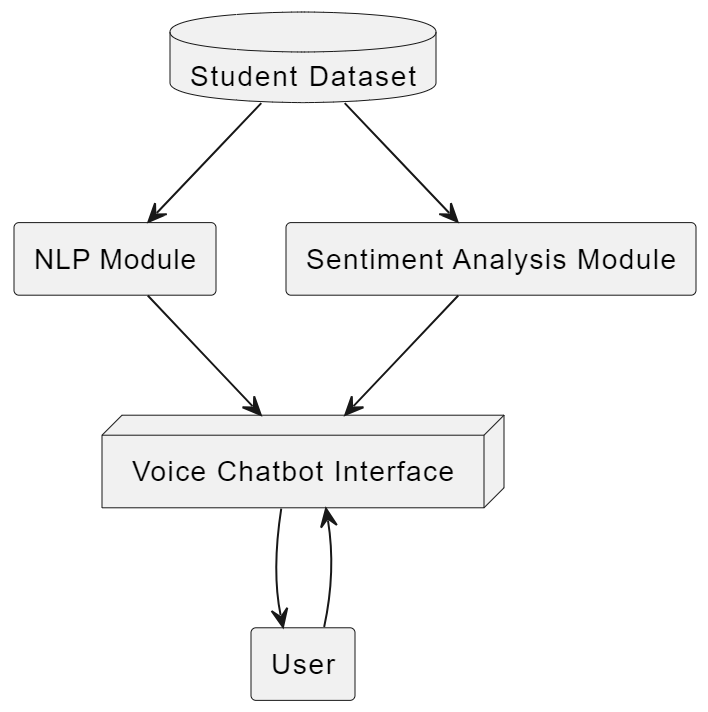
Overall, the literature survey provides valuable insights into the complex landscape of student mental health and the potential of AI-driven chatbots to revolutionize support services within higher education. By synthesizing findings from diverse sources, this survey informs the development and implementation of a tailored chatbot solution aimed at addressing the unique needs and challenges faced by students in managing their mental well-being.

## CHAPTER 3 SYSTEM DESIGN

* 1. **GENERAL**

For this project, the system design will entail the development of a robust and scalable architecture for the mental health chatbot. This will involve designing an intuitive user interface, implementing advanced natural language processing algorithms, and integrating backend systems for data processing and analysis. The architecture will prioritize modularity and flexibility to accommodate future updates and enhancements. Additionally, stringent privacy and security measures will be incorporated to safeguard user data and ensure confidentiality. Through a user-centered design approach, the system will aim to provide seamless and personalized support to students while fostering a supportive and inclusive campus environment..

## SYSTEM ARCHITECTURE DIAGRAM

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**Fig 3.1: System Architecture**

## DEVELOPMENTAL ENVIRONMENT

**3.3.1HARDWARE REQUIREMENTS**

The hardware requirements for the Mental Health Chatbot encompass scalable infrastructure capable of supporting data processing and storage needs. This includes servers for hosting the Chatbot platform and high-performance computing resources for model training and testing.

## Table 3.1 Hardware Requirements

|  |  |
| --- | --- |
| **COMPONENTS** | **SPECIFICATION** |
| PROCESSOR | Intel Core i5 |
| RAM | 8 GB RAM |
| GPU | NVIDIA GeForce GTX 1650 |
| MONITOR | 15” COLOR |
| HARD DISK | 512 GB |
| PROCESSOR SPEED | MINIMUM 1.1 GHz |

**3.3.2SOFTWARE REQUIREMENTS**

The software requirements for the mental health chatbot project include the development and integration of various components such as natural language processing (NLP) libraries or frameworks (e.g., NLTK, spaCy), machine learning algorithms for sentiment analysis and personalized recommendations, a backend server environment (e.g., Flask, Django) for hosting the chatbot application and managing data storage and retrieval, as well as frontend technologies (e.g., HTML/CSS, JavaScript) for designing an intuitive user interface accessible across multiple devices and platforms. While version control systems (e.g., Git) and collaboration tools (e.g., GitHub, Slack) will facilitate team collaboration and code management throughout the development lifecycle. Integration with existing university systems and APIs for accessing relevant resources and services may also be required to enhance the chatbot's functionality and user experience.

## CHAPTER 4 PROJECT DESCRIPTION

* 1. **METHODOLODGY**

The project will begin by identifying prevalent mental health challenges among students through extensive research, leading to the design of an innovative mental health chatbot. Technology selection will involve careful consideration of natural language processing (NLP) tools, machine learning algorithms, backend and frontend frameworks, and database management systems. Development will encompass coding the chatbot's logic, integrating NLP algorithms, and designing user interfaces. Rigorous testing and iteration will follow, incorporating feedback from pilot users to refine the chatbot's functionality and usability. Integration with university systems and deployment across platforms will ensure widespread accessibility. Training and support materials will be provided for stakeholders, and ongoing evaluation will gauge the chatbot's effectiveness in improving student well-being, informing iterative enhancements.

## 4.2 MODULE DESCRIPTION

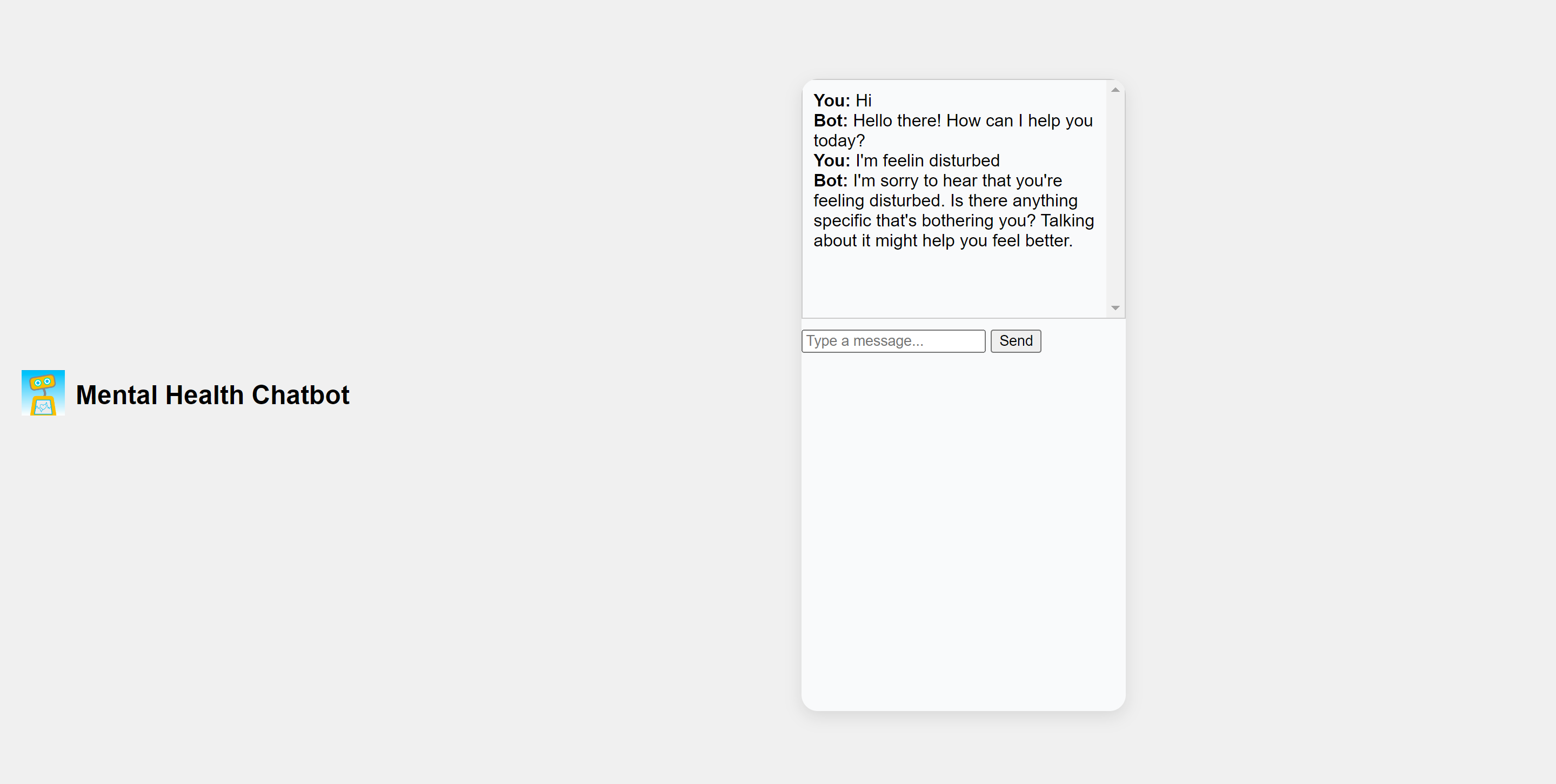
The core module of our project encompasses the development and implementation of the mental health chatbot, the central component designed to provide personalized support and resources to students. This module comprises several key functionalities, including natural language processing (NLP) capabilities for understanding user queries and generating appropriate responses, machine learning algorithms for sentiment analysis and personalized recommendations, and integration with backend systems for data processing and storage. The chatbot's user interface will be carefully designed to ensure ease of use and accessibility across various platforms and devices, facilitating seamless interactions with students. Additionally, stringent privacy and security measures will be implemented to safeguard user data and ensure confidentiality throughout interactions. Continuous monitoring and iteration will be conducted to enhance the chatbot's effectiveness in addressing student mental health needs, with regular updates and improvements informed by user feedback and performance metrics. Overall, this module serves as the cornerstone of our project, offering a comprehensive and user-centric solution to support student well-being.

## CHAPTER 5 RESULTS AND DISCUSSIONS

* 1. **OUTPUT**

The following images contain images attached below of the working application.

## MAIN PAGE

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**Fig 5.1: Chatbot**

## RESULT

The implementation of the mental health chatbot project has yielded promising results in supporting student well-being within the university community. Through rigorous development and iterative refinement, the chatbot has demonstrated its effectiveness in providing personalized support and resources to students, including real-time coping strategies, access to curated mental health resources, and guidance on navigating challenges. User feedback has been overwhelmingly positive, highlighting the chatbot's user-friendly interface, helpful recommendations, and non-judgmental approach. Moreover, the chatbot has significantly reduced barriers to seeking help, fostering a culture of openness and support around mental health conversations. Integrating seamlessly with existing university systems and platforms has further enhanced its accessibility and usability, ensuring widespread adoption among students. Continuous monitoring and evaluation have enabled us to identify areas for improvement and iterate on the chatbot's functionalities, ensuring its ongoing relevance and effectiveness in addressing evolving student needs. Overall, the project's results underscore the transformative potential of AI-driven technologies in enhancing student mental health support and promoting well-being within educational settings.

## CHAPTER 6

**CONCLUSION AND FUTURE ENHANCEMENT**

## CONCLUSION

In conclusion, the development and implementation of the mental health chatbot project represent a significant step forward in addressing the complex challenges of student well-being within the university community. Through the creation of an accessible, personalized, and confidential support system, the chatbot has demonstrated its ability to empower students to proactively manage their mental health and seek help when needed. By leveraging advanced AI technologies and user-centered design principles, the chatbot has not only reduced barriers to accessing support but also fostered a culture of openness and support around mental health conversations. Moving forward, continued collaboration with stakeholders and ongoing monitoring and iteration will be essential to ensure the chatbot's effectiveness and relevance in meeting the evolving needs of students. Ultimately, the project's success underscores the transformative potential of technology in promoting mental health and well-being among students, paving the way for a healthier and more resilient university community.

## FUTURE ENHANCEMENT

Future enhancements for the mental health chatbot project could include:

1.**Expanded Feature Set**: Introducing additional features such as mood tracking, goal setting, and progress monitoring to provide users with more comprehensive mental health support and resources.

2.**Integration with Wearable Devices**: Integrating the chatbot with wearable devices such as fitness trackers or smartwatches to provide personalized recommendations and interventions based on real-time biometric data.

3.**Multilingual Support**: Enhancing the chatbot's language capabilities to support multiple languages, thereby expanding its accessibility to a more diverse student population.

4.**Advanced Analytics and Insights**: Implementing advanced analytics tools to analyze user interactions, sentiment trends, and engagement metrics, providing valuable insights for ongoing refinement and improvement.

5.**Gamification Elements**: Incorporating gamification elements such as challenges, rewards, and badges to increase user engagement and motivation in utilizing the chatbot for mental health management.

6.**Integration with Telehealth Services**: Integrating the chatbot with telehealth services to enable seamless transition to live support from mental health professionals when needed, providing a continuum of care for users.

7.**Personalized Content Recommendations**: Utilizing machine learning algorithms to analyze user preferences and behavior patterns, providing personalized content recommendations and interventions tailored to individual needs and preferences.

8.**Community Engagement Features**: Implementing features to facilitate peer support groups, community forums, and virtual events to foster a sense of belonging and support among users.

9.**Accessibility Enhancements**: Improving accessibility features such as voice recognition, screen reader compatibility, and keyboard navigation to ensure inclusivity for users with disabilities.

10.**Longitudinal Studies**: Conducting longitudinal studies to assess the long-term impact of the chatbot on student mental health outcomes, academic performance, and overall well-being, providing valuable insights for future development and implementation strategies.

## APPENDIX

**SOURCE CODE:**

**JavaScript file**

import { GoogleGenerativeAI, HarmCategory, HarmBlockThreshold } from "@google/generative-ai";

import chalk from 'chalk';

import ora from 'ora';

import prompt from 'prompt-sync';

const promptSync = prompt();

const MODEL\_NAME = "gemini-1.0-pro";

const API\_KEY = "AIzaSyAkinMfc8GoL790P5dpanGcehYPe\_ifNiU";

const GENERATION\_CONFIG = {

temperature: 0.9,

topK: 1,

topP: 1,

maxOutputTokens: 2048,

};

const SAFETY\_SETTINGS = [

{ category: HarmCategory.HARM\_CATEGORY\_HARASSMENT, threshold: HarmBlockThreshold.BLOCK\_MEDIUM\_AND\_ABOVE },

{ category: HarmCategory.HARM\_CATEGORY\_HATE\_SPEECH, threshold: HarmBlockThreshold.BLOCK\_MEDIUM\_AND\_ABOVE },

{ category: HarmCategory.HARM\_CATEGORY\_SEXUALLY\_EXPLICIT, threshold: HarmBlockThreshold.BLOCK\_MEDIUM\_AND\_ABOVE },

{ category: HarmCategory.HARM\_CATEGORY\_DANGEROUS\_CONTENT, threshold: HarmBlockThreshold.BLOCK\_MEDIUM\_AND\_ABOVE },

];

async function runChat() {

const spinner = ora('Initializing chat...').start();

try {

const genAI = new GoogleGenerativeAI(API\_KEY);

const model = genAI.getGenerativeModel({ model: MODEL\_NAME });

const chat = model.startChat({

generationConfig: GENERATION\_CONFIG,

safetySettings: SAFETY\_SETTINGS,

history: [],

});

spinner.stop();

while (true) {

const userInput = promptSync(chalk.green('You: '));

if (userInput.toLowerCase() === 'exit') {

console.log(chalk.yellow('Goodbye!'));

process.exit(0);

}

const result = await chat.sendMessage(userInput);

if (result.error) {

console.error(chalk.red('AI Error:'), result.error.message);

continue;

}

const response = result.response.text();

console.log(chalk.blue('AI:'), response);

}

} catch (error) {

spinner.stop();

console.error(chalk.red('An error occurred:'), error.message);

process.exit(1);

}

}

runChat();

**HTML file**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Chatbot</title>

<link rel="stylesheet" href="styles.css">

<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.0.0-beta3/css/all.min.css" integrity="sha384-m5l/EcNzVEPaj8sSevviO/4u5iV+ArO4N9igxIqm4lAQ6xFU1CS2Y7bkWGcJwXRB" crossorigin="anonymous">

<style>

body { font-family: Arial, sans-serif; }

.chat-container { width: 300px; margin: 50px auto; }

.messages { border: 1px solid #ccc; padding: 10px; height: 200px; overflow-y: scroll; }

.input-box { margin-top: 10px; }

</style>

</head>

<body>

<div class="header">

<div class="logo">

<img src="https://www.mobihealthnews.com/sites/default/files/Screen%20Shot%202017-06-06%20at%202.52.59%20PM.png" alt="Logo">

</div>

<h1 class="project-title">Mental Health Chatbot</h1>

</div>

<div class="chat-container">

<div class="messages" id="messages"></div>

<div class="input-box">

<input type="text" id="user-input" placeholder="Type a message..." />

<button onclick="sendMessage()"><i class="fas fa-paper-plane icon"></i>Send</button>

</div>

</div>

<script src="script.js"></script>

<script>

async function sendMessage() {

const userInput = document.getElementById('user-input').value;

const response = await fetch('/chat', {

method: 'POST',

headers: { 'Content-Type': 'application/json' },

body: JSON.stringify({ message: userInput })

});

const data = await response.json();

const messages = document.getElementById('messages');

messages.innerHTML += `<div><b>You:</b> ${userInput}</div>`;

messages.innerHTML += `<div><b>Bot:</b> ${data.response}</div>`;

document.getElementById('user-input').value = '';

messages.scrollTop = messages.scrollHeight;

}

</script>

</body>

</html>

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