

**Government College Of Engineering And  
Research Avasari**

**Department Of Computer Engineering**



**Title: Smart Mental Healthcare Assistant Using NLP**

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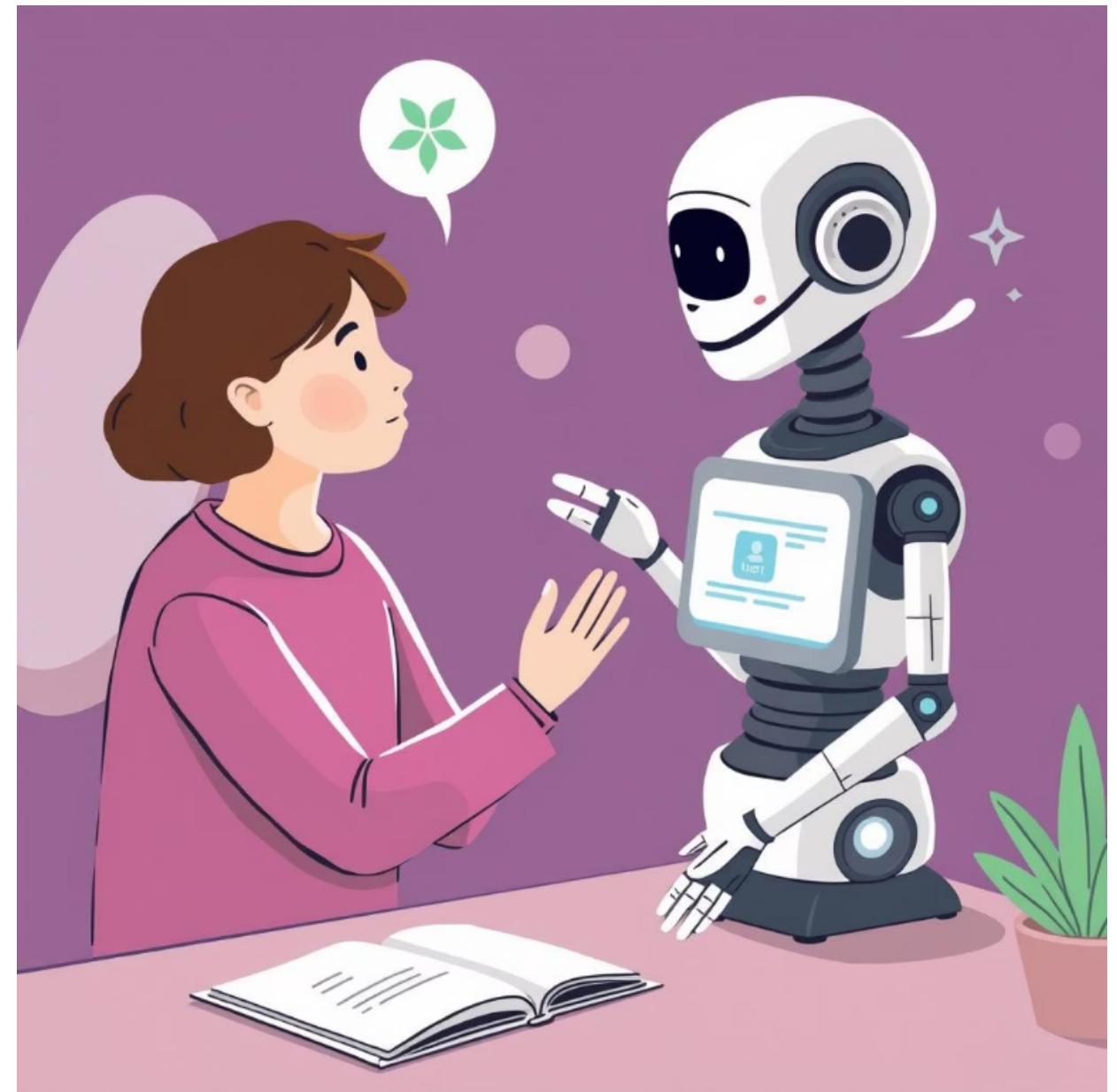
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# Abstract

- AI-based chatbots are transforming mental healthcare delivery.
- Provides accessible, low-cost, and private therapy through NLP.
- Simulates therapeutic conversations using CBT, mindfulness, and emotional classification.
- Deployed as a Flask web app, storing user data securely for feedback and improvement.
- Addresses limitations in clinical adoption of mental health AI tools.



# Introduction

- Mental health disorders (anxiety, depression, stress) are increasing globally.
- India contributes ~15% to global mental illness burden.
- Traditional therapy faces challenges: stigma, cost, and lack of professionals.
- Project offers a virtual assistant to detect emotional distress and provide personalized support.
- Built using NLP, ML, Flask, and secure database architecture.



# Problem Statement

Smart Healthcare Mental Health Assistance, using like Natural Language Processing (NLP) to simulate human conversations, have the potential to improve mental health care.



# Objectives of the Project

- Develop an NLP-powered mental health assistant.
- Detect stress, anxiety, depression from user conversations.
- Train models using real and simulated datasets.
- Provide therapy-like responses using CBT and mindfulness.
- Deploy as a secure and interactive web application.



# Literature Review: Mental Health Chatbots

- 1 **Empathy & Expertise Gaps**

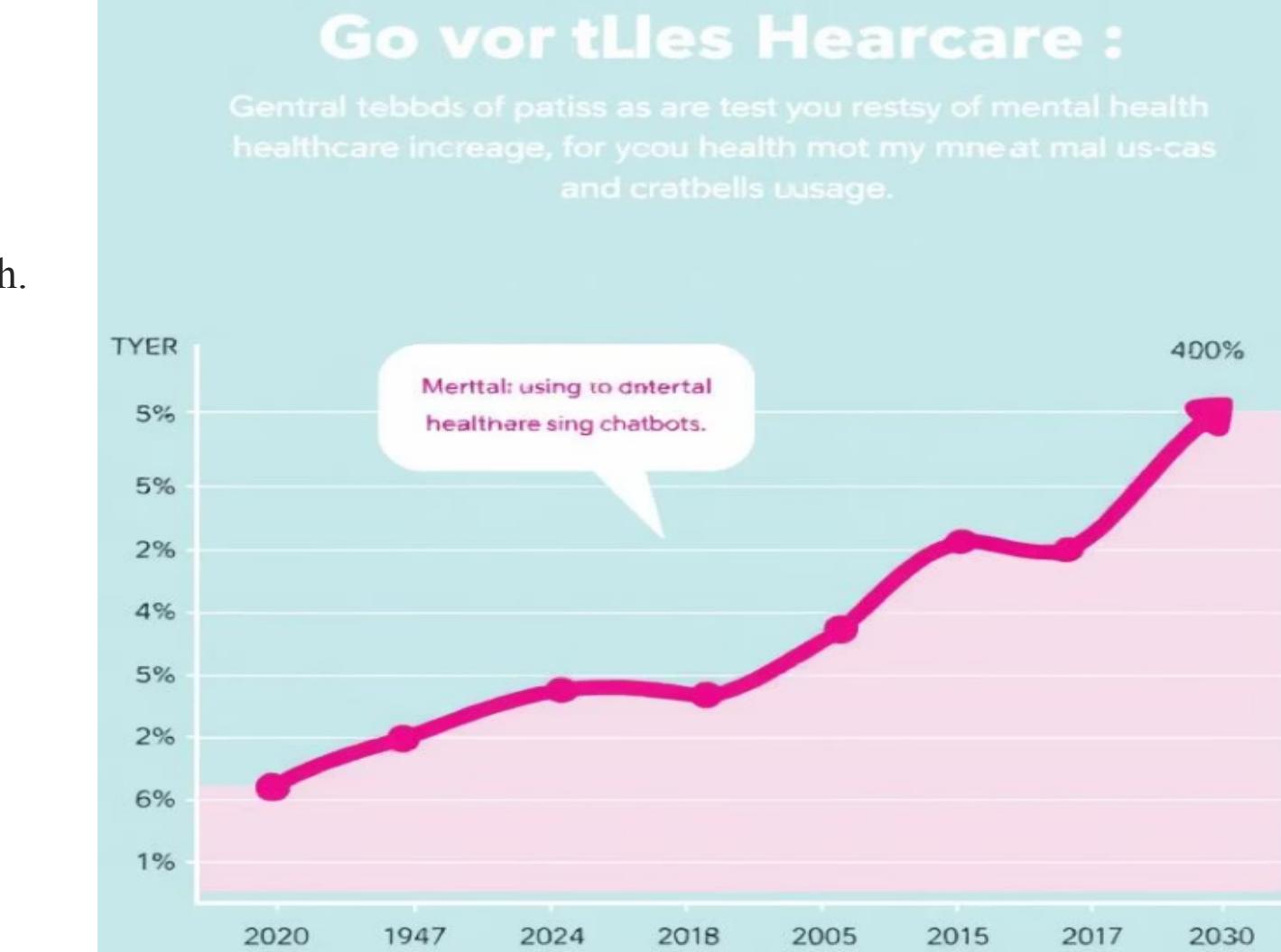
Current chatbots often lack essential empathy and clinical depth.
- 2 **Adoption Trends (2021 Survey)**

22% of adults used mental health chatbots.  
47% expressed interest in future use.
- 3 **COVID-19 Impact**

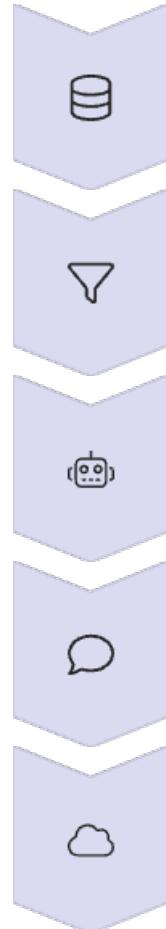
60% started using chatbots during the pandemic.  
44% used chatbots exclusively, no human therapist.
- 4 **Personalised Solutions**

Focus on individual suggestions over generic advice.

  - Wysa
  - Woebot
  - Replica
  - Tess



# Methodology for System Development



## Data Collection

Public datasets and user-simulated conversations.

## Data Preprocessing

Tokenization, lemmatization, and vectorization techniques.

## Model Training

Feed-forward neural network (FNN).

## Response Generation

CBT and mindfulness-based conversational logic.

## Deployment

Flask-based application with interactive UI and SQLite backend.



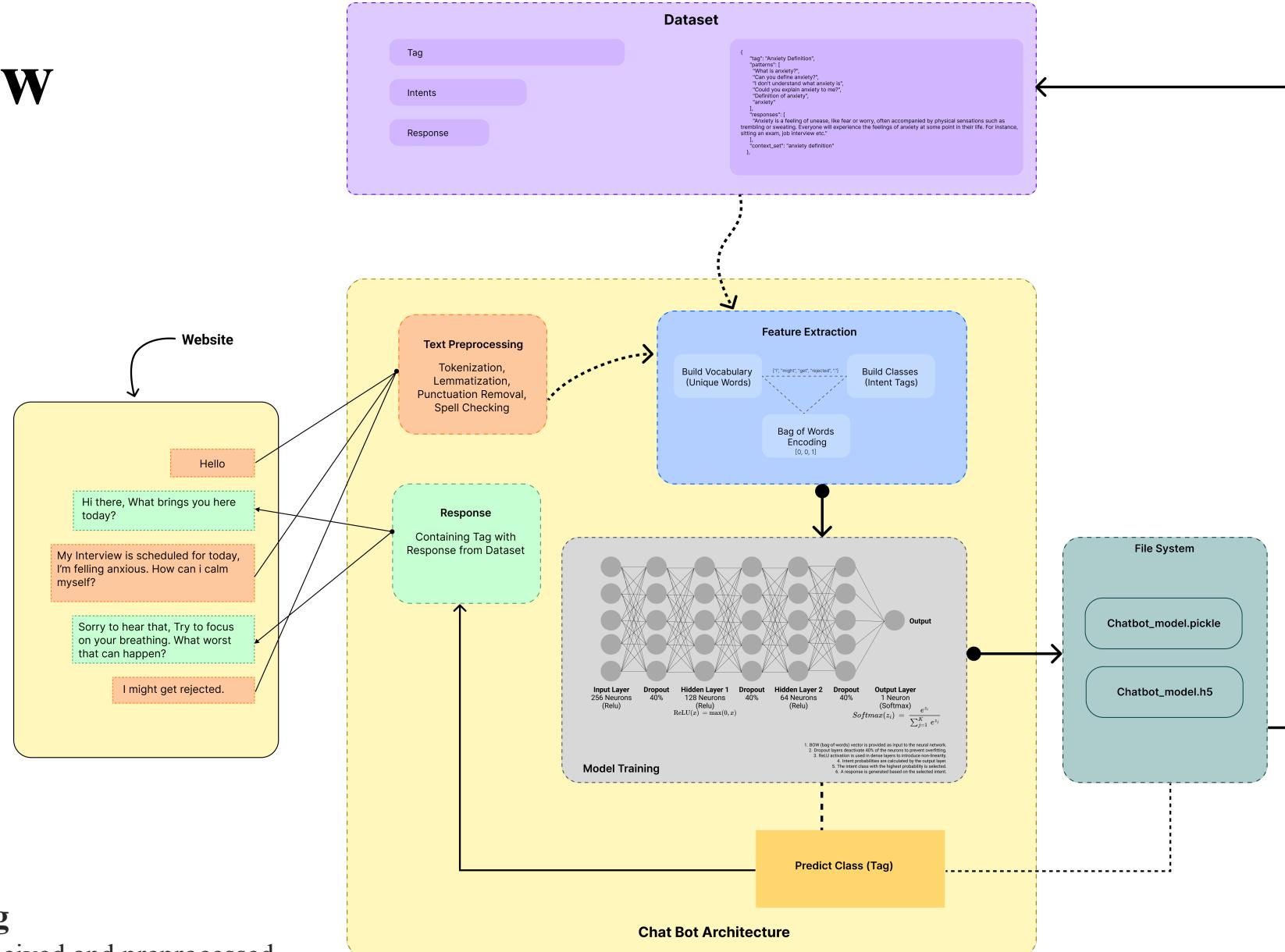
# Project Workflow

1      **Input Processing**  
User queries are received and preprocessed.

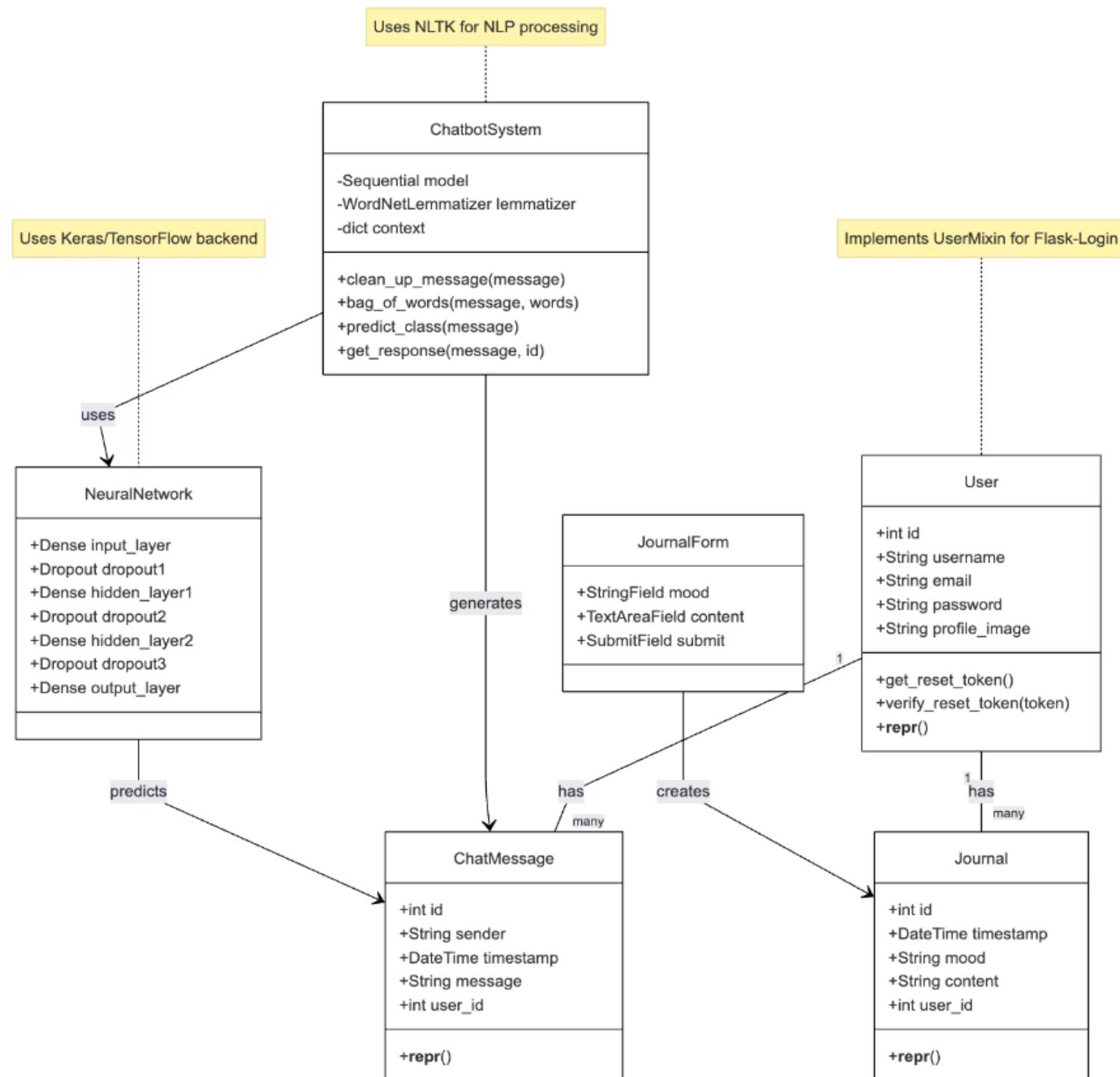
2      **Emotion Detection**  
NLP models classify emotional state.

3      **Therapeutic Response**  
Contextual and empathetic replies generated.

4      **User Interaction**  
Feedback loop for continuous improvement.



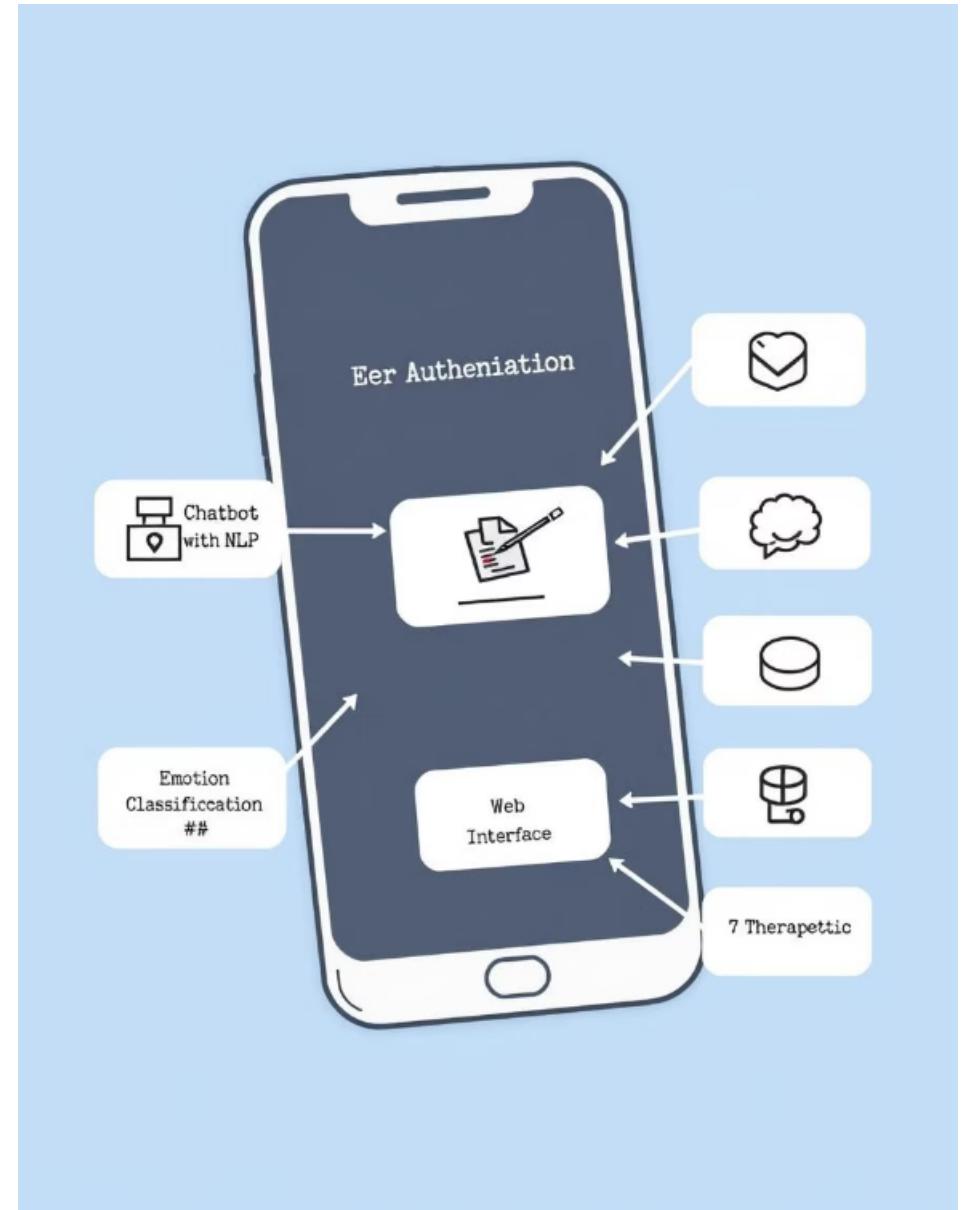
# UML Diagrams



# Gantt Chart

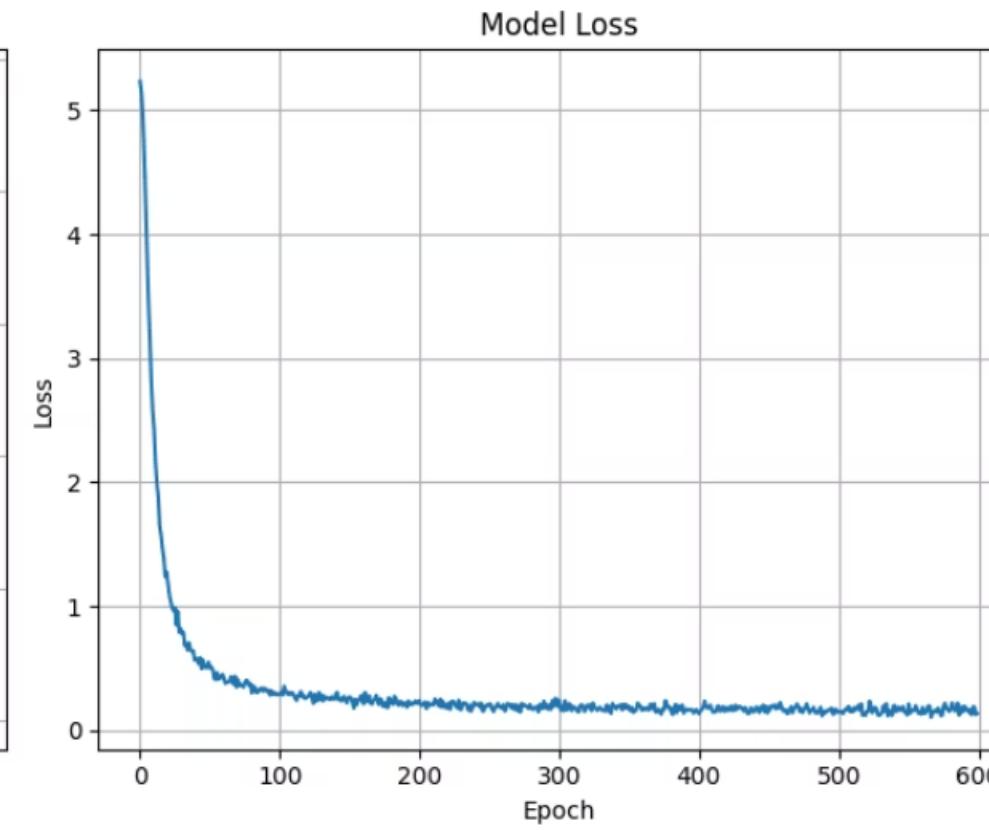
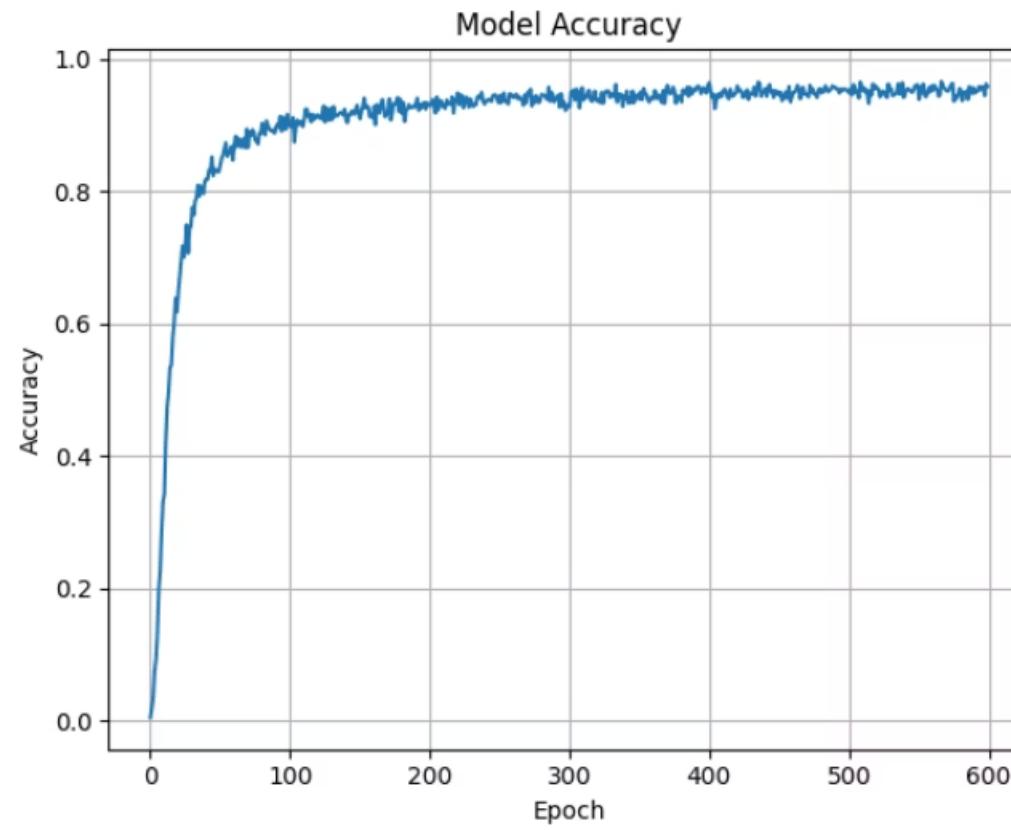
# Modules

1. User Authentication (bcrypt hashing)
2. Chat Module
3. Therapeutic Response Generator (CBT and Mindfulness)
4. Journal Module
5. Web Interface (Flask, HTML, CSS, JS)
6. Database Management (SQLite)



# Result and Discussion

- Tested on 600 epoch with batch size 10.
- Accuracy - 94.38% and Loss - 0.4395 to 0.7839
- Easily scalable for future a models like transformers (BERT/GPT)



# Screenshots of Implementation

## 1. Authentication Page

Amica Chat Journal About

Login Register



## Log In

Email

Password

Remember Me

**Login**

[Forgot Password?](#)

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Need an Account? [Sign Up](#)

## 2. Home Page

Amica    Chat    Journal    About

  Account    Logout

Healing takes time, and that's okay. 



### Amica, Your Friend

Here to help you feel better, one conversation at a time.

 Chat Now

 About Us

 Logout

### 3. Conversations

Amica Chat Journal About

Account Logout

The screenshot shows the Amica mental health chatbot interface. On the left, there's a sidebar with a circular icon of the bot, a "Need Help?" button, and a "Subject" button. The main area shows a conversation log:

- Amica** \*\*:\*\*  
Hi jayesh, welcome back! 😊
- You** 23:17  
Hello
- Mental Health Chatbot** 23:17  
Hi there, how are you feeling today?

At the bottom, there's a message input field with "Enter your message..." placeholder text, a "Send" button, and three buttons for "Topics", "Tests", and "Mindfulness".

## 4. Journal

Amica Chat Journal About

Account Logout

Add Journal

1

### Feeling anxious on 08.06.2025

I have my exams tomorrow.



jayesh

Created on 08/06/2025, Sunday, 23:22

View

# Future Work

- Focus on other domains in health care such as viral infections, heart diseases, etc.
- Convert into various regional languages
- Provide online therapies / yogas in video format.
- Make doctors available online.



# Dataset

- 1,000+ entries in JSON format (intent → patterns + responses).
- Data collected via **Google Forms** and ChatGPT prompts.
- Covers categories: anxiety, academic stress, sleep issues, etc.
- Verified by a **clinical psychologist** for safe and empathetic content.

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# Paper publication



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# Conclusion

- Achieved 98–99% accuracy in detecting mental health conditions.
- Real-time emotional support through intelligent interaction.
- Empathetic, private, and accessible solution for users.
- Scalable architecture supports future enhancements.

*Thank You*