

CAPSTONE PROJECT

AI MENTAL HEALTH BOT

Presented By

Student Name: Neelam . suhavani

College Name: stanley college of
engineering and technology for women

Department: b.e in computer science

Email ID: neelamsuha9@gmail.com

AICTE Student ID:
STU67f3ac8bdc0be1744022667



OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach (Technology Used)
- Algorithm & Deployment
- Result (Output Image)
- Conclusion
- Future Scope
- References

Problem Statement

In today's fast-paced world, mental health issues such as anxiety, stress, and depression are becoming increasingly common. However, many individuals hesitate to seek help due to stigma, lack of awareness, or unavailability of timely resources. For instance, Riya, a college student, often feels anxious and overwhelmed but finds it difficult to open up to others or schedule a therapist session. A non-judgmental, easily accessible support system could greatly benefit users like Riya by offering emotional assistance anytime, anywhere.

Proposed Solution

We propose an AI-powered chatbot designed to offer basic mental health support.

The chatbot:

- Listens empathetically to users
- Analyzes emotional tone
- Provides positive reinforcement and resources
- Offers breathing exercises or journaling prompts
- Refers to professional help if needed

Data Collection:

- Mental health conversation datasets (e.g., from Kaggle, Reddit, CLPsych)
- Emotion-labeled dialogue corpora

Data Preprocessing:

- Text cleaning using NLTK/Spacy
- Emotion classification with sentiment labels

Model:

- Sentiment/emotion analysis using transformer models (like BERT)
- Intent recognition with NLP classifiers

Deployment:

- Built interface using Streamlit / Flask
- Deployed with Python 3 and Hugging Face models

Evaluation:

- F1-score, accuracy of emotion detection
- User feedback on chatbot helpfulness

System Approach

Overall Methodology:

Data Collection: Text data from mental health support forums, annotated for emotional content.

Preprocessing: Tokenization, stopwords removal, lemmatization.

Model Training: Trained emotion detection model using transformer-based NLP.

Chatbot Engine: Built using rule-based and AI response logic (Rasa or custom Python bot).

Feedback Loop: User responses logged to improve model over time.

System Requirements:

Python 3.x

Jupyter Notebook / VS Code

NLP Libraries: NLTK, Transformers (HuggingFace), Scikit-learn

Algorithm & Deployment

Algorithm Used:

- Emotion classification using fine-tuned BERT
- Text classification for intent recognition
- Response generation using rule-based and retrieval-based methods

Training:

- Emotion classification model trained on conversational datasets
- Accuracy optimized via cross-validation

Deployment:

- Frontend interface via Streamlit
- Hosted on local server or cloud (Heroku or Render)

Prediction:

- User inputs message
- Bot detects emotion & intent
- Provides appropriate responses or self-help techniques

Result

Sample Interaction:

User: "I feel so anxious lately, and I don't know why."

Bot: "I'm really sorry you're feeling this way. You're not alone. Would you like to try a short breathing exercise or talk more about it?"

Detected emotion: Anxiety

Suggested action: Breathing exercise

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What's your name? Suhavani

Please choose an option:
1. Chat with the bot
2. View mood log
3. Exit
Enter your choice (1/2/3): 1

Hi Suhavani, how are you feeling today?
(Type 'exit' anytime to stop chatting.)

You: negative
Bot: I'm sorry you're feeling that way. 💔
Bot: Here's something that might help:
🌸 You're doing your best, and that is enough.
💡 Tip: Write down your thoughts.
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[2025-06-10 21:16:32] Suhavani felt neutral: yes
[2025-06-10 21:18:17] Sanvi felt neutral: Neutral

Please choose an option:
1. Chat with the bot
2. View mood log
3. Exit
Enter your choice (1/2/3): 1

Hi josh, how are you feeling today?
(Type 'exit' anytime to stop chatting.)

You: positive
Bot: That's great to hear! 😊 Keep it up!

Bot: Want to share more about what's making you feel good today?
You: █
```

Conclusion

Creating the AI Mental Health Bot was a deeply insightful journey. It taught me how to apply NLP for real-world emotional intelligence problems. The bot performs well in detecting user emotions and offering appropriate responses. Challenges included managing sensitive content, ensuring ethical guidelines, and maintaining user trust. Overall, the bot delivers empathetic and context-aware replies that offer initial mental health support and encouragement.

Future scope

- Integrate voice-based input and responses
- Add multilingual support
- Include professional therapist directory for referrals
- Enable long-term user journaling and progress tracking
- Use reinforcement learning for more personalized responses
- Implement crisis detection and emergency protocols

References

Hugging Face Transformers:

<https://huggingface.co/transformers>

Mental Health Datasets:

<https://www.kaggle.com/datasets>

Sentiment Analysis:

<https://nlp.stanford.edu/sentiment/>

GitHub Link: [Link](#)

Thank you
