

Calmly :An AI-Based Mental Health Chatbot

Capstone Project Presentation

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AGENDA

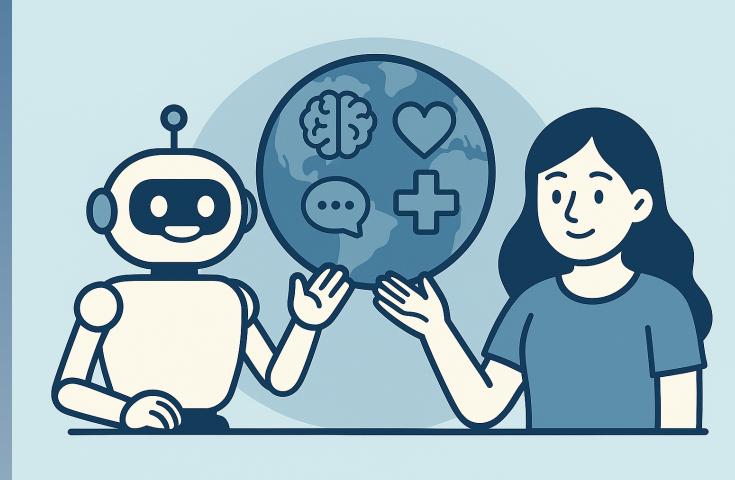


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Introduction

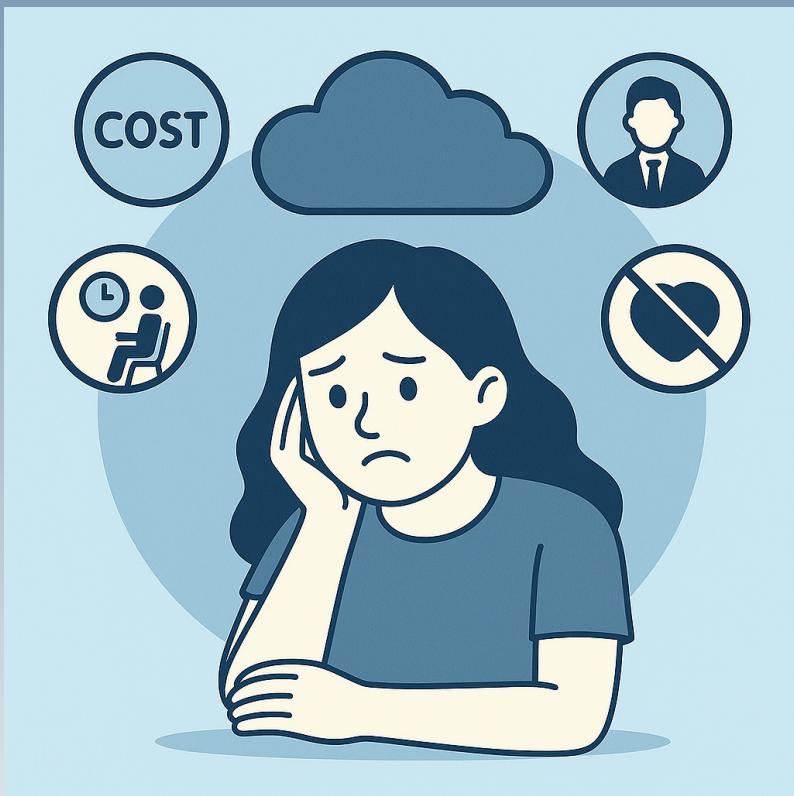
- **Calmly: A web-based AI chatbot using advanced NLP and emotion detection**
 - Real-time emotional support using Natural Language Processing.
 - Detects user emotions and responds empathetically.
 - Trained on large emotional datasets (GoEmotions) for higher accuracy.
 - Provides personalized responses tailored to the user's emotional state.

- **Growing mental health challenges worldwide**
 - Mental health issues like anxiety and depression are rising globally.
 - Millions still lack timely emotional support.
 - Emotional well-being is affected by lifestyle, financial stress, and isolation.
 - Early intervention and regular emotional check-ins are critically needed.



- **Need for accessible, immediate, empathetic support**
 - Therapy delays and stigma discourage help-seeking.
 - AI chatbots can provide 24/7 anonymous emotional support.
 - Instant access to empathetic conversations reduces emotional burden.
 - Cost-effective support platforms are essential for wider reach.

Problem Statement



Mental Health Stigma and Delayed Care Access

- Fear of judgment discourages people from seeking help.
- Delays worsen emotional distress.
- Early support is critical for recovery.
- Anonymous platforms can encourage more users to open up.

Shortage of Mental Health Professionals

- Demand for therapy exceeds available professionals.
- Many regions face long waiting times.
- Technology can supplement the shortage.
- AI systems can offer first-line emotional support.

Need for Real-Time, Personalized Support Systems

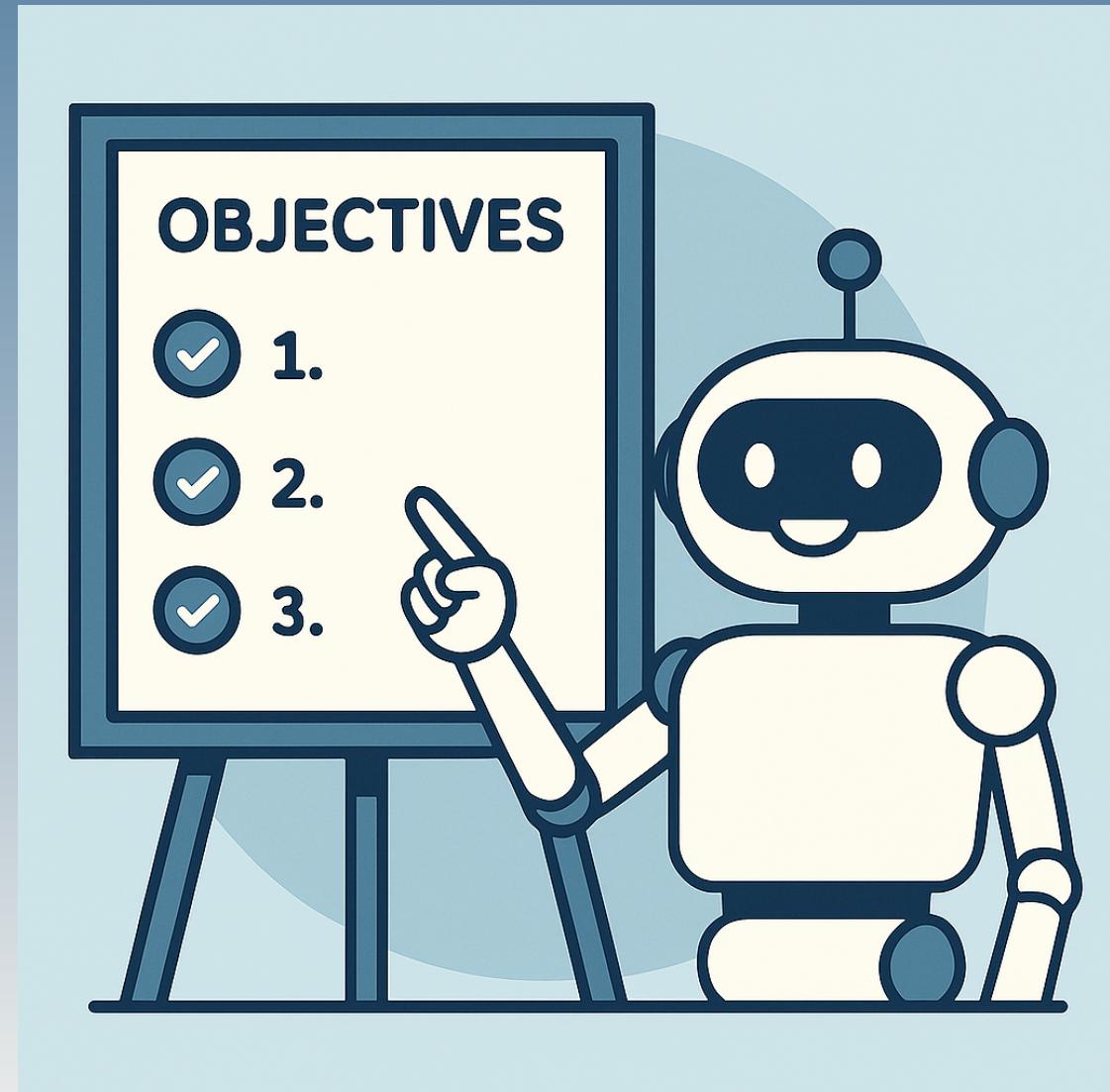
- Immediate help can prevent emotional crises.
- Traditional systems cannot respond instantly.
- Personalized support improves engagement.
- AI chatbots enable quick, tailored conversations.

Calmly Aims to Bridge Gaps with AI Technology

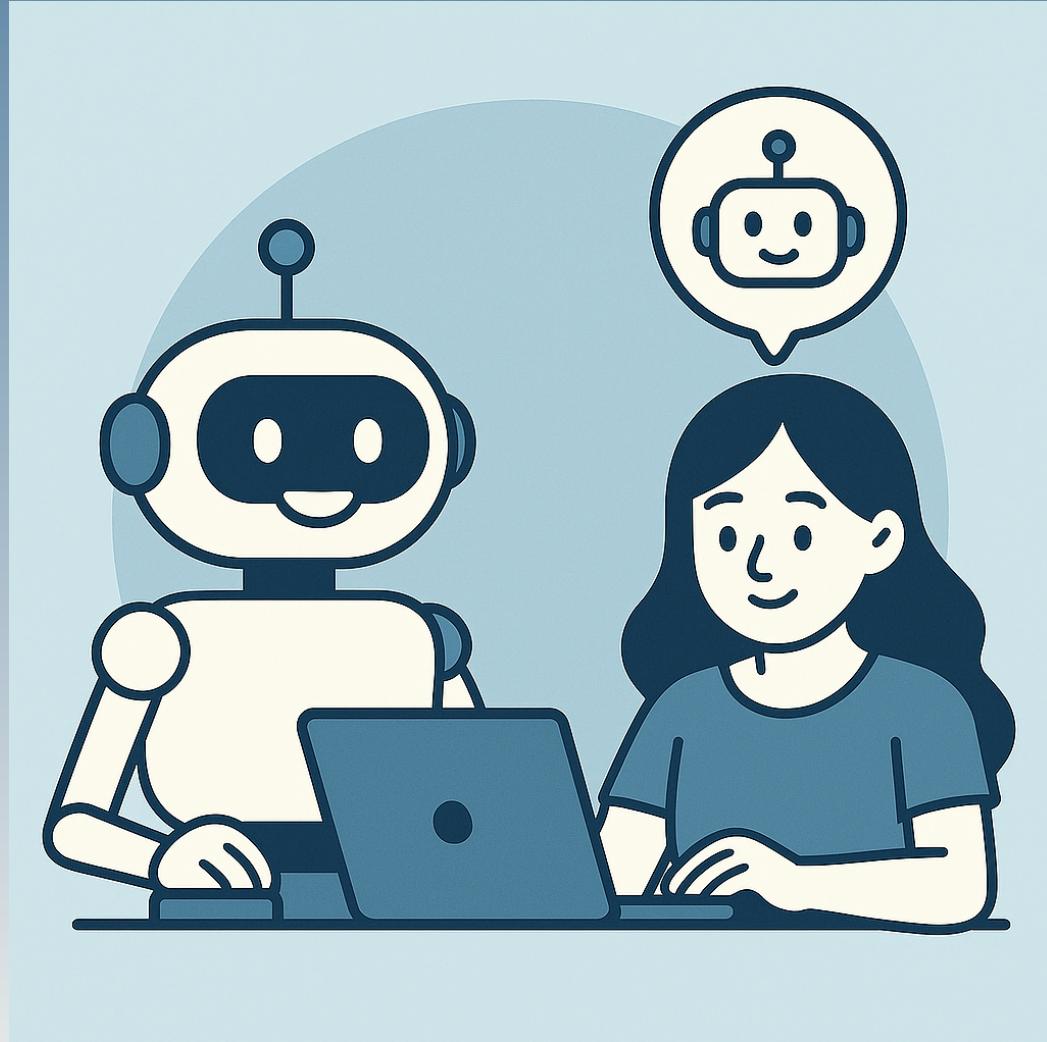
- Calmly uses NLP to detect emotions accurately.
- Provides 24/7 empathetic, non-judgmental support.
- Reduces barriers like cost and stigma.
- Offers a personalized, accessible mental wellness companion.

Objectives

- *Develop an AI chatbot offering empathetic mental health support*
- *Detect user emotions accurately using NLP models*
- *Provide personalized interventions based on detected emotions*
- *Build a secure, user-friendly, scalable platform*



Scope of the Project



- *Web-based chatbot system*
- *Rasa framework for conversational AI*
- *Flask backend for model serving and API integration*
- *Emotion detection using DistilRoBERTa*
- *Secure user data storage (MySQL + SQLAlchemy)*
- *Emergency assistance support*

System Architecture

- **Rasa NLU & Core**

→ Handles user intent recognition, entity extraction, and conversation flow management.

- **Flask Backend**

→ Manages API communication, integrates with Rasa actions and the emotion detection model.

- **DistilRoBERTa Emotion Detection Model**

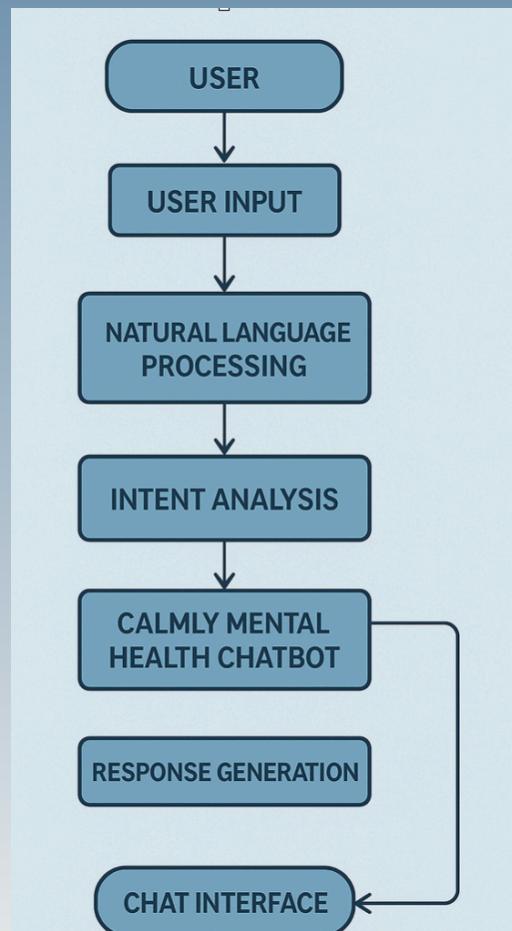
→ Analyzes user messages to detect emotional states and triggers appropriate responses.

- **SQL Database (MySQL + SQLAlchemy)**

→ Stores user demographics, mood logs, and chat history securely for personalization and analytics.

- **Frontend (HTML, CSS, JavaScript)**

→ Provides an interactive chat interface, mood calendar, and user dashboard for real-time engagement.



Implementation

Emotion Detection Module	AI (Rasa Framework)	Demographics Data Handling	Emergency Assistance Trigger
<ul style="list-style-type: none">• Fine-tuned a DistilRoBERTa model using the GoEmotions dataset covering 27 emotional categories.• Integrated the trained model with Rasa for real-time emotion prediction during user conversations.	<ul style="list-style-type: none">• Built using Rasa NLU and Rasa Core for intent detection, entity extraction, and conversation flow management.• Custom actions created for handling user emotions and special triggers like emergency support.	<ul style="list-style-type: none">• Developed a demographic form capturing age, gender, and location.• Data securely stored in an SQL Database (MySQL) using SQLAlchemy for further emotional trend analysis.	<ul style="list-style-type: none">• Emergency actions designed to detect crisis-related inputs.• Provides immediate access to national helpline contacts and hospital information if a user is in distress.

Implementation

Mood Calendar

Integration

- Integrated a mood tracking calendar in the frontend where users log daily emotions.
- Mood entries are saved into the database and linked with user accounts for trend analysis.

Flask APIs

- Built REST APIs using Flask for:
 - /predict-emotion — Predict emotion from user text
 - /api/mood — Save and retrieve mood entries
 - /api/chat-log — Save chat conversations for analysis

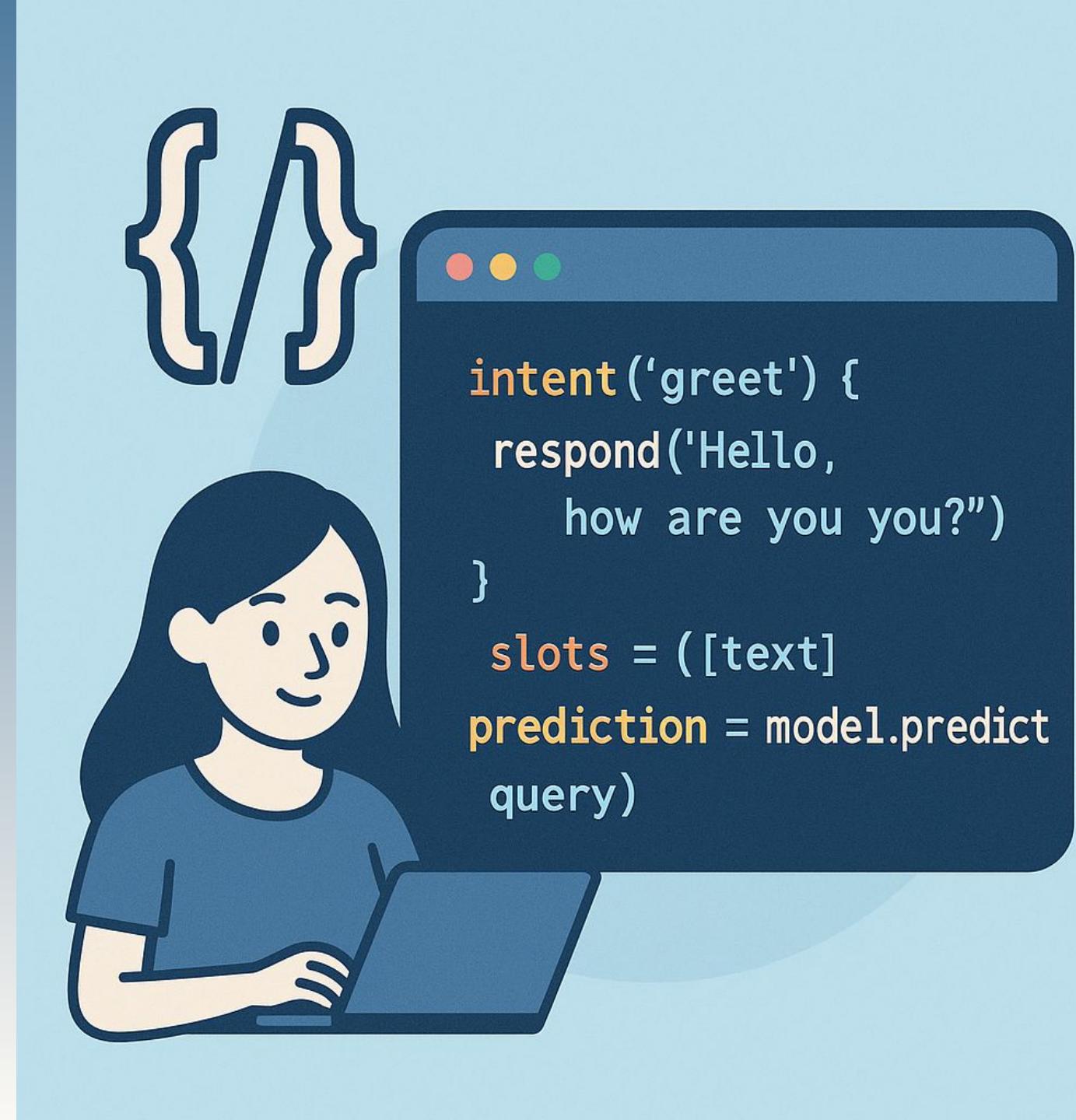
Custom Rasa Actions

- *Detecting emotions dynamically from user input.*
- *Providing emergency contacts during emotional distress.*
- *Saving demographic details to support personalized interactions.*

Frontend Dashboard

- Developed an interactive HTML/CSS/JavaScript dashboard.
- Displays chatbot interface, mood calendar, user statistics, and secure login/signup functionality.

Live Demo of chatbot



THE 16th INTERNATIONAL IEEE CONFERENCE
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NETWORKING TECHNOLOGIES (ICCCNT) - IIT
Indore, Madhya Pradesh, India

Cognitive Insights: Machine Learning for Emotion Detection, Mental Health Analysis.

```
wlload.py:97: FutureWarning: `resume_download` is deprecated and will be removed in v
ersion 1.0.0. Downloads always resume when possible. If you want to force a new download, use `force_download=True`.  
warnings.warn(
```

```
[{'label': 'sadness', 'score': 0.9802719950675964}]
```

Positive Emotions:

```
In [3]: print(predict_emotion("I just got a promotion at work!")) # Expected: joy
print(predict_emotion("I love spending time with my family.")) # Expected: love
[{'label': 'surprise', 'score': 0.4458518624305725}]
[{'label': 'joy', 'score': 0.9882948398590088}]
```

Negative Emotions

```
In [8]: print(predict_emotion("I feel like nothing matters anymore.")) # Expected: sadness or
print(predict_emotion("I'm terrified of what's going to happen next.")) # Expected: fear
[{'label': 'sadness', 'score': 0.42972439527511597}]
[{'label': 'fear', 'score': 0.9923535585403442}]
```

Angry or Frustrated

```
In [4]: print(predict_emotion("Why does nobody ever listen to me?!!")) # Expected: anger
[{'label': 'anger', 'score': 0.6718524098396301}]
```

Confused or Surprised

```
In [5]: print(predict_emotion("I didn't expect that result at all!")) # Expected: surprise
print(predict_emotion("I have no idea what I'm doing.")) # Expected: confusion
[{'label': 'surprise', 'score': 0.9695680737495422}]
[{'label': 'surprise', 'score': 0.8291070461273193}]
```

Calm/Neutral

```
In [6]: print(predict_emotion("I'm just sitting here enjoying the sunset.")) # Expected: calm
[{'label': 'joy', 'score': 0.9467862844467163}]
```

Overwhelmed or Mixed

```
In [7]: print(predict_emotion("I'm overwhelmed with everything happening around me.")) # Expected
[{'label': 'surprise', 'score': 0.906908392906189}]
```

Conclusion

- *Calmly demonstrates that AI can provide scalable, empathetic mental health support*
- *Reliable real-time emotion detection*
- *Secure, responsive web application architecture*

Future Work

- *Voice-Based Interaction (Speech to Text / Text to Speech)*
- *Mobile App Version*
- *Sentiment Trend Tracking*
- *Escalation to Human Therapists (for critical cases)*

THANK YOU!

