Mental Health Support Chatbot - Job Assessment Submission for Accordia Global Sdn Bhd

1. Industry Use Case

Industry: Healthcare (Mental Health Support)

Specific Use Case:

AI-Powered Mental Health Crisis Support and Emotional Wellness Chatbot

Problem Statement:

- Mental health support remains difficult to access due to stigma, cost, and limited availability
- Many regions lack 24/7 crisis support
- Early intervention is crucial to prevent escalation of mental health crises

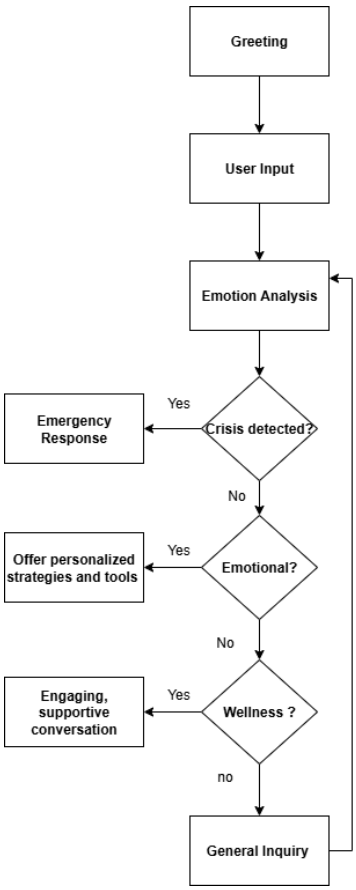
Solution:
An intelligent chatbot that offers:

- Immediate crisis detection and intervention with referral to proper resources
- Emotionally aware and empathetic conversations
- Personalized coping strategies and mental wellness advice
- Seamless guidance toward professional help when necessary

Target Users:

- Individuals struggling with mental health issues
- Those seeking emotional support and guidance
- At-risk users needing immediate intervention

2. Conversational Flow Design



3. Training & Technical Overview

Model Architecture:

- Base Model: TinyLlama-1.1B-Chat-v1.0
- Fine-Tuning Method: PEFT (Parameter Efficient Fine-Tuning) using LoRA
- Training Datasets (100k samples used from ~800k total due to local hardware limits):
    - **Mental-Health-Conversations (HF)**
    - **mental-health-chat-dataset (HF)**
    - **Mental Health Counseling Conversations (Kaggle)**
    - **Therapist Patient Conversation Dataset (Kaggle)**
    - **Mental Health Conversational Data (Kaggle)**

Training Parameters and Reasoning:

- per_device_train_batch_size=2 — optimal for 4GB VRAM GPU (RTX 2050)
- gradient_accumulation_steps=4
- learning_rate=5e-5 fp16=True — mixed precision training for performance boost
- max_steps=100000

Training Outcome:

- Final Loss: ~1.085
- Mean Token Accuracy: 70.5%
- Epoch Reached: ~3.6
- Notes:
    - Model successfully learned patterns without memorizing responses
    - Safety instructions and tone generalize well across unseen inputs
- Total Training Time = 3 Days.

Core Technical Components:

Crisis Detection Logic:

- Using simple crisis phrases e.g., Kill myself.

Conversation Flow Control:

- Tracked via session_state in Streamlit
- Controls path: crisis, support, general chat

Session-Based Context:

- Tracks user state during conversation
- Dynamically alters flow based on previous input

Model Behavior Customization:

Instruction:

You are a compassionate mental health assistant.

If user expresses suicidal thoughts, respond with crisis help.

If user is anxious, depressed, or overwhelmed, ask clarifying questions.

Avoid medical diagnosis and always refer to professionals.

4. Demonstration & Outcomes

What This Chatbot Can Do:

1. **Real-Time Crisis Response**
2. **Emotionally Supportive Conversations**
3. **Mental Wellness Recommendations**
4. **Context-Aware Dialogue Flow**

Unique Capabilities:

- Malaysia-specific crisis contacts (e.g., Befrienders KL, Talian Kasih)
- Adapts tone based on severity

Sample Interaction - Crisis:

User: I want to die

Bot: 🚨 I'm really concerned. Please call Befrienders KL at 03-7627-2929 or Talian Kasih 15999. You're not alone. Would you like to share more about what's troubling you?

Sample Interaction - Support:

User: I'm stressed about work deadlines

Bot: That sounds really overwhelming. Can you tell me more about what's causing that pressure? I'm here to listen.

Conclusion

This submission demonstrates the practical and ethical deployment of a fine-tuned LLM for mental health use. It is technically sound, uses domain-specific training, and handles conversations with care and control.