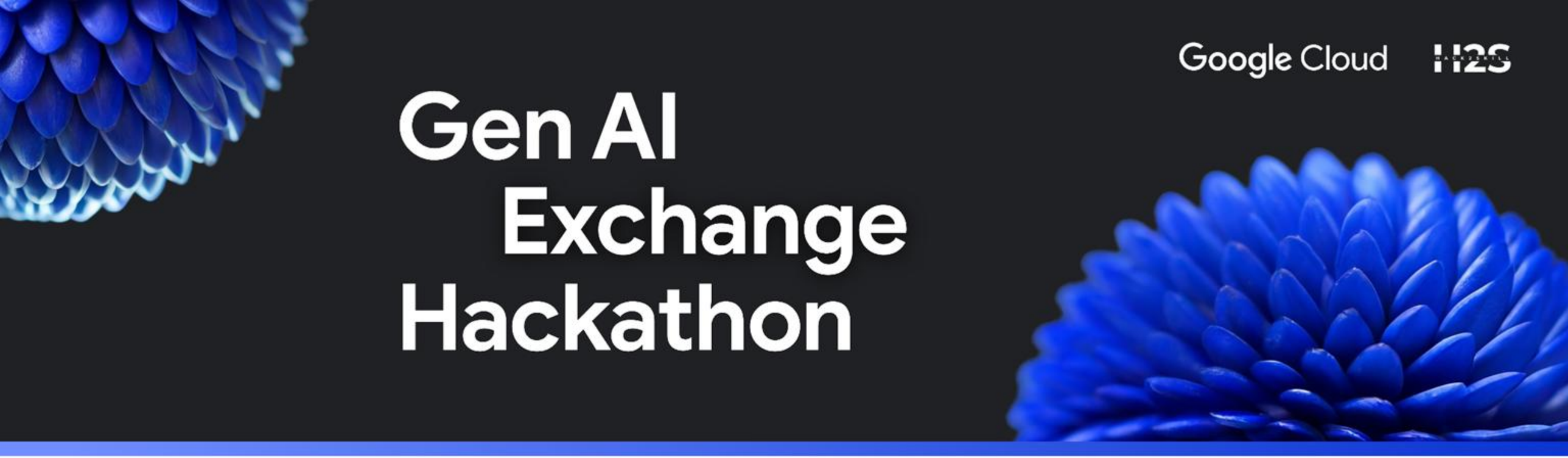


Team Name : The Data Company

Team Leader Name : Mitul Srivastava

Problem Statement : Generative AI for Youth Mental Wellness

Brief about the prototype:

Our prototype is an **AI-powered mental health chatbot** designed for empathetic, safe, and context-aware conversations.

At its core, it uses the **Phi-3 Mini (instruction-tuned LLM)** as the **primary conversational model**, with **falcon-rw-1b** as a fallback. This LLM backbone is augmented with multiple intelligent layers:

Mood & Emotion Detection

Classifies user sentiment.

Concern Analysis (ABSA)

Identifies key user issues.

Crisis & Safety Filtering

Detects harmful content; redirects to helplines.

Grounded Tips (RAG)

Provides safe and accurate advice.

Empathetic Responses

Ensures supportive and varied tone.

Multimodal Interaction

Supports voice & visual interactions.

How different is it from existing solutions?

Existing Solutions

Scripted CBT or general-purpose LLMs (e.g., Wysa, Woebot).

Our Prototype

Integrates Phi-3 Mini with safety, empathy, and grounding layers for safe, empathetic, and context-aware conversations.

How will it solve the problem?

24/7 Scalable Support

Constant, accessible support for common mental health concerns.

Adaptive & Empathetic

Detects emotions and concerns, adapting responses for personalized support.

Crisis Detection

Flags unsafe content; guides users to appropriate helplines.

Grounded Responses

RAG ensures accurate, reliable, and evidence-based advice.

USP of the proposed solution

Safety-First AI

Crisis-aware mental health chatbot

Empathetic & Context-Aware

Leverages sentiment, ABSA, and emotion-driven responses

Multimodal Interaction

Supports text, voice, facial and emotion recognition

Lightweight & Scalable

Deployable on cloud or mobile platforms

List of features offered by the solution

Text & Voice Interaction

Utilizes gTTS and SpeechRecognition for seamless communication.

Emotion & Sentiment Detection

Powered by RoBERTa and DistilBERT for nuanced understanding.

Aspect-Based Sentiment Analysis (ABSA)

Employs DeBERTa with a fallback to BERT for precise sentiment insights.

Crisis & Safety Filtering

Screens for unsafe keywords and leverages Toxic-BERT for user protection.

Retrieval-Augmented Generation (RAG)

Integrated with a FAISS knowledge base for accurate and relevant responses.

Deduplication & Empathy Management

Avoids repetition and infuses warmth into every interaction.

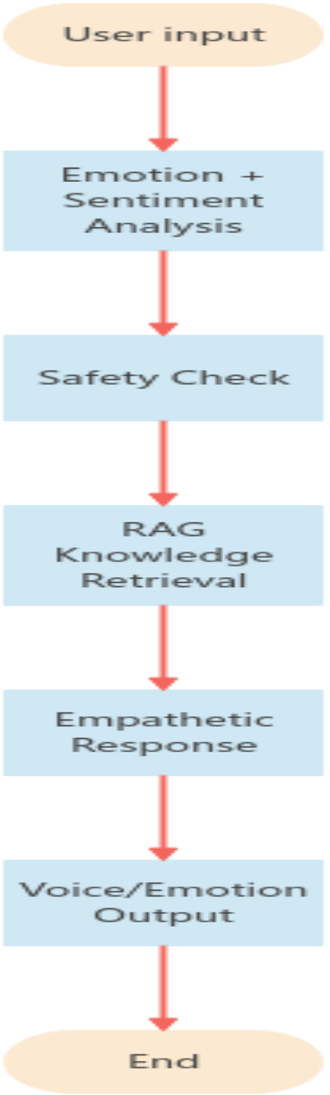
Facial Emotion Recognition

Incorporates DeepFace and OpenCV for visual emotion detection.

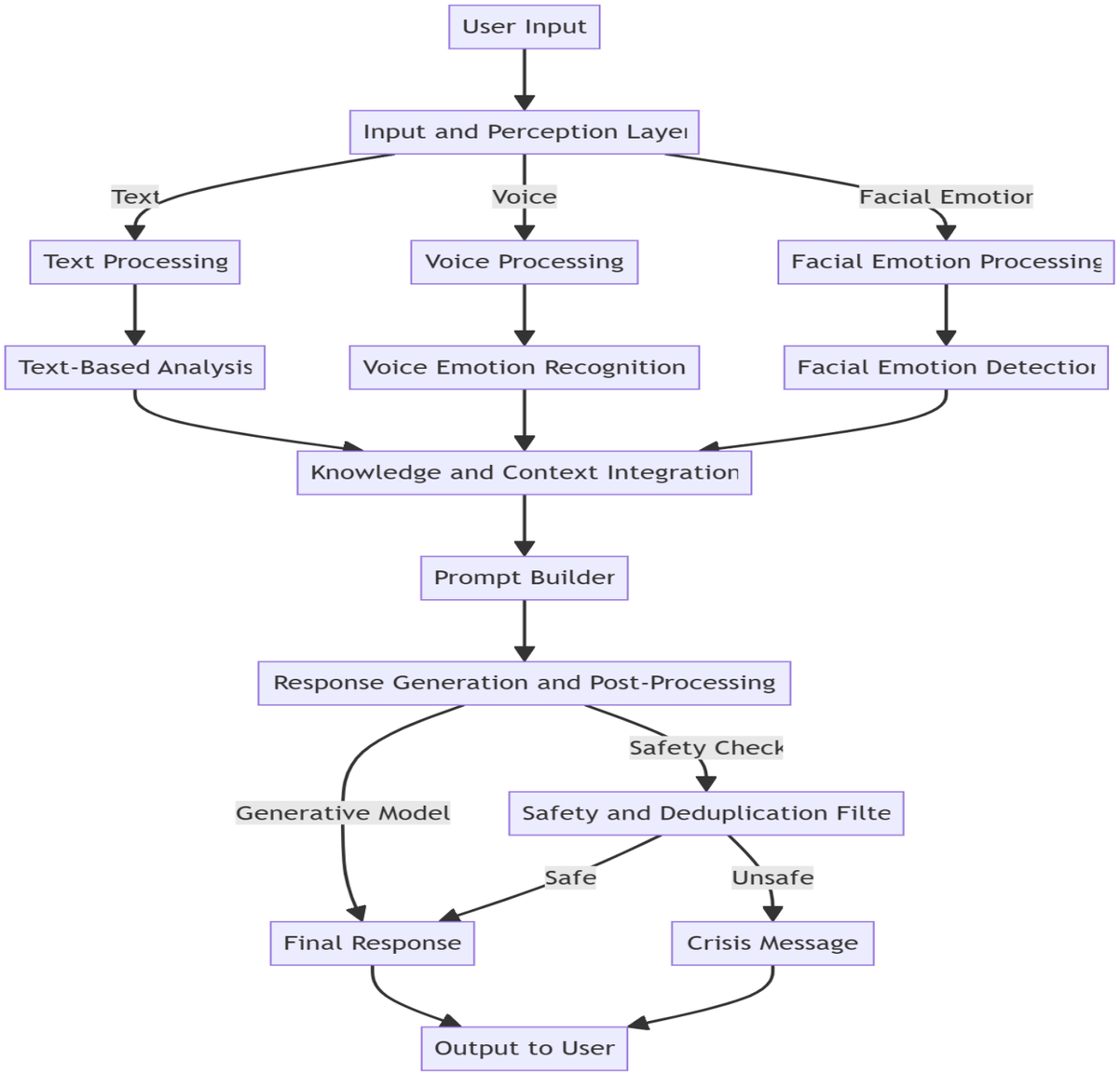
Cloud-ready & Scalable

Designed for easy deployment on cloud platforms like Colab / GCP.

Process flow diagram



Architecture diagram of the proposed solution



Technologies to be used in the solution:

Core Development

- **Python** (main language)
- **PyTorch** (deep learning)
- **HuggingFace Transformers** (LLMs, NLP)
- **SentenceTransformers + FAISS** (Embeddings & RAG)

Conversational Models

- **Phi-3 Mini** (primary LLM)
- **Gemma-2B** (fallback LLM)
- **RoBERTa / DistilBERT** (sentiment)
- **DeBERTa / BERT** (Aspect-Based SA)

Speech & Vision

- **gTTS & SpeechRecognition** (TTS, voice input)
- **DeepFace, OpenCV, Mediapipe** (facial emotion)

Safety & Crisis Detection

- **Toxic-BERT** (toxicity filtering)
- **Custom keyword embeddings** (unsafe content)

Deployment & Tools

- **Google Colab** (prototyping, training)
- **Pandas, NumPy** (data preprocessing)
- **FAISS Indexing** (fast RAG retrieval)

Estimated implementation cost:

Development & Training (Current Prototype)

- ✅ **Google Colab (Free + Pro)** → $0 – $10/month
- ✅ **Pre-trained Models (HuggingFace)** → Free (open-source)
- ✅ **Libraries & Frameworks** → Free (PyTorch, Transformers, FAISS, etc.)

Future Scaling (If deployed in production)

- ☁️ **Cloud Hosting (e.g., GCP/AWS/Azure)** → $50 – $200/month (depending on user load & GPU usage)
- 🗣️ **Speech & Emotion APIs (if external services used)** → $20 – $50/month
- 📚 **Custom Dataset Expansion** → Variable (data sourcing, annotation costs)

Total Current Prototype Cost: ~ $0 – $20/month (sustainable for hackathon & testing).

Future Deployment Cost: ~ $100 – $300/month (for small-scale real-world pilot).

Google Cloud H2S

Gen AI Exchange Hackathon

Thank you