

TEAM FACKERS, DUBAI 

FALCON HACKATHON

FALCON COGNITIVE THERAPY ASSISTANT

An AI driven chatbot that serves as a virtual personal therapy assistant for users (patients) who are suffering from cognitive behavioral disorders and need quick, empathetic, yet cost-effective assistance.

An AI71/ lablab organized event – July 26th to August 5th, 2024



APPLICATION DESCRIPTION



Target Audience

- Users seeking psychological guidance
- Individuals interested in cognitive behavior counseling



AI-Driven Engagement

- Natural language processing for meaningful and empathetic dialogue
- Understands user intent and emotions in real-time



Interaction Highlights

- Provides positive, challenging, encouraging, and useful responses
- Summarizes emotional triggers in user prompts during the session



Emotional Analysis

- Displays top 5 emotion triggers with scores as a chart in each session



Session Summary

- Concludes with a summary of the conversation
- Offers personalized medical and non-medical recommendations/action plans

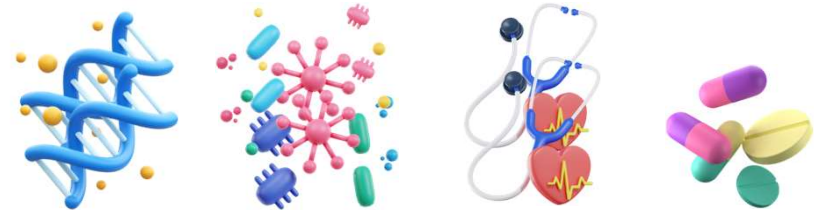




PROJECT SCOPE

- ⊕ Workflow Demonstration
 - Showcasing the application's dialogue generation capabilities
- ⊕ Functional Capabilities
 - Utilizing cosine similarity for user prompt embedding vectors with a local vector database
 - Classifying user emotions from consolidated dialogues
 - Summarizing conversations and generating recommendations based on the summary

Caveats: Better quality of dialogue dataset will provide better, relevant responses by the application. Better hosting platform with higher processing and storage capabilities will produce better and faster results.



TECHNOLOGY & CATEGORY TAGS

- + AI71
 - + TIIUAE/FALCON-180B-CHAT
 - + PARAPHRASE-MINILM-L6-V2
 - + FACEBOOK/BART-LARGE-MNLI
 - + GRADIO
 - + PYTHON LIBRARIES
 - + HUGGINGFACE DATASETS
 - + HUGGINGFACE SPACES
 - + TORCH
 - + COLAB
- + #GenAI, #RAG, #Classification, #Gradio, #Huggingface
#Falcon #AI71 #Vector-database



PROBLEM & SOLUTION

⊕ What is Cognitive Behavioral Therapy?

- Effective psychological treatment for various mental disorders
- Research shows significant improvement in functioning and quality of life
- Proven to be as effective as, or more effective than, other psychological therapies or psychiatric medications



PROBLEM & SOLUTION

⊕ Problem background:

As per World Health Organization (WHO):

- 1 in every 8 people in the world live with a mental disorder
- Mental disorders involve significant disturbances in thinking, emotional regulation, or behaviour
- There are many different types of mental disorders
- Most people do not have access to effective care





PROBLEM & SOLUTION

Some of the common CBT disorders:

- depression
- anxiety disorders
- obsessive-compulsive disorder (OCD)
- post-traumatic stress disorder (PTSD)
- substance use disorders
- borderline personality disorder
- eating disorders such as anorexia and bulimia
- panic disorder
- phobias
- psychosis
- schizophrenia
- sleep problems such as insomnia
- problems related to alcohol misuse



PROBLEM & SOLUTION

Core Issue and its resolution:

- Millions of people around the world suffer from psychological disorders
- This app provides counselling and guidance assistance using cost effective, easy and personalized conversation
- This app can be a viable alternative for patients who have reservations or constrained to approach doctors directly

REVENUE STREAMS

+ Main revenue stream:

- Revenue from user sessions

+ Other revenue streams:

- Annual app subscription charges
- Advertisements from doctors and pharmacists





BUSINESS POTENTIAL

This app can help millions of people around the world who are suffering from CB disorders by providing intuitive, interactive, intimate, conversational guidance to deal with their issues.

One can imagine the business potential even a small fee per session is considered. Though it does not absolutely replace doctors, it does save a lot for users on consultation and treatment charges.



BUSINESS POTENTIAL – ONLY FOR MAIN REVENUE STREAM

Total Addressable Market (TAM) & Serviceable Addressable Market (SAM)

▪ Total world population:	8,000,000,000
▪ Approx total population with access to technology (40%):	3,200,000,000
▪ (TAM) Total potential population - people with mental disorders (1 in 8 of global population):	400,000,000
▪ (SAM) Target number of users (0.1%)	400,000
▪ Avg number of sessions per month per user:	2
▪ Avg number of sessions per year for target users per year:	9,600,000
▪ Approx per session charge:	USD.1
▪ Approx total revenue per year:	USD.9,600,000





BUSINESS POTENTIAL



Revenue projections - Thought process

Geography	Time Frame	Approx Population	TAM(P*0.7 for ME, 0.4 for world/8)	SAM (TAM*.01 for ME, .001 for world)	User Sessions (SAM*24)	Revenue from Main RS (USD.1/ session)	Revenue from Other RS **	Total Revenue/ Year (USD)
UAE	1st Year	12,500,000	1,093,750	5,469	131,256	131,256	55,190	186,446
GCC	2-3 Years	60,000,000	5,250,000	26,250	630,000	630,000	263,500	893,500
Global	From 4th year	8,000,000,000	400,000,000	400,000	9,600,000	9,600,000	4,002,500	13,602,500

** Subscription charges (SAM*10) + Ads (250*10)

The subscription and Ad charges vary as per geography

HOW THE APP WORKS!

- The app uses a Therapist-Patient dialogue database in the backend with vector embeddings for user dialogues additionally.
- The app also uses a dataset of 15 different emotion trigger class labels to classify any user dialogue
- When a patient submits his query prompt in the gradio app, that will be fetched, converted into an embedding vector and compared against all the embedded vectors in the database and the best match is picked as the therapist's response.
- At the same time the app compares the accumulated patient's dialogues, classifies them, picks up top five emotion triggers labels out of the possible 20 classes, with their corresponding normalized scores and creates a chart.



HOW THE APP WORKS!

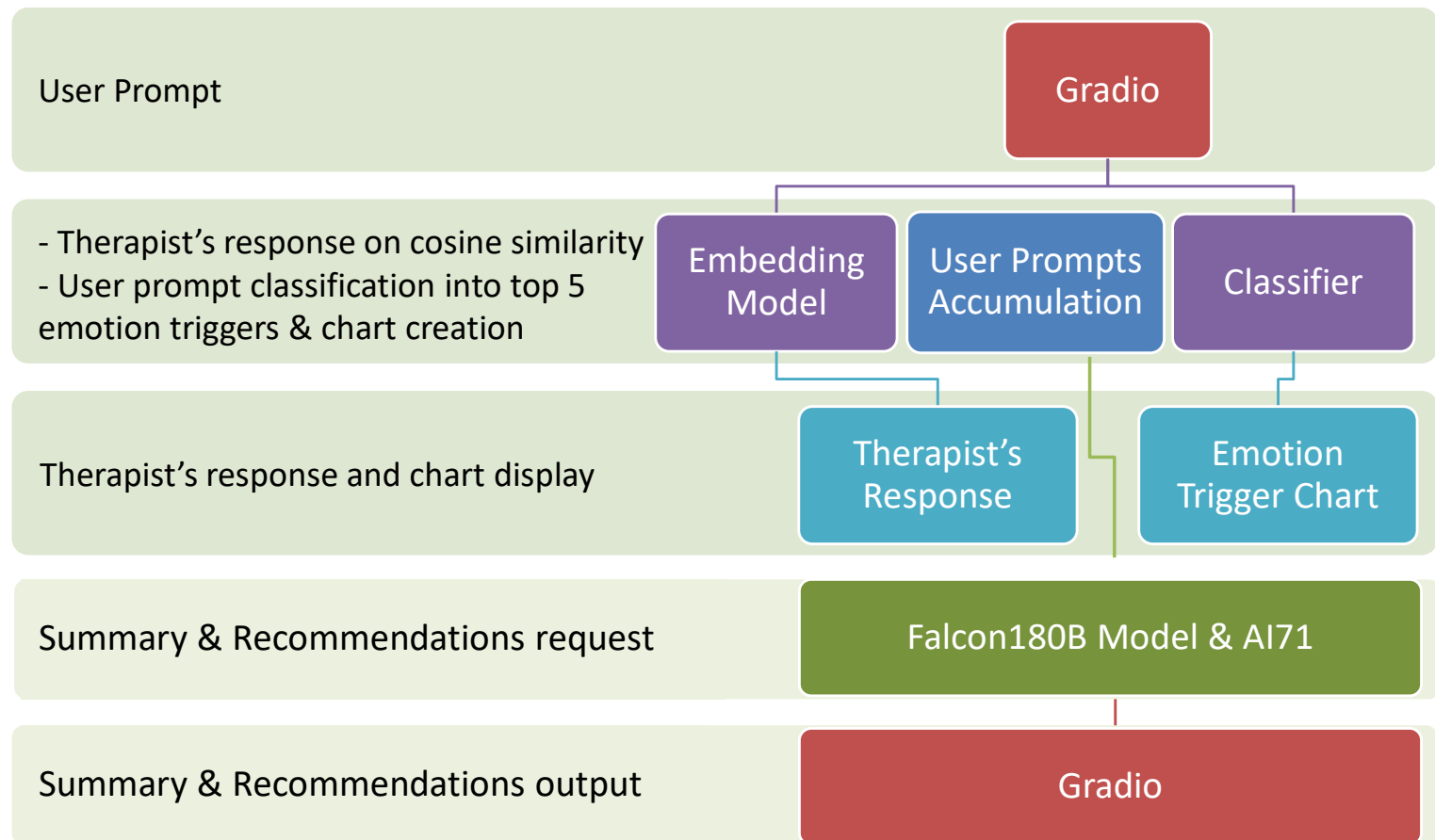
- ⊕ The chart and the therapist's response are pushed to the gradio app for display.
- ⊕ All the previous steps are repeated for all patient's prompts in the session.
- ⊕ At the end of session, upon user's request, the application uses AI71 API and Falcon-180B GenAI model, initiates one call for summarization and another call to generate recommendations from summary.
- ⊕ These are in turn pushed to the gradio app for display along with session date and time.



HOW THE APP WORKS!



+ Application Workflow



HOW THE APP WORKS!




 Initial Screen

Falcon Cognitive Behavioural Therapy Assistant

• Your Personal AI Therapist. Start chatting...

Your Personal Therapy Assistant



Therapy Session Conversation

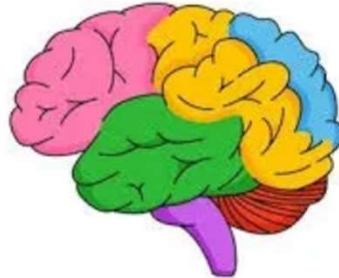
Therapist: Hello, What can I do for you?

User

Enter your message here...

Submit

Top 5 Emotion Triggers



Generate Session Notes & Recommendations

Clear console

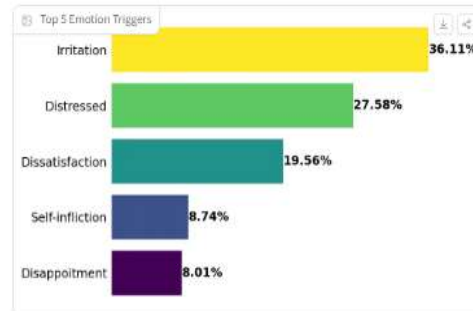
HOW THE APP WORKS!



1st User Prompt & Therapist's Response

Falcon Cognitive Behavioural Therapy Assistant

• Your Personal AI Therapist. Start chatting...



Therapy Session Conversation

Therapist: Hello, What can I do for you?

User: I'm feeling really frustrated and sorry about my personal relationships.

Therapist: I'm here to listen and help. What specifically is causing you frustration in your personal relationships?

User

Enter your message here...

Submit

Generate Session Notes & Recommendations

Clear console

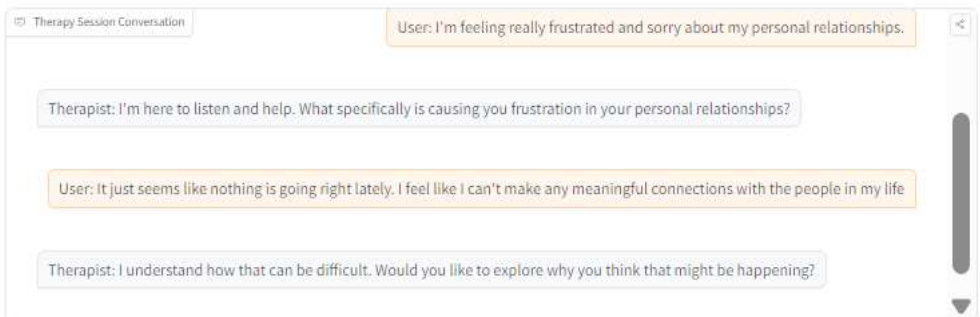
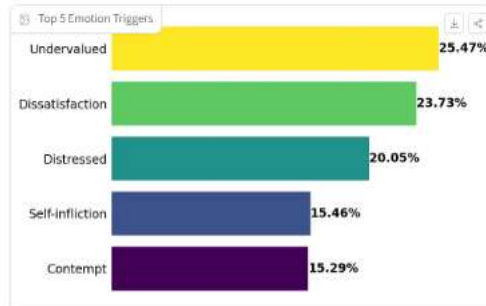
HOW THE APP WORKS!



➕ 2nd User Prompt & Therapist's Response

Falcon Cognitive Behavioural Therapy Assistant

• Your Personal AI Therapist. Start chatting...



User

Enter your message here...

Submit

Generate Session Notes & Recommendations

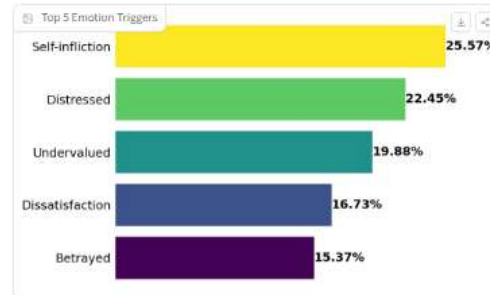
Clear console

HOW THE APP WORKS!



Falcon Cognitive Behavioural Therapy Assistant

• Your Personal AI Therapist. Start chatting...



User

Enter your message here...

Submit

Generate Session Notes & Recommendations

Clear console

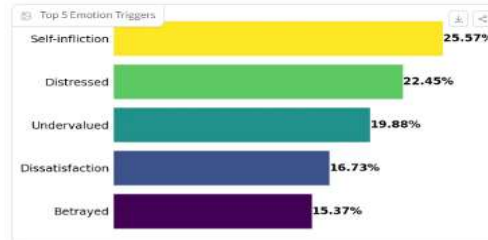
+ 3rd User Prompt & Therapist's Response

HOW IT WORKS!



Falcon Cognitive Behavioural Therapy Assistant

• Your Personal AI Therapist. Start chatting...



Summary Notes of the Session

expressing themselves in a group setting and feeling excluded. They also feel judged and defensive in the workplace. The patient is frustrated with their personal relationships and feels like they can't make meaningful connections. They recognize that they haven't been fully present for the people around them.

Summary of therapist messages: The therapist validates the patient's feelings and suggests communicating with friends to rebuild a sense of connection. They also remind the patient that everyone has insecurities and ask if there are any past experiences that make communication challenging. The therapist explores the patient's feelings of defensiveness in the workplace and asks how it manifests. They listen to the patient's frustration with personal relationships and ask why they think it's happening. The therapist acknowledges the patient's self-awareness and asks for specific instances where they haven't been fully present.

Summary of the whole session: The patient is struggling with communication and connection in various areas of their life. The therapist validates their feelings and encourages self-reflection and communication with others. The patient shows self-awareness and a willingness to work on their issues. The session ends with the therapist asking for specific instances where the patient hasn't been fully present.

Therapy Session Conversation

Therapist: I understand how that can be difficult. Would you like to explore why you think that might be happening?

User: I think part of it might be that I've been so caught up in my own life and problems that I haven't been fully present for the people around me

Therapist: It's great that you're able to recognize that. Are there any specific instances where you feel you haven't been fully present?

User

Enter your message here...

Submit

Recommended Actions

- The patient is referred to a support group to work on their communication skills in a group setting.
- The patient is advised to practice active listening and assertiveness in their personal and professional relationships.
- The patient is refrained from making assumptions about others' thoughts and feelings.
- It is suggested that the patient explore any past experiences that may be impacting their communication skills.
- The patient is encouraged to schedule a follow-up session to discuss their progress and any further concerns.
- The patient is advised to practice mindfulness and being present in the moment to improve their personal relationships.
- The patient is encouraged to seek feedback from trusted friends or family members to gain insight into their communication style.

Generate Session Notes & Recommendations

Clear console

+ Summary & Recommendations



Competition

- ⊕ Many mobile apps and websites - Clinical practitioners/ doctors, both established and new startups

FUTURE ENHANCEMENTS

- Functionality can be extended to other types of ailments and disorders





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UAE



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KSA



THE END
THANK YOU

