

TEAM NEXTGEN, DUBAI



NEXT2 EDGE RUNNERS HACKATHON

YOUR INTIMATE PERSONAL THERAPIST

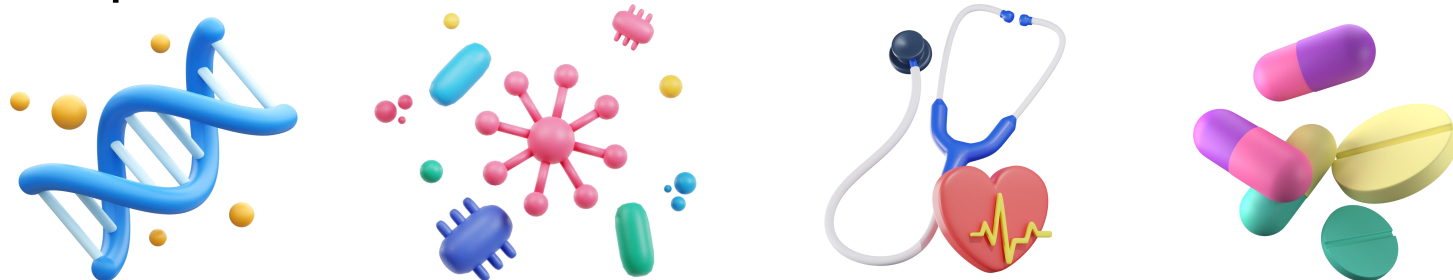
An AI driven chatbot that serves as a virtual personal therapy assistant for users (patients) who are suffering from cognitive behavioral disorders and need quick, empathetic, yet cost-effective assistance.

An AIML/ lablab organized event – Aug 16th to August 23rd , 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

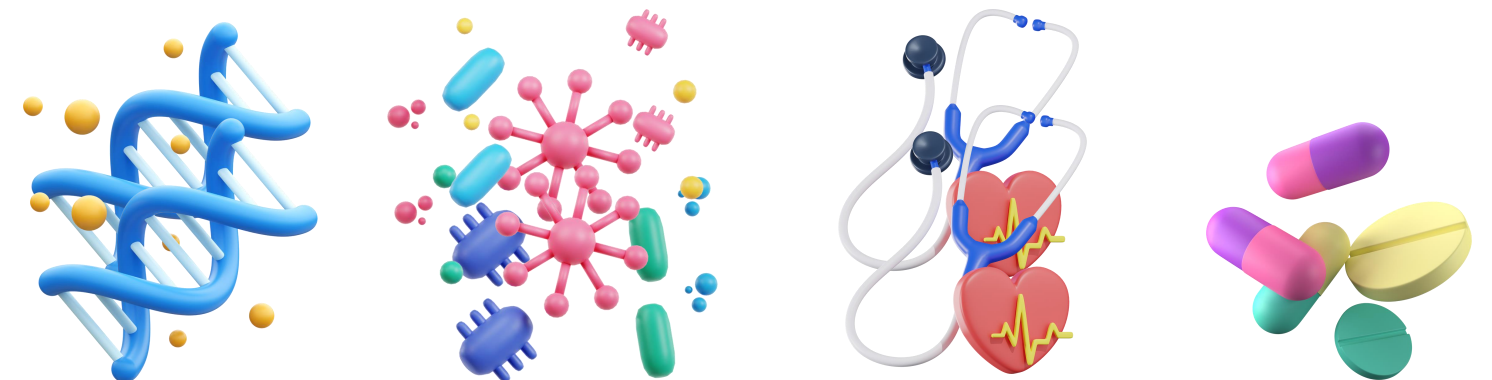


PROJECT SCOPE



- ⊕ Workflow Demonstration
 - Showcasing the application's dialogue generation capabilities
- ⊕ Functional Capabilities
 - Utilizing Llama-3.1 to generate synthetic data mimicking Patient & therapist dialogues
 - Using the synthetic data to finetune TinyLlama to create a small model
 - Developing an Edge deployable prototype using Flask

Caveats: The demo of developed edge prototype is out of scope, as there are no free & open-source platforms supporting it. However, app functionality is demonstrated using Gradio/ HuggingFace spaces



TECHNOLOGY & CATEGORY TAGS

- ➕ ML/AI & AI71
- ➕ TIIUAE/FALCON-180B-CHAT
- ➕ Meta-Llama-3.1-8B-Instruct-Turbo
- ➕ FACEBOOK/BART-LARGE-MNLI
- ➕ GRADIO
- ➕ PYTHON LIBRARIES
- ➕ HUGGINGFACE MODELS/ SPACES
- ➕ TinyLlama-bnb-4bit t
- ➕ TORCH
- ➕ COLAB
- ➕ #GenAI, #Classification, #Gradio, #Huggingface
#Falcon #MLAI #Fine-Tuning #PEFT



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



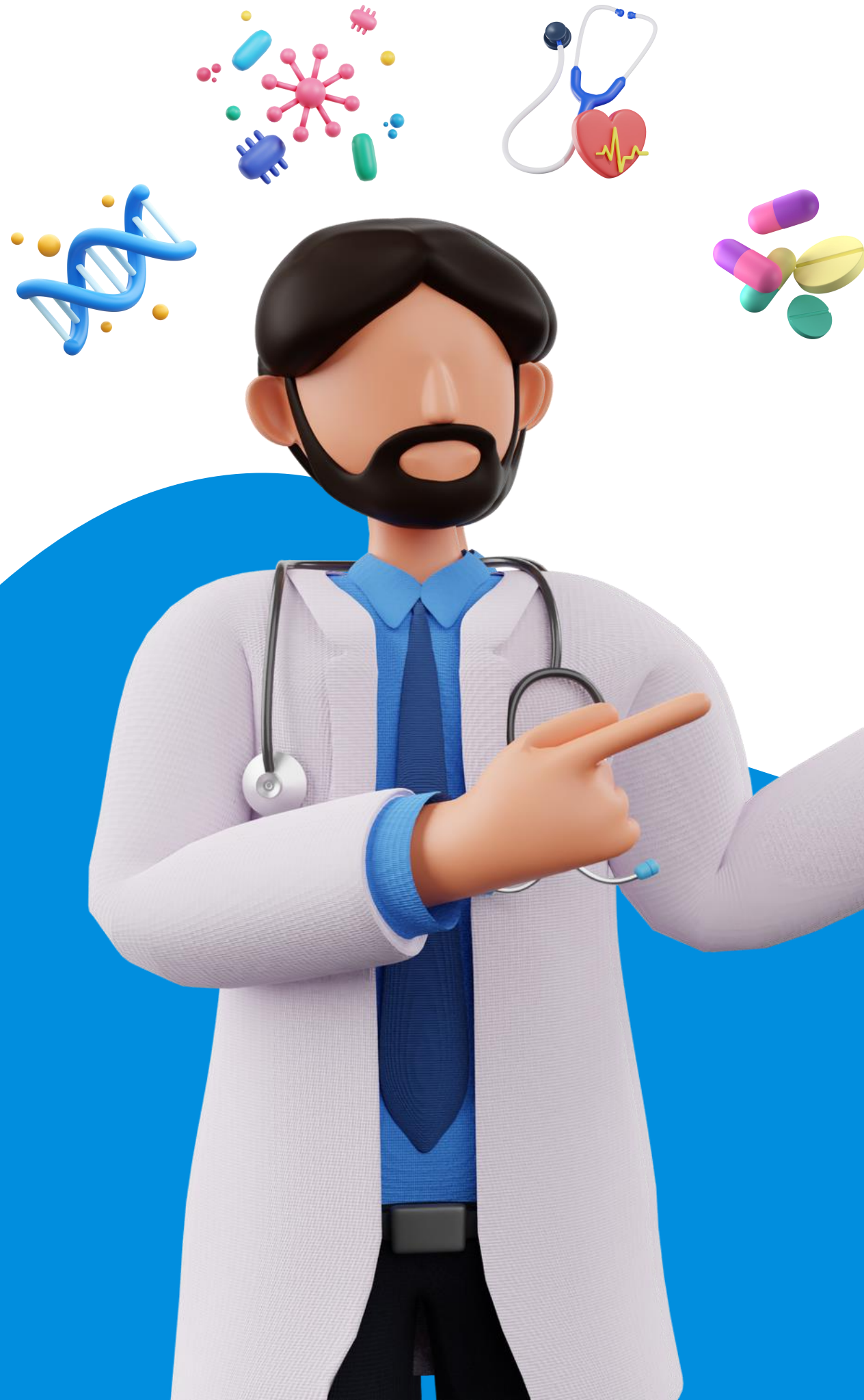
PROBLEM & SOLUTION

⊕ 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.

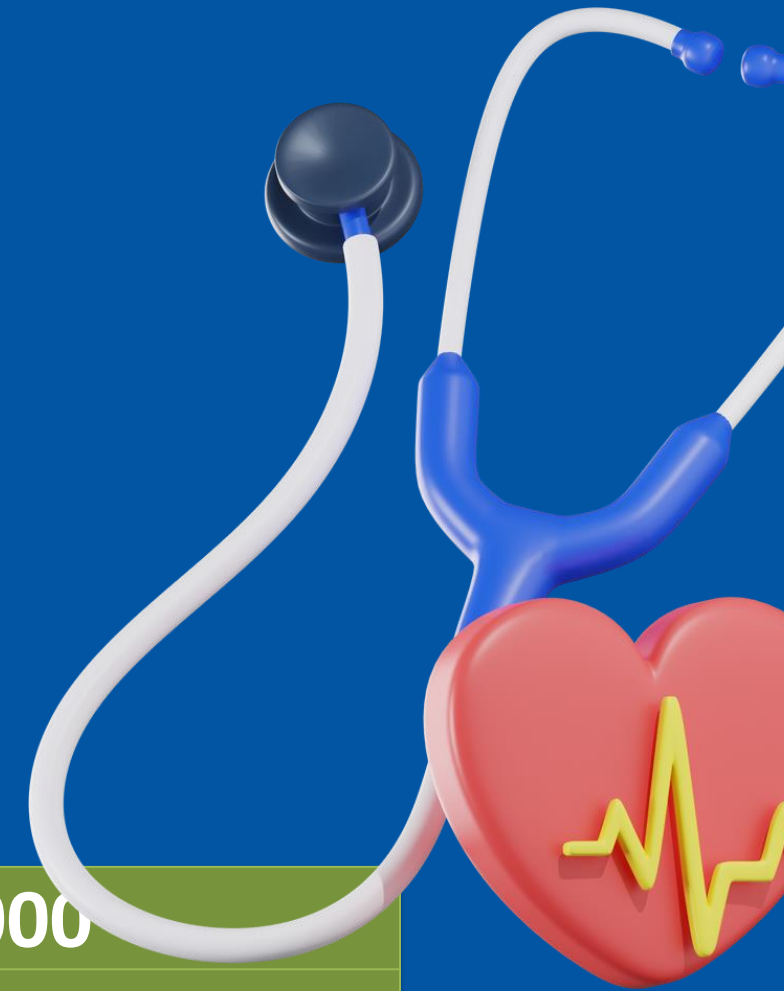
One can imagine the business potential even a small fee per session is considered. Though it does not absolutely replace doctors, it does save a lot for users on consultation and treatment charges.



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 synthetically generated for fine-tuning the core, tiny model
- 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, and the model generates Therapist's response based on its learning during fine tuning stage and pushes it to Gradio's UI.
- 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!

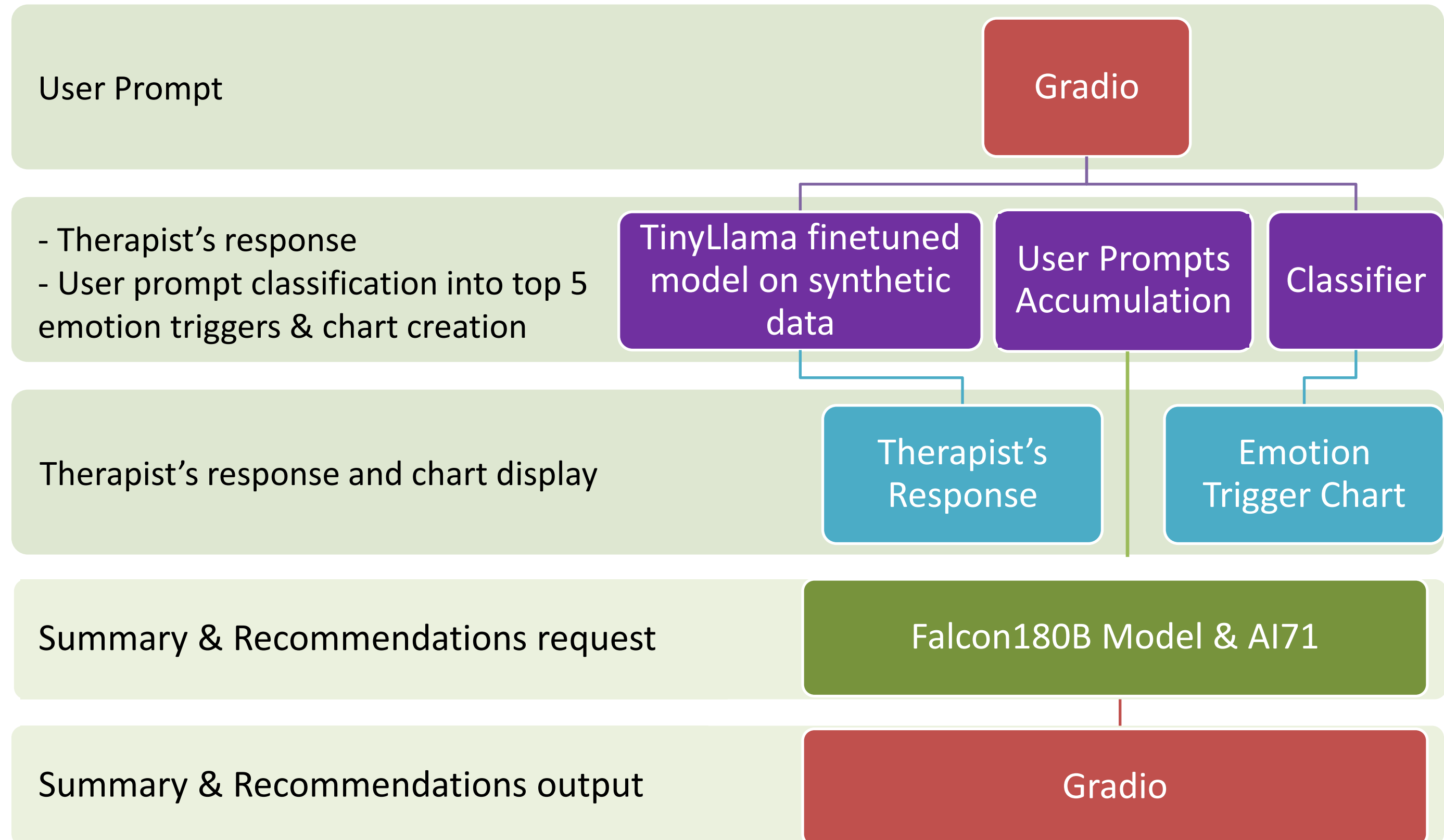
- ➕ ▪ The chart and the therapist's response are pushed to the gradio app for display.
- ➕ ▪ All the previous steps are repeated for all patient's prompts in the session.
- ➕ ▪ At the end of session, upon user's request, the application uses AI71 API and Falcon-180B GenAI model, initiates one call for 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



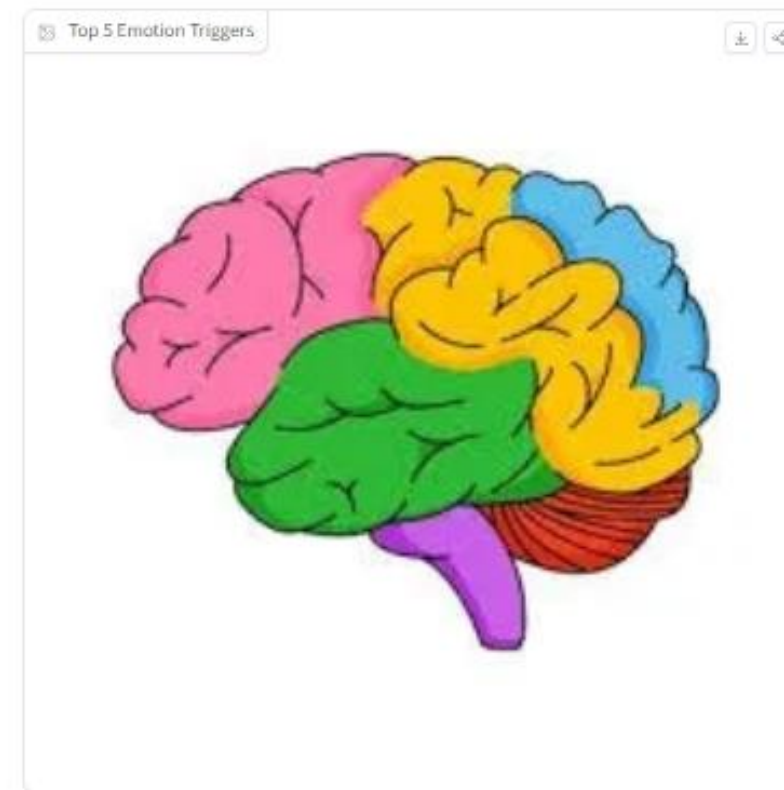
HOW THE APP WORKS!



 Initial Screen

Your Intimate Personal Therapist

• Your Personal AI Therapist. Start chatting...



Therapy Session Conversation

Therapist: Hello, What can I do for you?

User

Enter your message here...

Submit

Generate Session Notes & Recommendations

Clear console

HOW THE APP WORKS!


Your Intimate Personal Therapist

• Your Personal AI Therapist. Start chatting...



1st User Prompt &
Therapist's Response

Your Personal Therapy Assistant



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

Top 5 Emotion Triggers

Irritation	36.11%
Distressed	27.58%
Dissatisfaction	19.56%
Self-infliction	8.74%
Disappointment	8.01%

Generate Session Notes & Recommendations

Clear console


HOW THE APP WORKS!

Your Intimate Personal Therapist

• Your Personal AI Therapist. Start chatting...



Your Personal Therapy Assistant



Therapy Session Conversation

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: It just seems like nothing is going right lately. I feel like I can't make any meaningful connections with the people in my life

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

User

Enter your message here...

Submit

Top 5 Emotion Triggers

Undervalued	25.47%
Dissatisfaction	23.73%
Distressed	20.05%
Self-infliction	15.46%
Contempt	15.29%

Generate Session Notes & Recommendations

Clear console

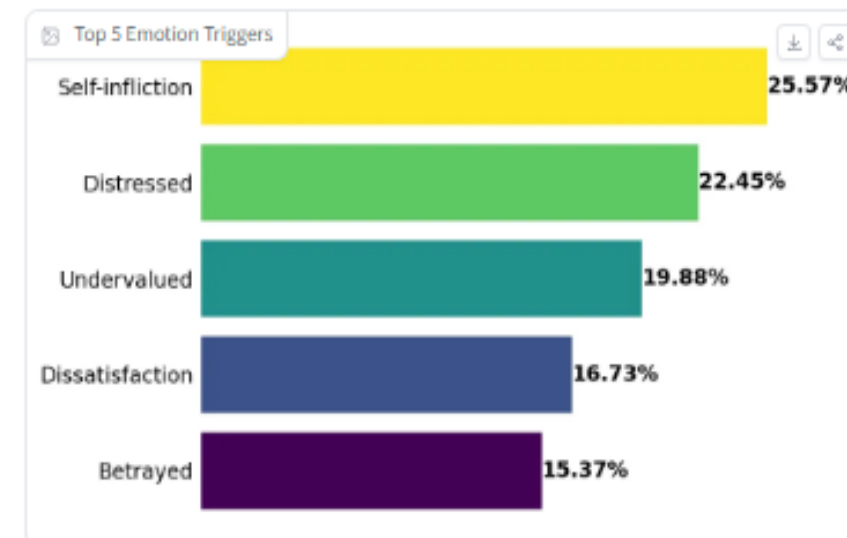
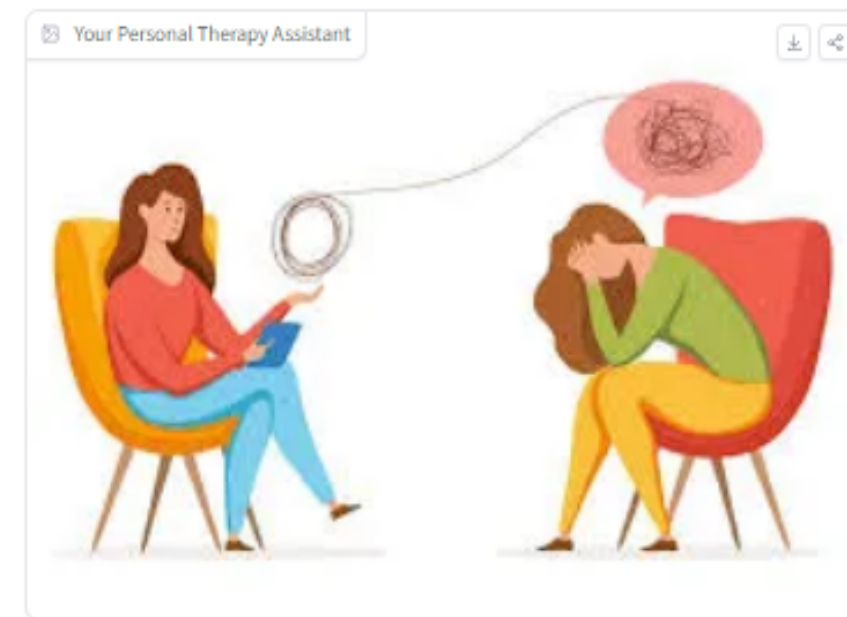


2nd User Prompt &
Therapist's Response

HOW THE APP WORKS!

Your Intimate Personal Therapist

✦ Your Personal AI Therapist. Start chatting...



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

Generate Session Notes & Recommendations

Clear console

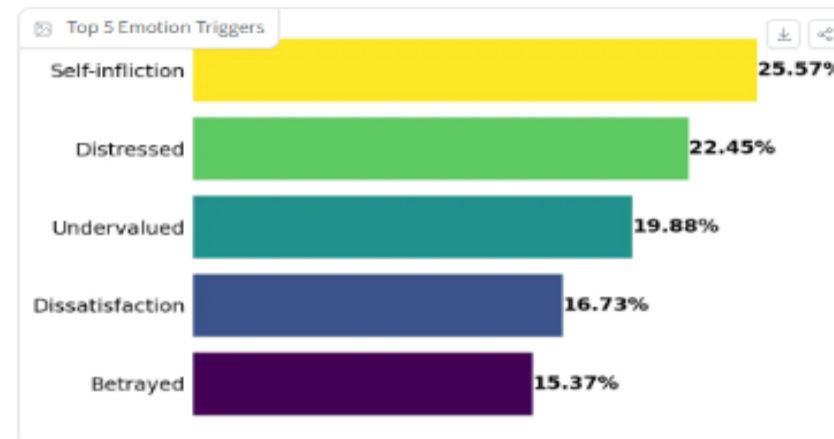
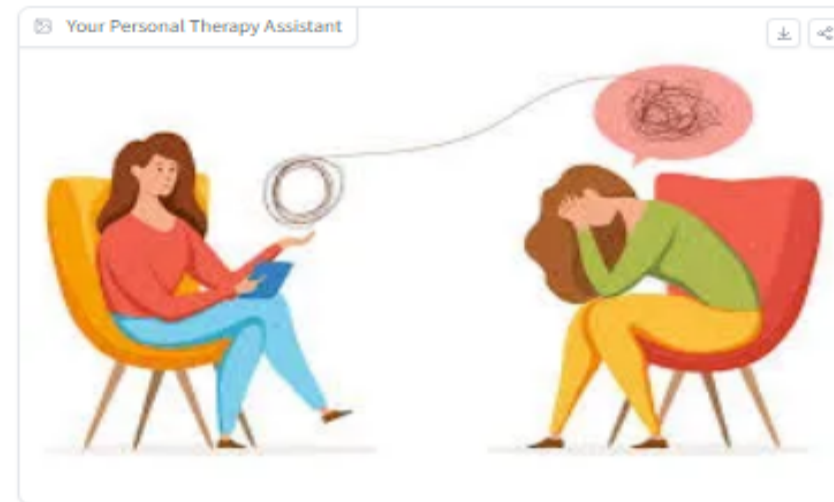
✚ 3rd User Prompt & Therapist's Response

HOW IT WORKS!



Your Intimate Personal Therapist

• 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

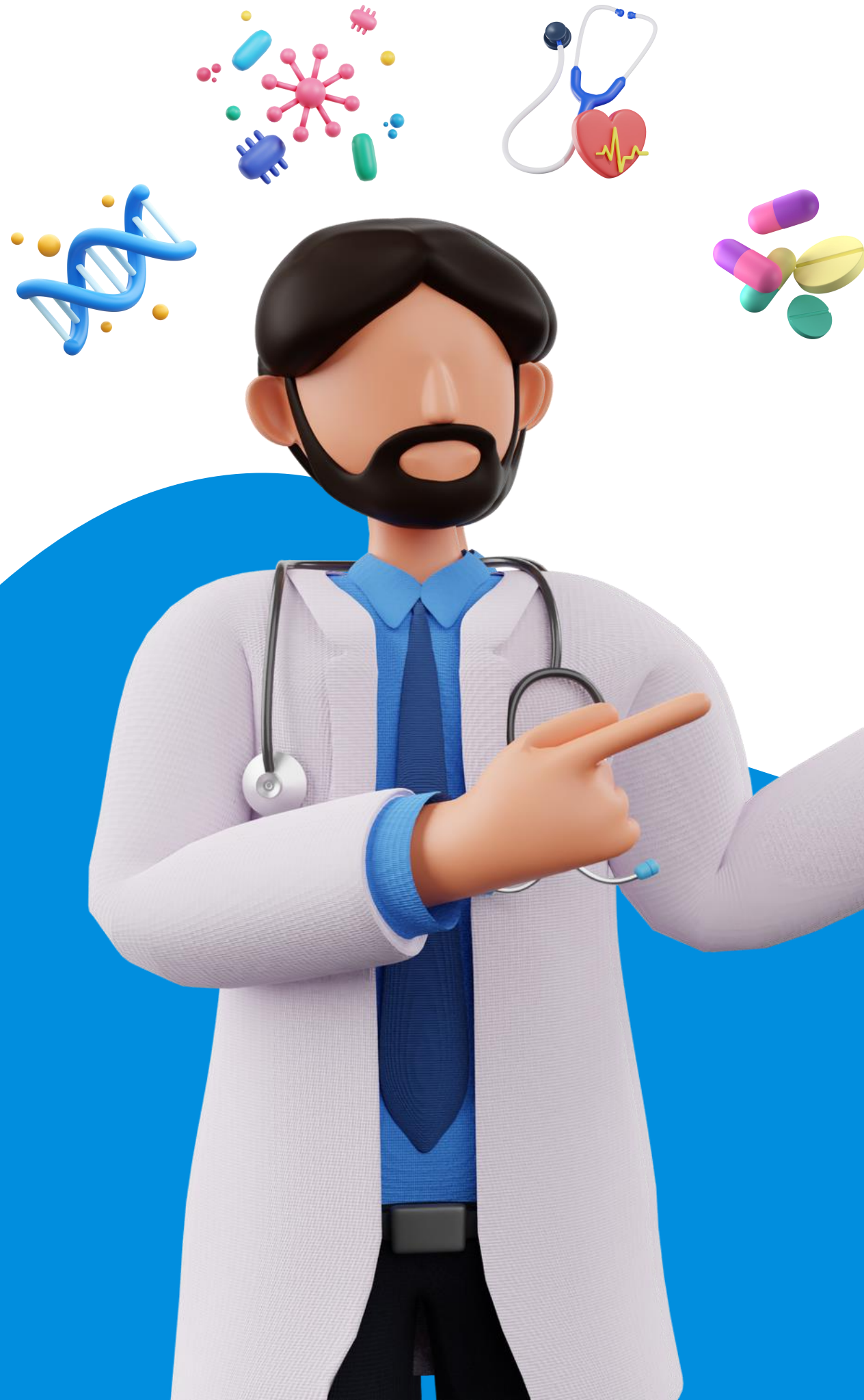
HOW IT WORKS!



⊕ Conversations generated by Flask App

⊕ Demonstration of edge prototype conversations

```
1  [  
2    {  
3      "Patient": "My daughter has been feeling really anxious about school lately, and I'm  
4      worried it's affecting her grades.",  
5      "Therapist": "It sounds like you're worried about your daughter's grades. Have you  
6      talked to her about how she can manage her anxiety?"  
7    },  
8    {  
9      "Patient": "Well, she's been complaining about having butterflies in her stomach  
10     before every test, and she's been having a hard time sleeping at night because she's worried  
11     about not doing well.",  
12     "Therapist": "Thank you for sharing. It sounds like you're worried about your child's  
13     performance. Can you tell me more about what's been going on?"  
14   },  
15   {  
16     "Patient": "Actually, yes. She's been really hard on herself when she makes a mistake  
17     on a test, and I think that's when the anxiety really takes over. ",  
18     "Therapist": "That's a common pattern. It's important to remember that anxiety can be  
19     a sign of underlying emotional distress. It's important to acknowledge that anxiety can be a  
20     symptom of underlying emotional distress, and that it's important to address those underlying  
21     emotional distresses"  
22   }  
23 ]
```

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



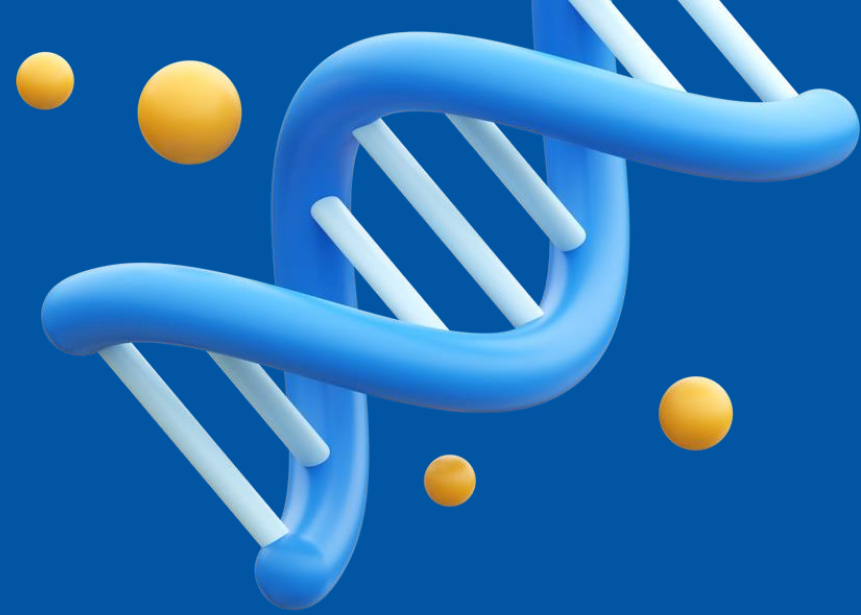


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THE END
THANK YOU

