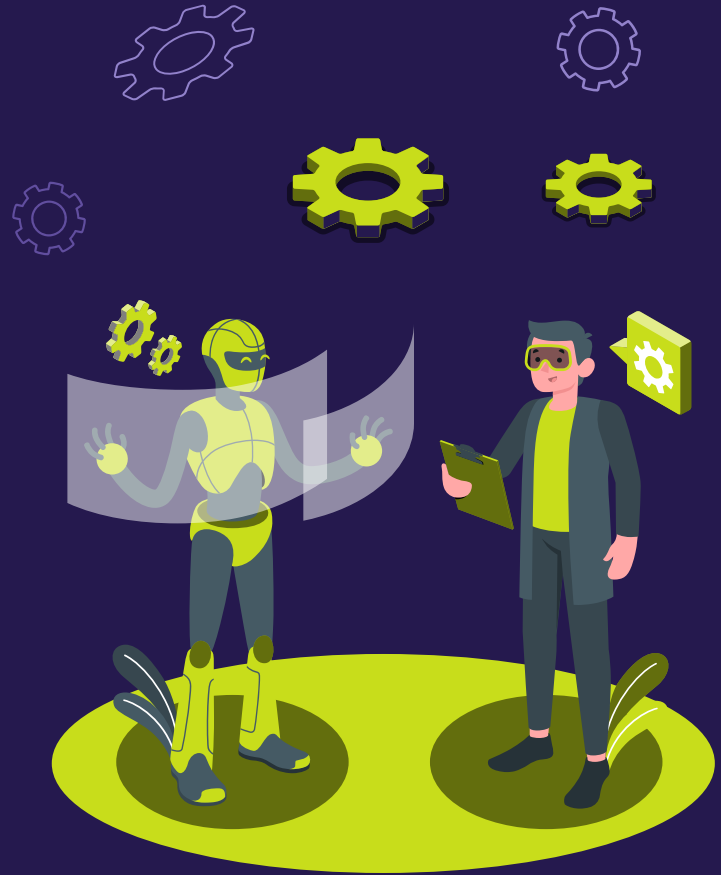


Cozmo Therapist

Ritika Mehta, Cherie Hua



Problem Statement



While mental health awareness is increasing, therapy can be costly and virtual therapy may lack interactivity. Cozmo presents a promising solution for therapy, as it offers an interactive component that virtual therapy lacks - a tangible form capable of speaking, listening, and performing actions.

Cozmo has the potential to provide tailored treatment to individuals, considering their unique needs, personalities, and life experiences and create an engaging experience for users.



OUR APPROACH

- **Emotional Recognition:**
 - Accurately identify a person's emotions using sentiment analysis with GPT3.5, and non-verbal cues such as facial expressions using cozmo's facial recognition
- **Personalization:**
 - Provide personalized responses to each person, taking into account detected emotions, conversation history and analysis on query to determine type of response required (advice, encouragement, elaboration if emotion detected is unknown)
- **Interactive:**
 - Detect and respond to human emotions through animations, ensure face remains in frame for optimal engagement



IMPLEMENTED FEATURES



SPEECH RECOGNITION

Cozmo comprehends user speech and converts it into text, which is then fed to GPT3.5.



SENTIMENT ANALYSIS

When presented with a user's statement, ChatGPT recognizes the emotion conveyed in the statement and utilizes this information to formulate an appropriate response.



GPT RESPONSES & ITERATION

Systematic iteration process with multiple API calls to GPT3.5 with identical queries and prompts. Then an additional API call to analyze the query and evaluate which response complies with the word limit, and aligns best with the ongoing chat history and query. It remembers the whole conversation, and will track the changing conversation.



DEFAULT RESPONSES

A call to ChatGPT checks if there is unethical or dangerous advice in the response. If there is, Cozmo returns a default, generic response according to therapy guides online.



FACIAL RECOGNITION

Cozmo constantly turns to find the user's face, recognizes the user's emotion, and performs an animation according to that emotion after every time it speaks.

RESULTS

SENTIMENT ANALYSIS

We found that we had to be quiet specific about the kind of response we wanted from GPT in terms of the exact emotion and only the emotion, no other text. So we listed out over 154 emotions that it could pick from and tailored the premise so that it only responded with the emotion.

EXAMPLE THERAPIST CHATBOT

```
cxhua@nor1:~/FinalProject$ python3 sentiment_analysis.py
i have an exam tommorow and I'm not prepared at all
anxious
I broke up with my boyfriend
sad
I can't figure out what to wear for my interview
anxious
There are too many projects due for me
overwhelmed
My lunch today was my favourite food, it was actually so good and I shared it with all my friends
happy
I can't believe my friends organised a surprise party for me, it was so sweet of them
happy
Im so sleepy
neutral
I wish I could go to bed right now but I cant because i have too much work UGH
frustrated
```

```
cxhua@nor1:~/FinalProject$ python3 therapist.py
How are you feeling today?
You: I have finals next week so life's not great right now
It's completely understandable to feel stressed during finals week. Remember to take breaks, stay organized, and practice self-care. You got this!

You: I don't think so I'm not gonna lie. I have so much work due and I haven't even started studying for my exams. I feel like I really need a break but I don't have time for breaks
Feeling overwhelmed is natural, but it's important to prioritize self-care, like taking short breaks, getting enough sleep, and nourishing your body with healthy food. Break your work into short-term goals and take it one step at a time. You can do this!

You: I also think my friends don't like me
It's okay to have different social circles and make new friends too. Your worth is not defined by your social life.

You: yeh but they keep avoiding me
If your friends are avoiding you, it's important to communicate with them and express how you feel. They may be going through something personal or may not realize their actions are affecting you. However, if they continue to avoid and exclude you, it may be time to seek out new friendships that align with your values and make you feel supported.

You: What were we talking about
"We were discussing finals and feeling overwhelmed, as well as concerns about friendships and feeling avoided by friends. Is there anything else you would like to talk about?"
```

What didn't work



Negative connotations: We originally had a function that checked if Cozmo's advice had negative sentiment. However, if the user says something negative, it will probably be included in the response even if the message is positive. Using this function filtered out almost all of Cozmo's responses.

Query analysis:

Originally we had separate calls to the API for length check and query analysis, but we found that our iterative solution had much better responses that were more tailored to the actual query.

What didn't work



Default response: We found that when we had strict premises that had information from online therapy guides, ChatGPT had more vague responses than it did when our premises were vague. As a result, we limited our default responses to the case where ChatGPT gave a response with unethical advice.

The ChatGPT API is very slow (because we make around 4-5 calls), so our iterative solution takes a long time to run, which reduces user engagement.

Future Work



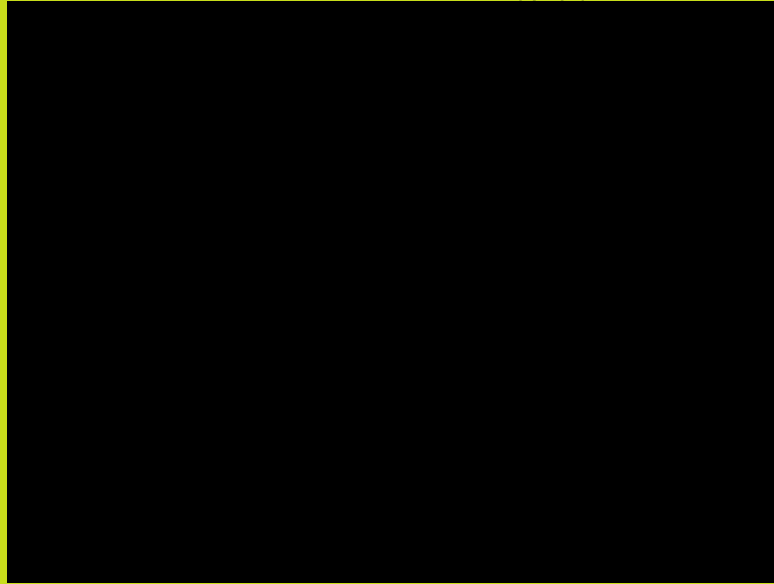
Use body language as additional information about the person's emotional state

Refine the responses (quite generic right now); give more instructions from therapy guides in the premise and improve the efficiency of the API calls

Ethical concerns surrounding the use of a robot therapist, including data privacy, misdiagnosis and misinformation, becoming overly dependent on AI therapist, etc

Improve facial recognition through an online module

DEMO



Cozmo Convo1:

https://drive.google.com/file/d/1Y9xA7ayNLklJpXuc6O9_J-m-2A8qaWEe/view?usp=sharing

Cozmo Convo2:

https://drive.google.com/file/d/1nZVGr64_t-yGgBW_eJiK9yNpk8hYygyu/view?usp=sharing