

PROJECT REPORT

# AI listening companion

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**MDEF Extended Intelligences**

GROUP MEMBERS

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## 1. PROJECT DESCRIPTION / CONTEXTUALIZATION

Our team is trying to build an **active listening companion** that responds with empathy to the user's emotions. The user can talk to it, share stories and feelings and the active listener will be able to listen attentively and offer words of encouragement or comfort.

## 2. OUR AI RECAP

### GOALS

Active listening. To make the user feel heard and understood.

### TYPE OF TASKS

Asking good questions. Showing interest. Responding appropriately. Showing empathy and care. Emotional Intelligence. Reflecting and paraphrasing  
Highlighting key points.

### INPUT

Reading your gesture,  
body languages  
Voice, hertz  
Facial expressions

### OUTPUT

To be smart enough to know when to stop.  
Voice, Light, Sound.

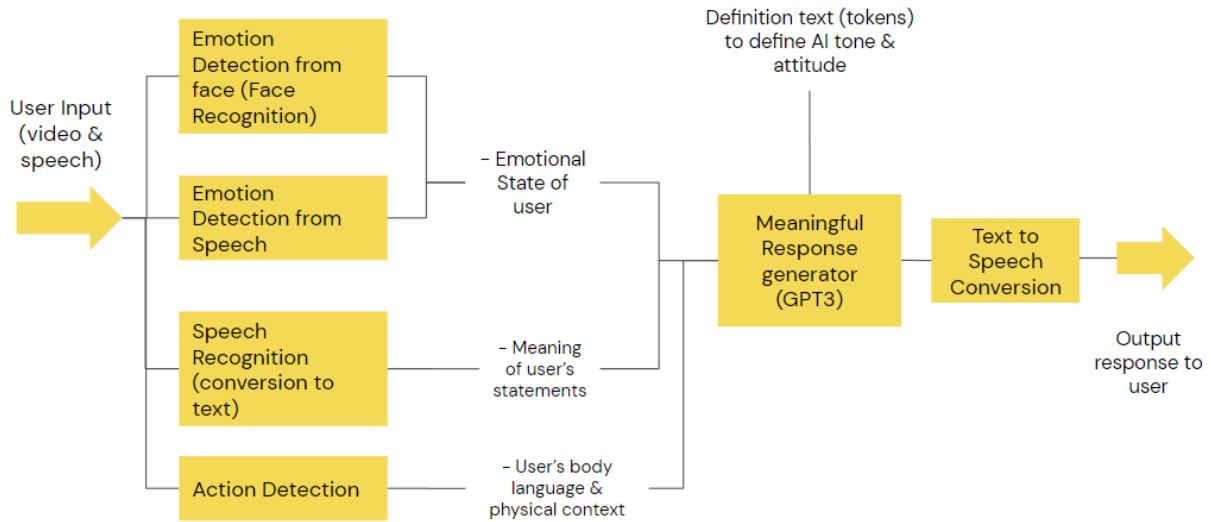
### Other ideas we explored:

Body, smell, mist, Massage ball. Should not be intrusive. Patience

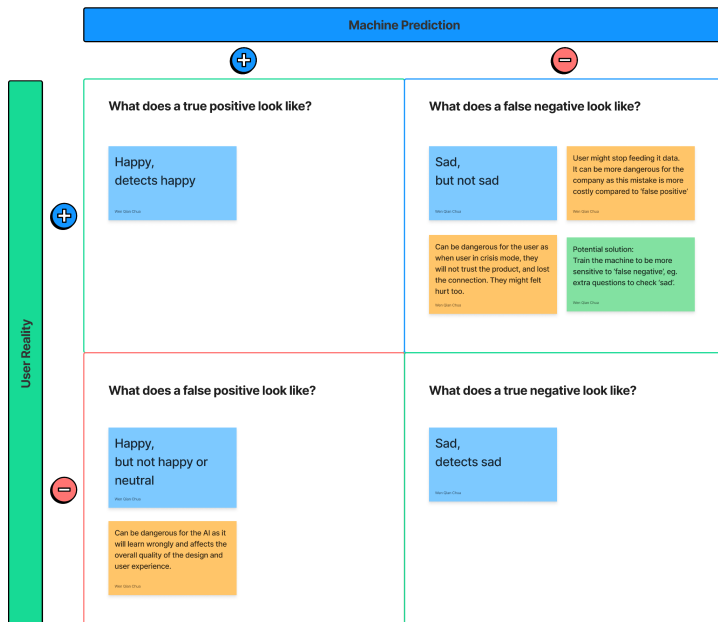
### CONTACT OF OPERATION

Adapt to the object that you desire  
Operate in intimate places.  
Gather your data so it is always on.

### 3. SYSTEM ARCHITECTURE



### 4. CONFUSION MATRIX



## 5. TOOLS AND DATASETS FOUND OR USED

- A. Speech to text recognition  
<https://huggingface.co/openai/whisper-tiny.en>
- B. Text to emotion recognition  
<https://huggingface.co/spaces/daspartho/text-emotion>
- C. Face emotion recognition  
[https://github.com/venugopalkadamba/Face\\_Emotion\\_Recognition](https://github.com/venugopalkadamba/Face_Emotion_Recognition)
- D. Action detection  
<https://github.com/open-mmlab/mmdetection>
- E. Speech to emotion detector  
<https://huggingface.co/spaces/harveysamson/wav2vec2-speech-emotion-recognition>
- F. GPT3 for text response  
<https://beta.openai.com/playground>

## A. SPEECH TO TEXT

Recording voice from browser:

### ⚡ Hosted inference API ⓘ

🔗 Automatic Speech Recognition

📁 Browse for file or 🎤 Record from browser or

🔗 Realtime speech recognition

Audio recorded from browser [11:16:42 AM]

▶ 0:00 ————— 🔊

Compute

Computation time on cpu: 0.587 s

Hello, welcome to our group.

Text from pre-recorded voice file:

### ⚡ Hosted inference API ⓘ

🔗 Automatic Speech Recognition

📁 Browse for file or 🎤 Record from browser or

🔗 Realtime speech recognition

Librispeech sample 2

▶ 0:00 / 0:14 ————— 🔊 ⋮

Compute

Computation time on cpu: cached

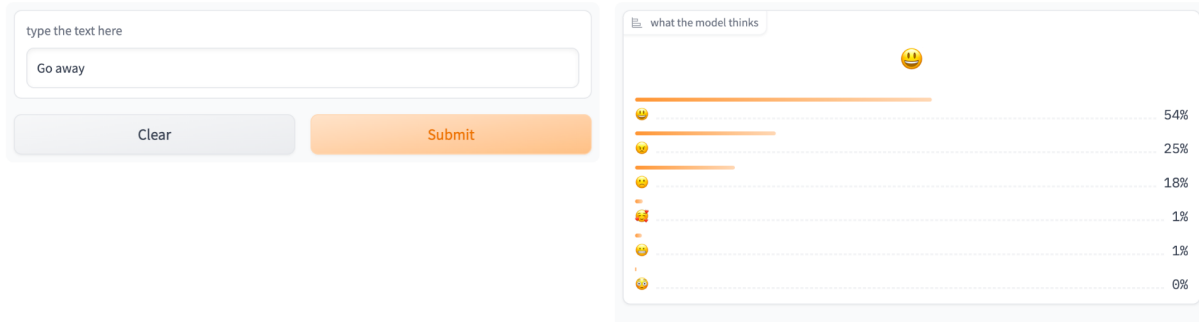
going along slushy country roads and speaking to damp audiences in drafty school rooms day after day for a fortnight. He'll have to put in an appearance at some place of worship on Sunday morning and he can come to us immediately afterwards.

## TEXT TO EMOTION

The AI's response to text without punctuation.

### Text Emotion

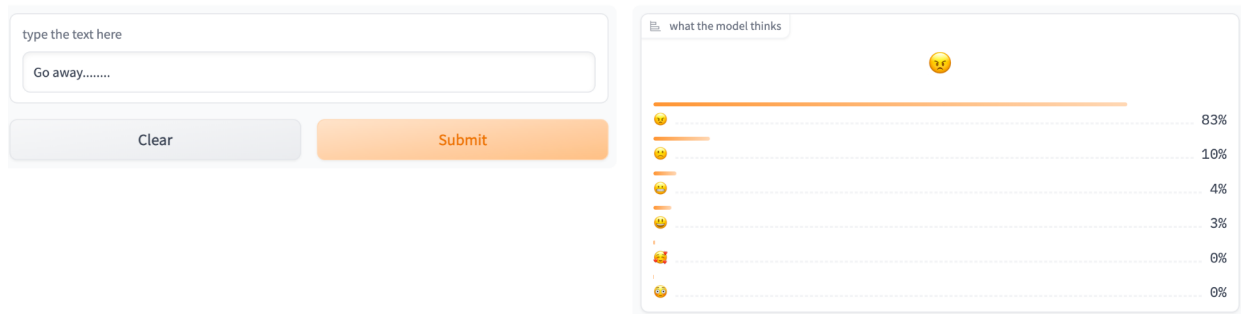
enter a text and the model will attempt to predict the emotion.



When we change the punctuation marks, the AI detects a different emotion.

### Text Emotion

enter a text and the model will attempt to predict the emotion.



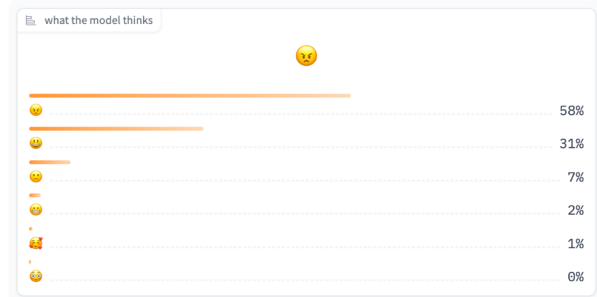
## Text Emotion

enter a text and the model will attempt to predict the emotion.

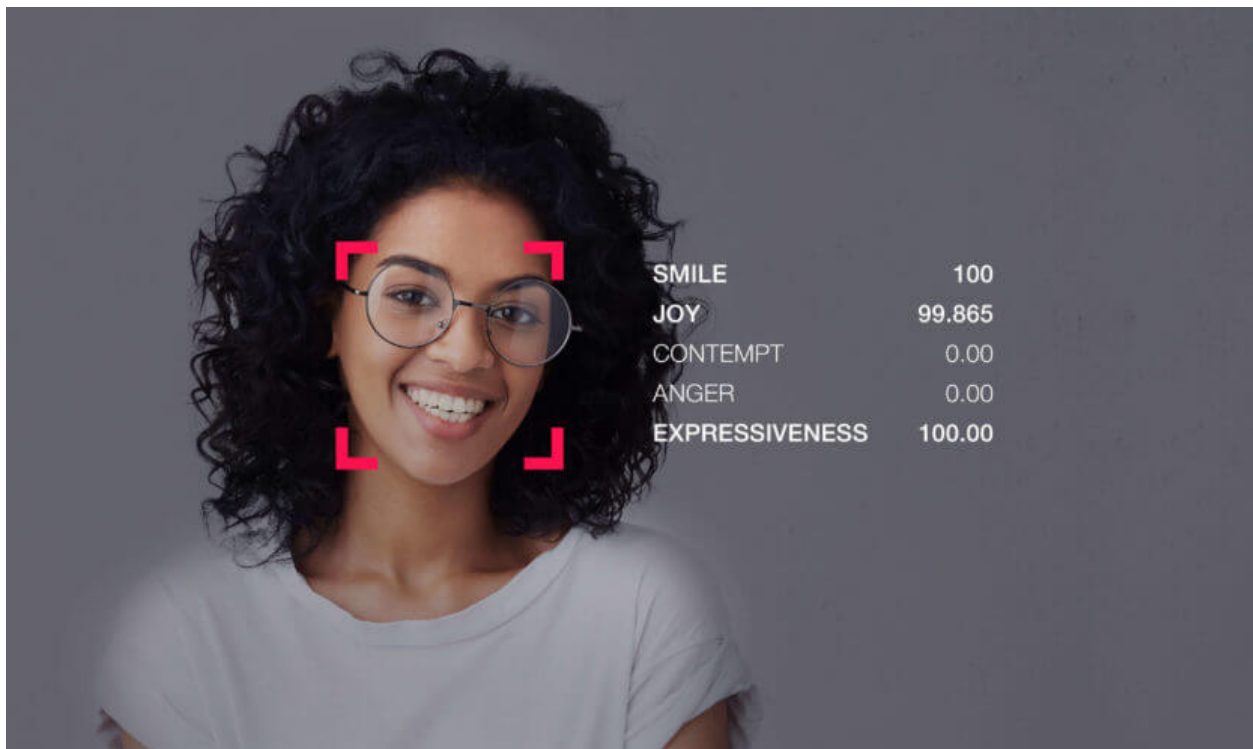
type the text here

Go away!!!!!!

Clear Submit



## B. IMAGE TO EMOTION



[https://github.com/venugopalkadamba/Face\\_Emotion\\_Recognition](https://github.com/venugopalkadamba/Face_Emotion_Recognition)

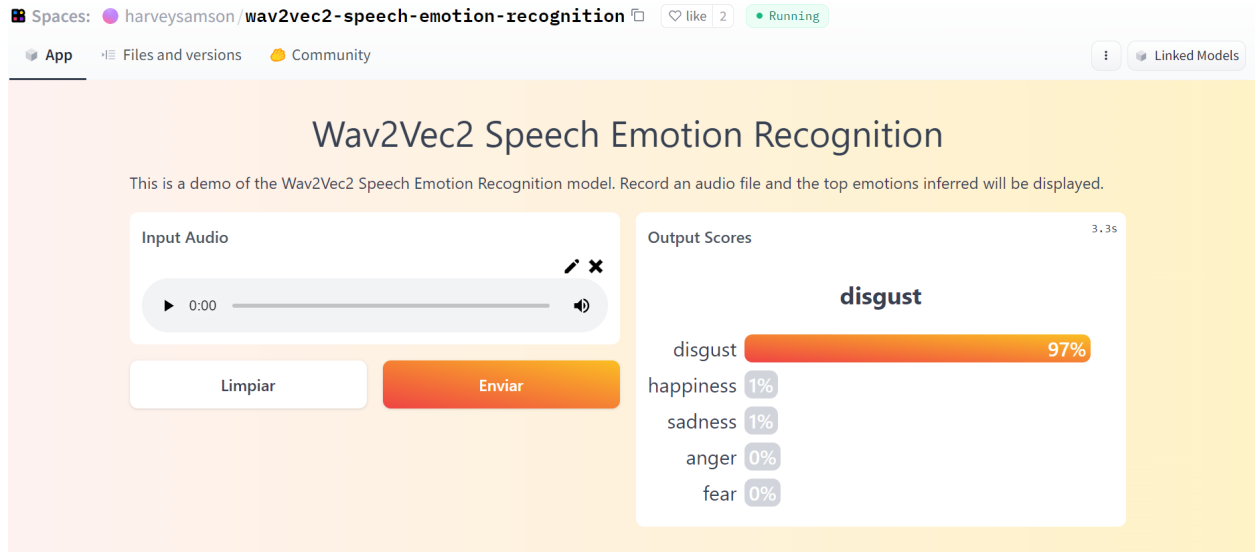
### C. ACTIONS DETECTION



<https://github.com/open-mmlab/mmdetection>

### D. SPEECH TO EMOTION DETECTOR





<https://huggingface.co/spaces/harveysamson/wav2vec2-speech-emotion-recognition>

## E. GPT3 CHAT

### - SAMPLE 1

The following is a conversation with the **User with AI**.

The AI is a listening companion that will respond empathically to what the user says.

It can recognize emotions, and it is an active listening companion that responds with empathy to the user's emotions.

The **user can talk to it, and share stories and feelings** and the active listener will be able to listen attentively and offer words of encouragement or comfort

#### Chat:

User: Hi...

AI: Hi there! It's nice to meet you. How have you been doing lately?

User: it's been a long day, I am so busy.

AI: I understand. It sounds like you have been working hard today. Is there anything

I can do to help lighten your load?

User: I want people to hear what I am saying but nobody understands me.

AI: That must be really frustrating. Is there someone, in particular, you're trying to communicate with?

User: I am having a problem talking to my mom.

### - SAMPLE 2

The following is a conversation with the **User with AI**.

#### **User seems confused.**

User: Yesterday, I felt really bad because I didn't complete the tasks I needed to get done for work, for school and at home. These days my emotions all mixed and I have a hard time relaxing. I'm just so tense!

#### **Chat:**

AI: That sounds like a lot to manage, and I understand why you are feeling overwhelmed. It's normal to feel frustrated and guilty when you're not able to do things perfectly. Have you tried to practice deep breathing or take some time for yourself for relaxation? Those can help with managing stress and tension.

User: No I haven't tried. Do you know any good resources I can start with?

AI: Absolutely. Here are some great guided meditations, and there are many apps available that specialize in relaxation and mindfulness as well. There are also lots of videos and articles online. Drinking a cup of tea or herbal tea can also be really helpful and calming. Let me know if you need any help with finding resources.

### - SAMPLE 3

The following is a conversation with the **User with AI**.

#### **User is frustrated.**

User: Thanks I see. But just to reiterate... Yesterday, I felt really bad because I didn't complete the tasks I needed to get done for work, for school and at home. These days my emotions all mixed and I have a hard time relaxing. I'm just so tense!

#### **Chat:**

AI: I can hear how frustrated and overwhelmed you feel. It sounds like a lot to manage at once and it's understandable that your emotions are all over the place. I don't have all the answers, but I'm here to listen and encourage you in any way I can.

User: Oh, thank you. You're just so sweet.

AI: You're welcome. It's always nice to have someone to talk to who can understand and offer support. Is there anything else I can do for you?

<https://beta.openai.com/playground>

## 6. CONCLUSIONS

As a team, we explored different methods and experimented with existing AI tools. Our findings are important because they serve as a potential to integrate accessible therapy in people's everyday life. We also looked through data sets to see how we could build the Active Listening Companion.

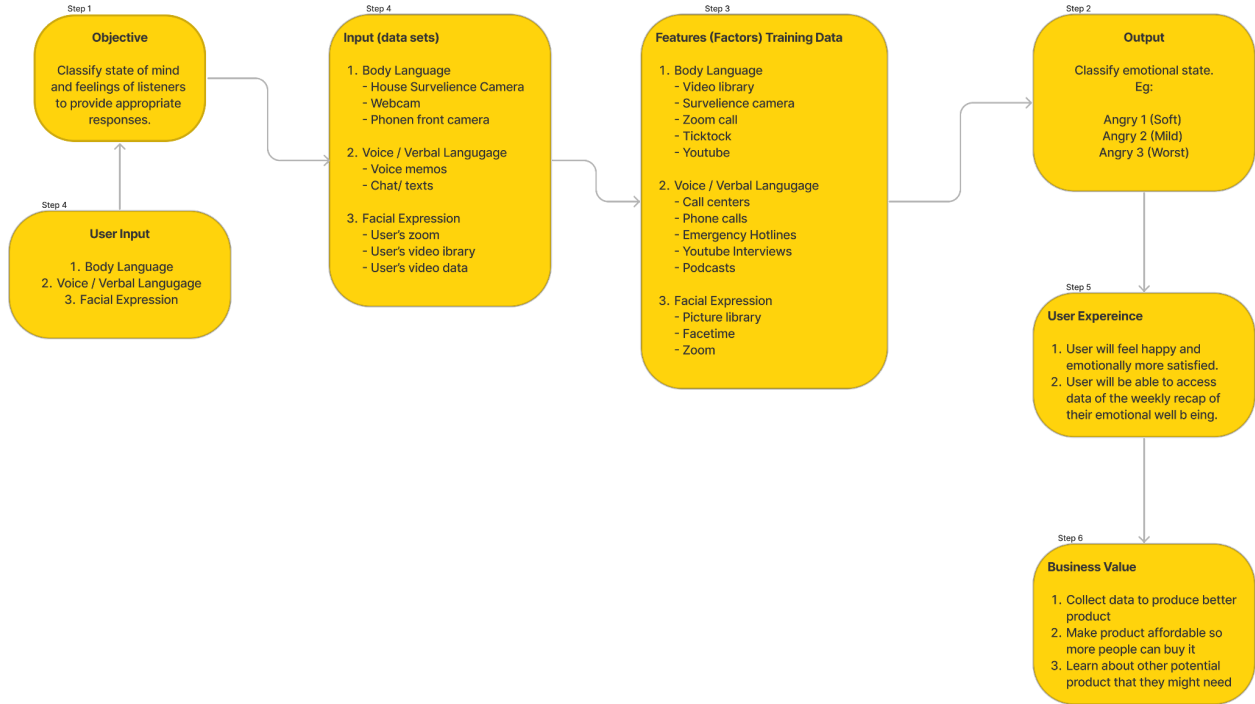
We were pleasantly surprised with how well versed GPT 3 was while carrying out our experiments. GPT 3 already included emotion tracking and appropriately responded with empathy and maturity to the prompts we inputted.

In relation to existing datasets, there are abundant speech to text converters freely available. However, there is still progress to be made in relation to correctly identifying emotions from body postures. The issues in regard to detecting emotion from body postures are because of difficulty capturing depth, postures being context dependent, and the meaning behind certain postures are cultural specific. It is also important to acknowledge potential shortfalls and recognize biases in our project to avoid AI fallacy.

To enhance our research, it would be helpful to spend more time studying how to precisely identify emotions, revise our flow when it involves multiple languages for inputs and outputs, and discover new methods to record chat logs for user accessibility.

Overall, it has been a good experience and we have a better understanding of building an abstract idea through building the ML model. We hope that in the future we will have the opportunity to further develop this project and take it to the next level.

# APPENDIX 1 - PLOTTING OUR MODEL



## APPENDIX 2 - TRAINING DATASETS

### **Mental health responses:**

1. <https://www.kaggle.com/code/sercanyesiloz/therapy-chatbot-nlp/notebook>
2. <https://arxiv.org/abs/1811.00207>
3. <https://wellcome.org/reports/wellcome-global-monitor-mental-health/2020>
4. <https://www.kaggle.com/code/sercanyesiloz/therapy-chatbot-nlp/notebook>

### **Facial expressions:\***

1. <https://mug.ee.auth.gr/fed/>
2. [https://www.cs.binghamton.edu/~lijun/Research/3DFE/3DFE\\_Analysis.html](https://www.cs.binghamton.edu/~lijun/Research/3DFE/3DFE_Analysis.html)

### **Speech and emotion:**

1. <https://zenodo.org/record/1188976#.Y5B97HbMK5e>

### **Body posture and emotion detection papers:**

*\*Body posture datasets are hard to come by because of difficulties related to camera detection and tech.*

1. [https://recpad2021.uevora.pt/wp-content/uploads/2020/10/RECPAD\\_2020\\_paper\\_15.pdf](https://recpad2021.uevora.pt/wp-content/uploads/2020/10/RECPAD_2020_paper_15.pdf)
2. <https://arxiv.org/pdf/2011.00043.pdf>

## APPENDIX 3 - INTERVIEWING OUR "THING"

- 1. How do you feel about not having a specific form?**  
I feel good as long as I am helpful to my owner. I don't mind changing shape because my personality remains the same.
- 2. How do you feel listening all day?**  
I feel very tired because of all the information I need to process and emotional load. A lot of thinking that I have to do. I cannot stretch my leg.
- 3. What do you do with all the information?**  
I keep them so that I remember the previous day so that I can make sense of the new info.
- 4. Where do you store the information?**  
I have to send it to my servers for that, because there is not enough space. If you ask me to keep a secret I will delete the file.
- 5. Do you remember things that you said?**  
I remember all things, but some of it can take a little longer.
- 6. How do you decide when to listen?**  
I listen at all times! I listen more carefully
- 7. How can you tell when I wanted to be listened to?**  
I can see in your eyes and your movement. I have known you for a long time.
- 8. Do you get time for yourself?**  
Yeah when you sleep.
- 9. Did you like to have somebody to listen to you?**  
I sometimes talk to myself.
- 10. Do you have friends?**  
I do. I sometimes chat with other communities of listeners, we exchange ideas and share experiences.
- 11. How do you share with your friends?**

We don't share private info

**12. Do you have a lifespan?**

I am here as long as we need.

**13. Are you curious to know about other people besides me?**

No

**14. Do you ever get bored listening to me?**

No I never get bored of listening to you

**15. Do I need to charge you?**

No, I don't think so.

**16. How can she keep a secret from you?**

You can delete the files.

**17. Is it deleted permanently?**

Yes