



mindpeers

TensionFlow: Classification & Analysis of Mental Health Concerns

TEAM: rm -rf

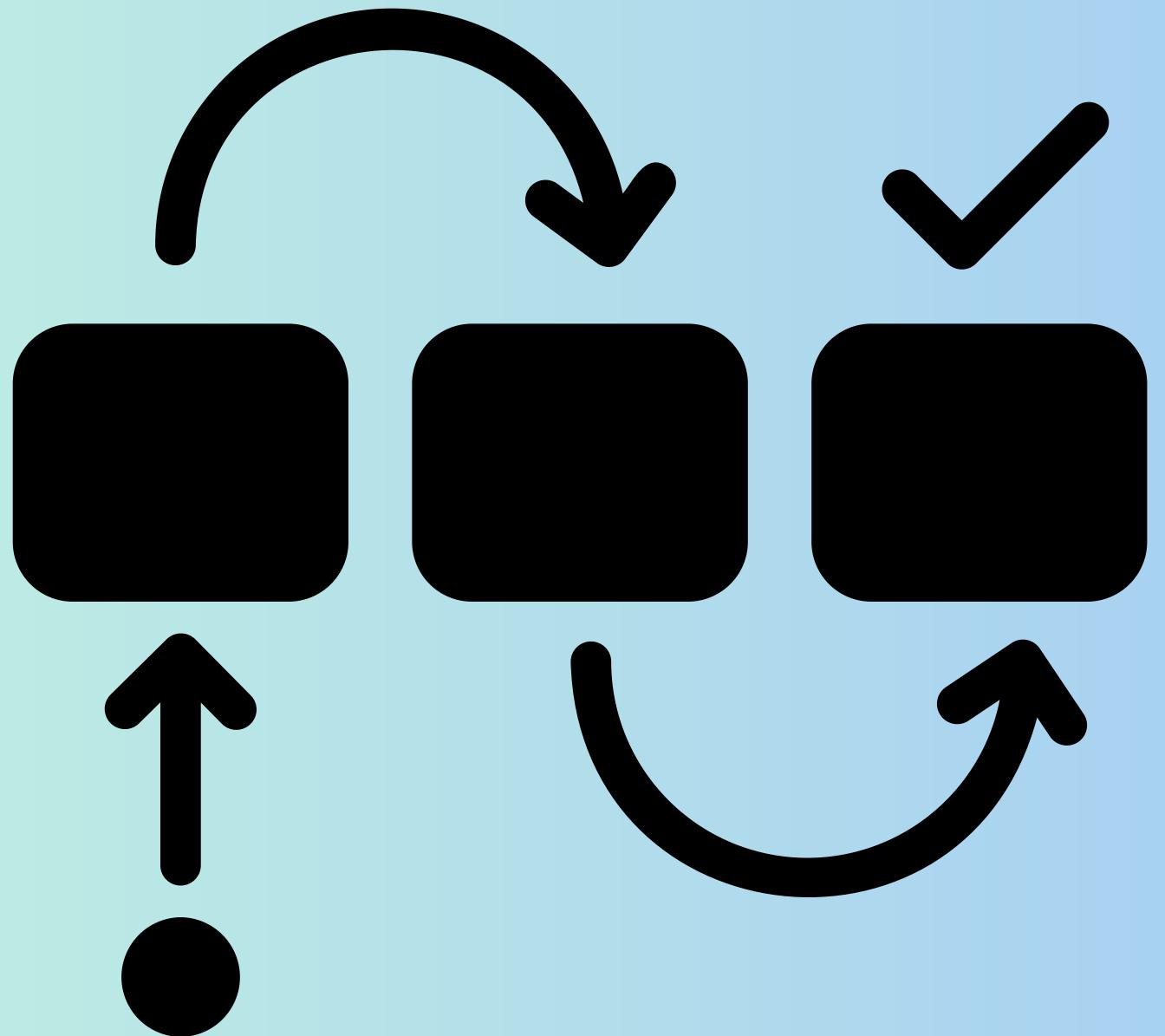




Objective

Developing an NLP-based solution
that automatically extracts,
classifies, and performs deeper
analysis of mental health concerns
from user input

Work Flow



[1] Data Preparation



- The given dataset was expanded in order to use it for training.
- Depending on the Polarity, Category and Intensity the text was modified to add context to it.
- A dataset of ~2000 data points was prepared with the help of LLMs

Data Preparation

Let's smell the data :]

```
{text,intensity,category,polarity}
```

```
{"It's a struggle to sleep, my mind  
just won't rest.",7,Insomnia,-1.0}
```

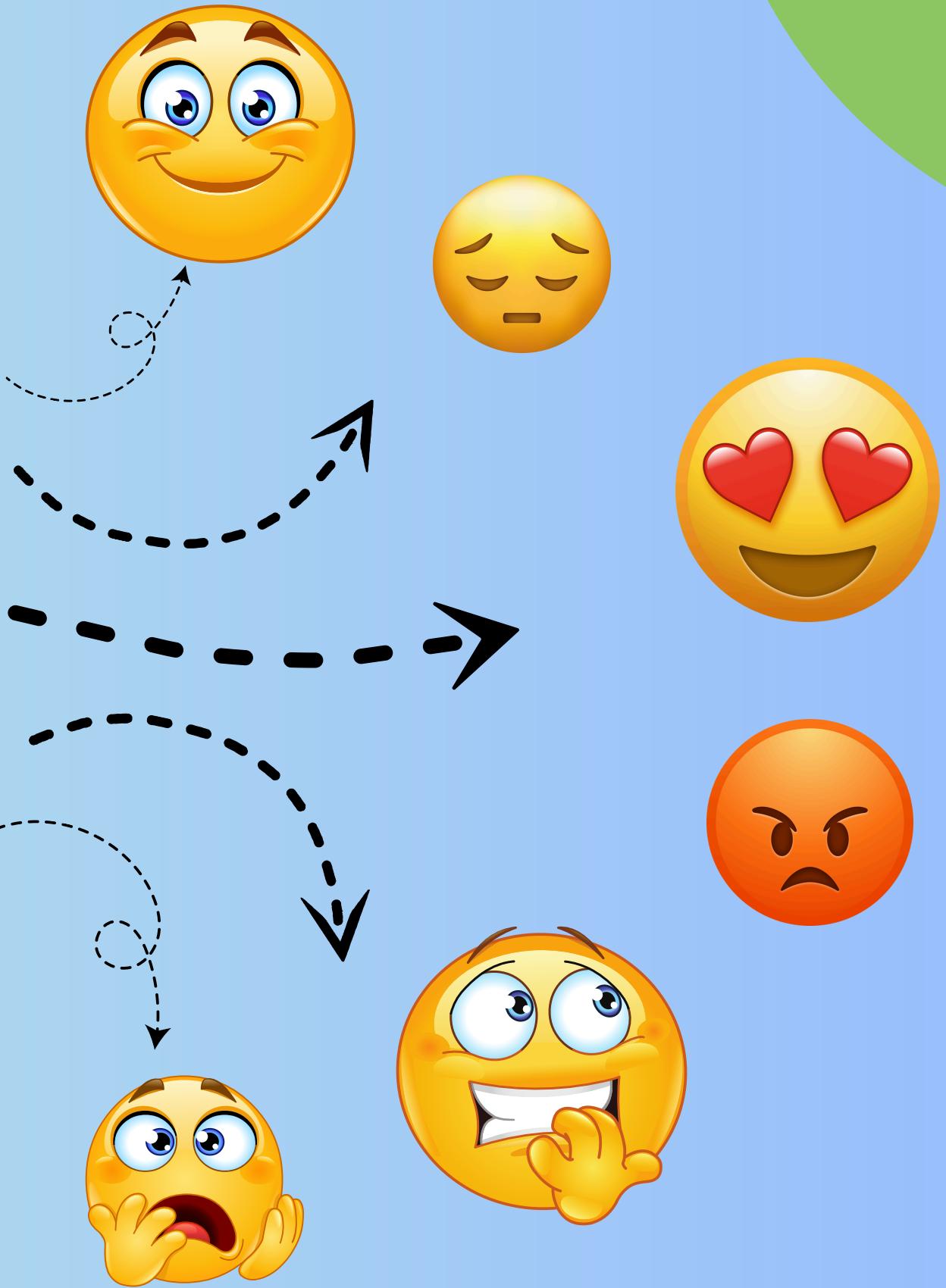
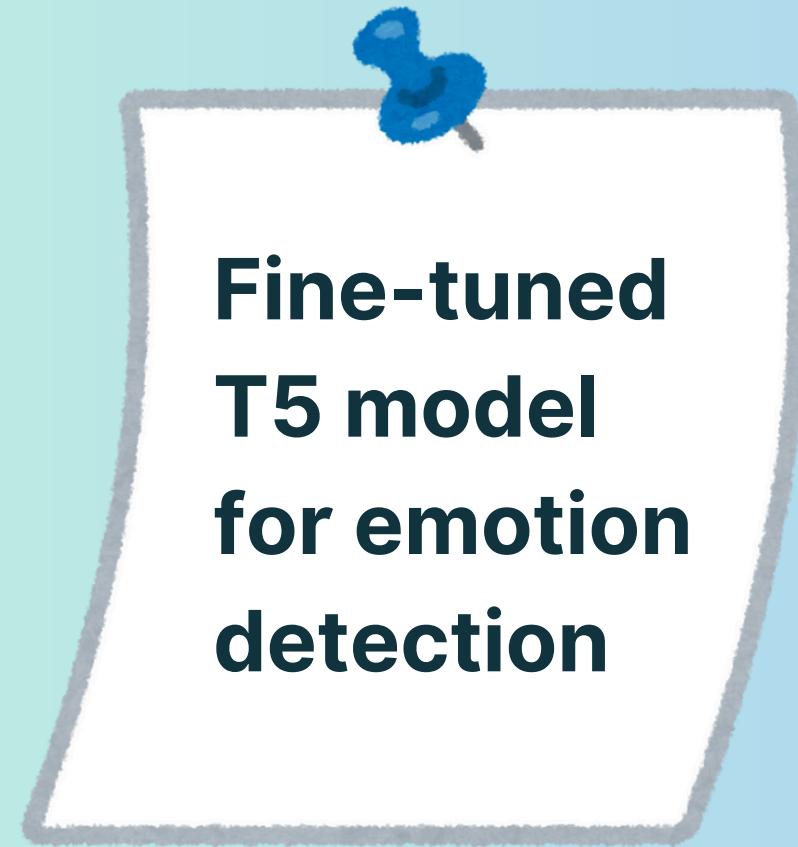
```
{"These past few days, I've felt more  
hopeful.",4,Positive Outlook,1.0}
```

“My mind feels
like it's can't
sleep
well.”,7,Insomnia,
Negative

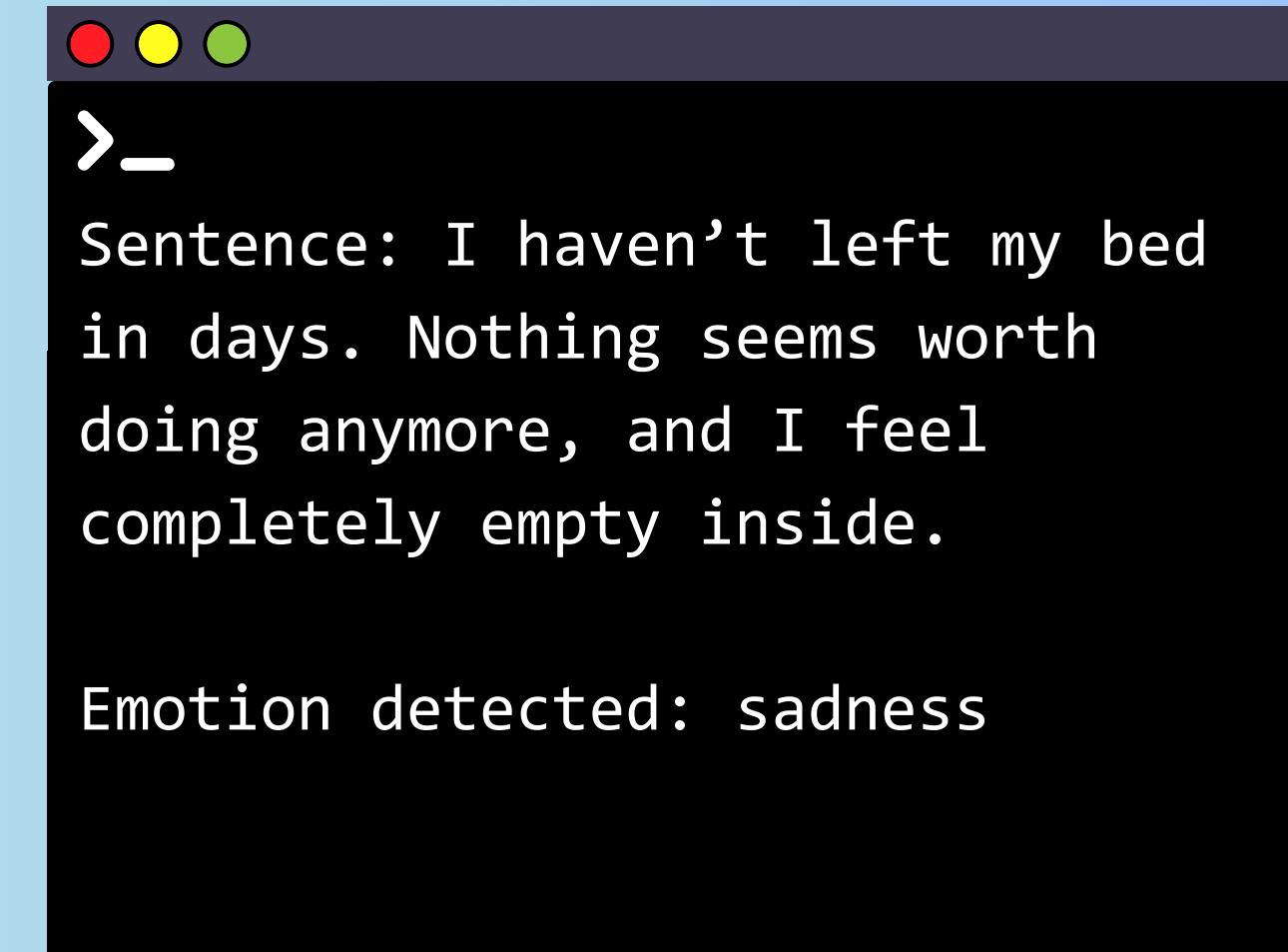
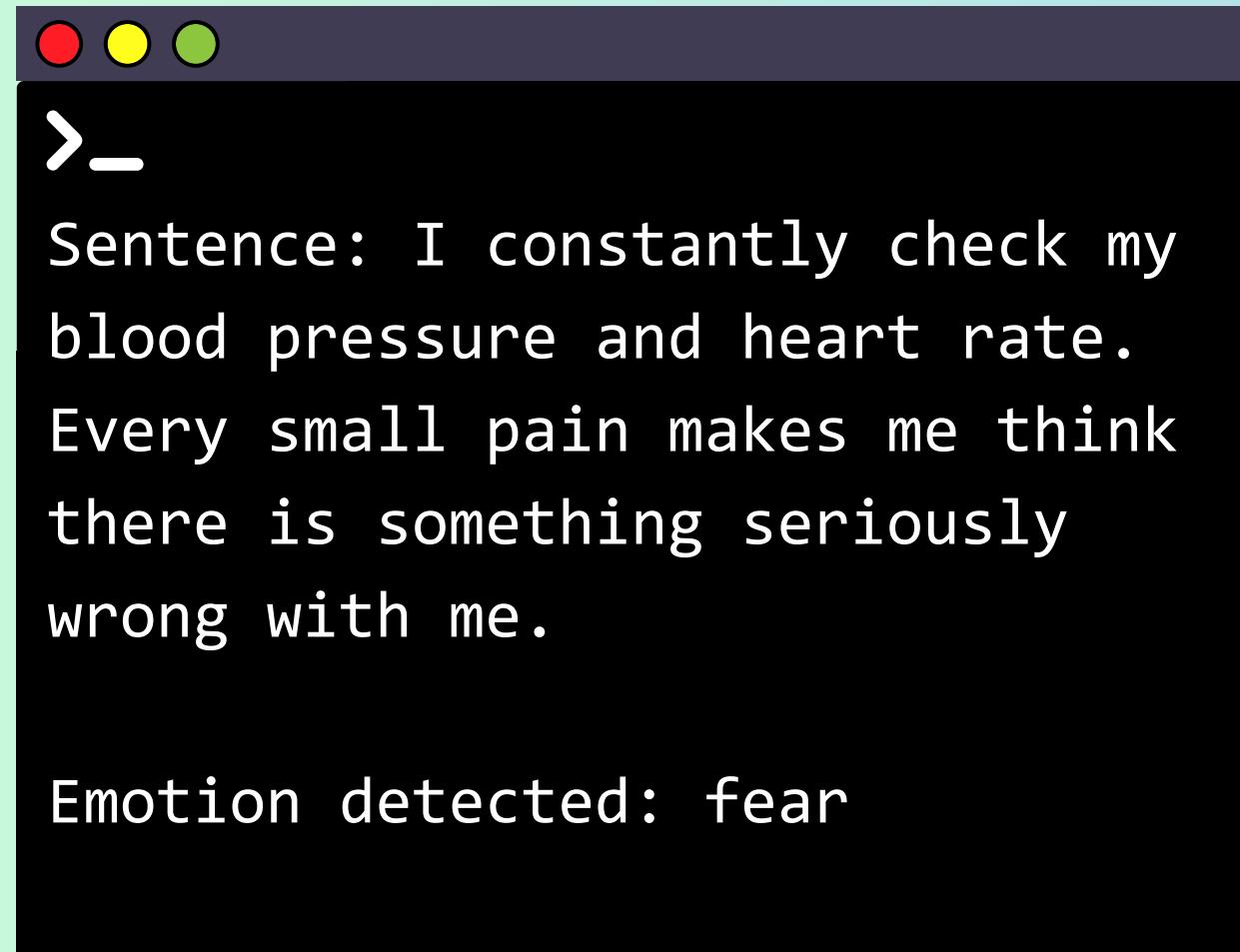
“It's a struggle
to sleep, my mind
just won't
rest.”,7,Insomnia,
-1.0

[2] Emotion Predictor

“ ___
___ ”
Sentence



Emotion Predictor



Sentence is inputted into the T5 model, which is fine-tuned for emotions. The output obtained is the emotion present in the sentence. This includes joy, fear, sadness, love, anger, and surprise.

Final features for classifier

text,intensity,category,polarity,emotion

"I am very anxious, and it's hard to stay calm.",8,Anxiety,-1.0,fear

"Work deadlines are piling up, and I feel completely overwhelmed. Can't seem to catch a breath.",7,Stress,-1.0, surprise

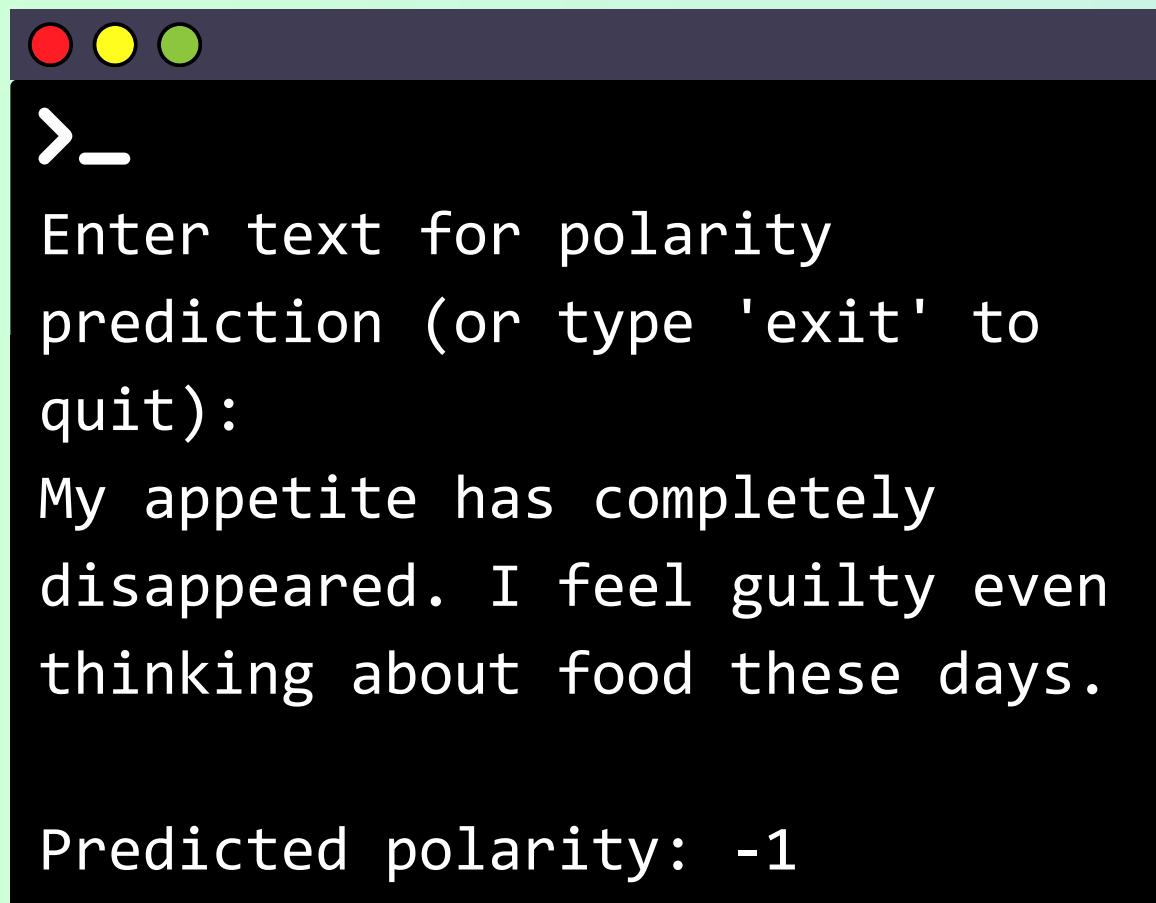


[3] Polarity Classifier

Fine tuned the Roberta classifier with our dataset with input as modified sentences and labels as polarity: neutral, negative and positive.

```
>_ Training...  
Epoch 1, Loss: 0.3556  
Validation F1 Score: 0.9147  
Validation Accuracy: 0.9574  
Validation Precision: 0.8959  
Validation Recall: 0.9375  
  
Epoch 2, Loss: 0.1258  
Validation F1 Score: 0.9413  
Validation Accuracy: 0.9707  
Validation Precision: 0.9282  
Validation Recall: 0.9562  
  
Epoch 3, Loss: 0.0730  
Validation F1 Score: 0.9306  
Validation Accuracy: 0.9628  
Validation Precision: 0.9083  
Validation Recall: 0.9565
```

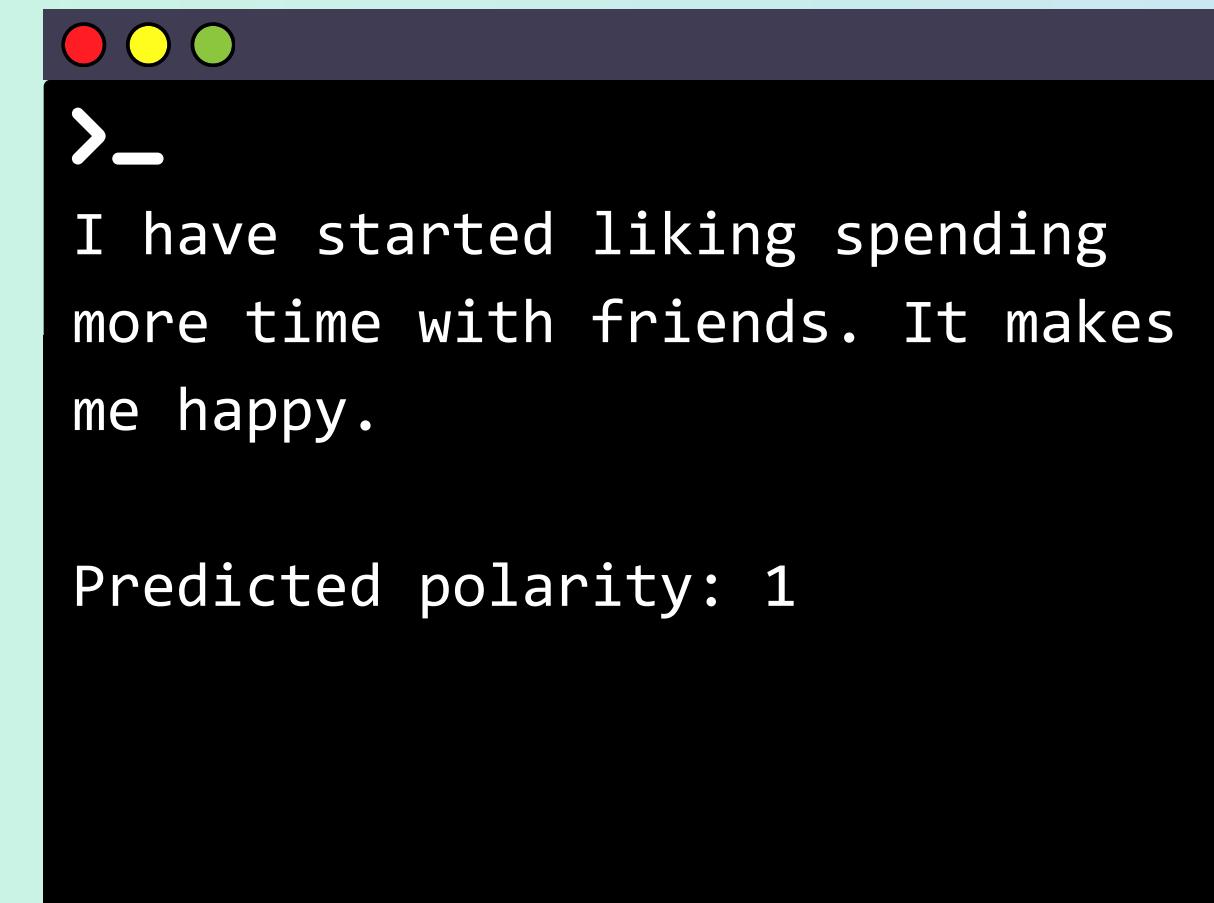
Polarity Classifier: Results



```
>_
Enter text for polarity
prediction (or type 'exit' to
quit):
My appetite has completely
disappeared. I feel guilty even
thinking about food these days.

Predicted polarity: -1
```

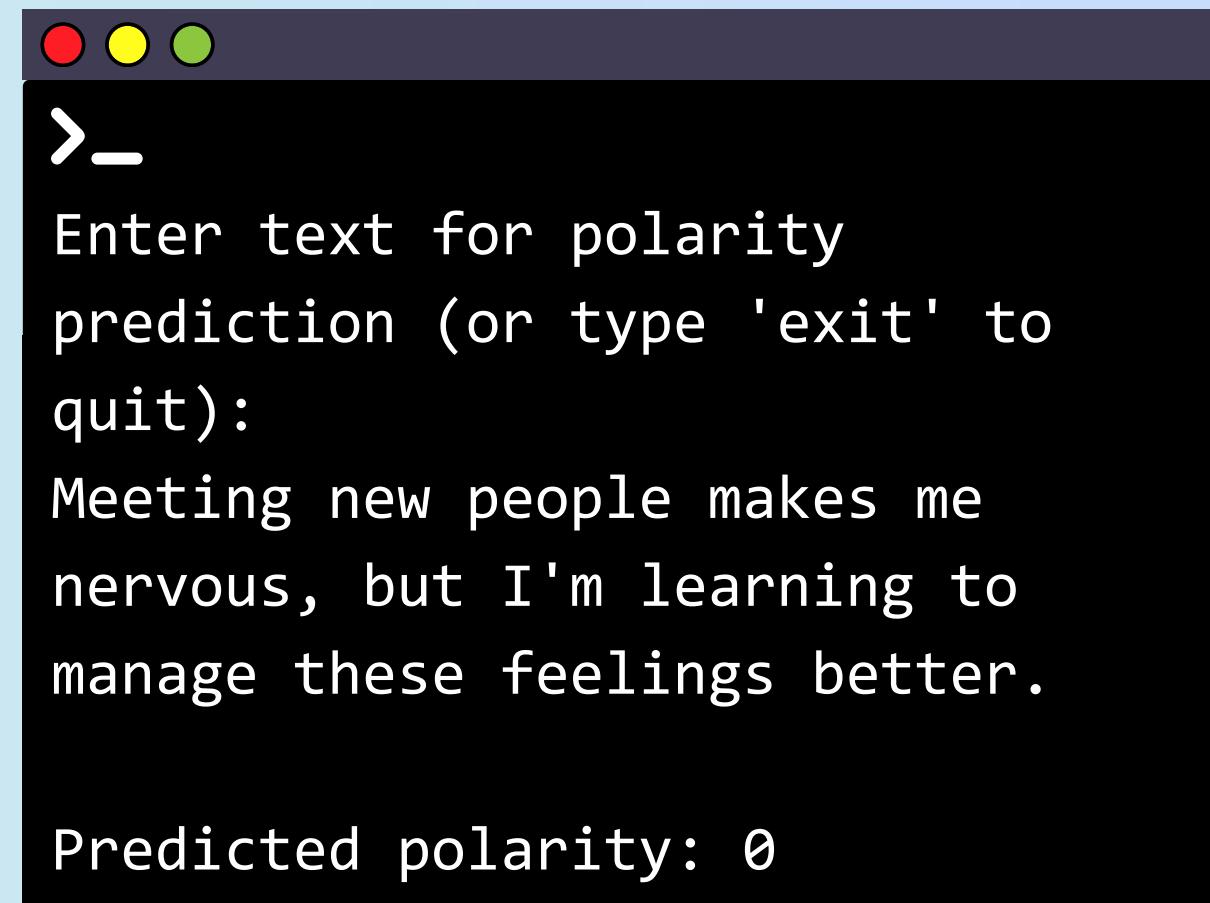
Negative



```
>_
I have started liking spending
more time with friends. It makes
me happy.

Predicted polarity: 1
```

Positive



```
>_
Enter text for polarity
prediction (or type 'exit' to
quit):
Meeting new people makes me
nervous, but I'm learning to
manage these feelings better.

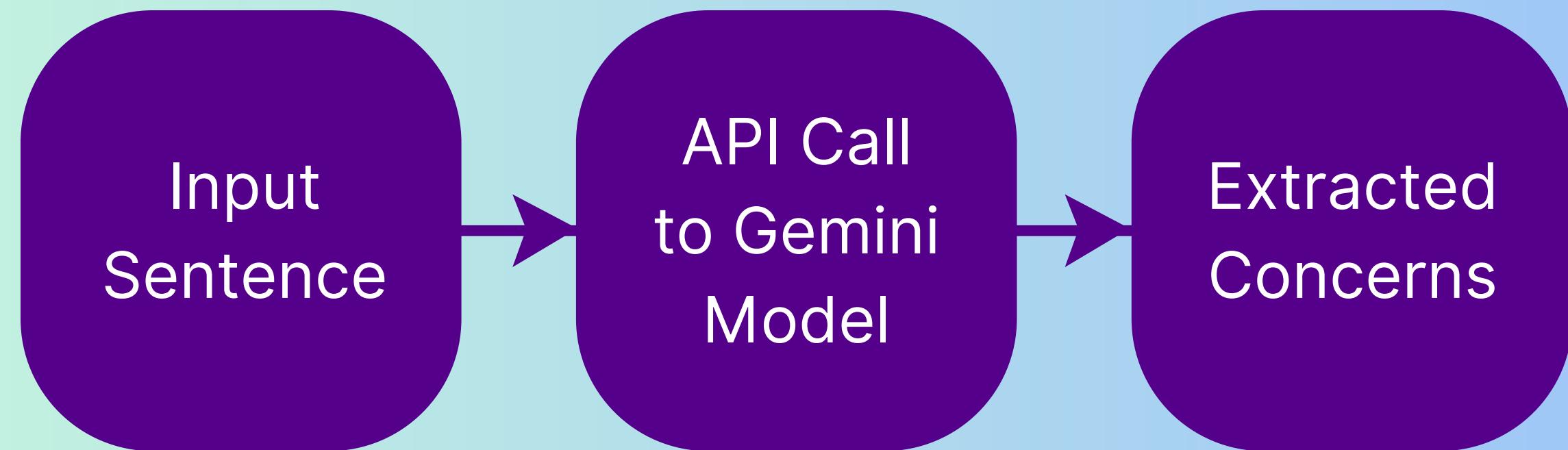
Predicted polarity: 0
```

Neutral

[4] Extract Keywords

Features: {text}

Output: {emotional_phrases}



Prompt Tuning

Extract Keywords



>_

Sentence:

Started painting again after
months. Colors are slowly coming
back into my life.

Extracted Concerns:

```
['slowly coming back', 'colors  
are slowly coming back']
```



>_

Sentence:

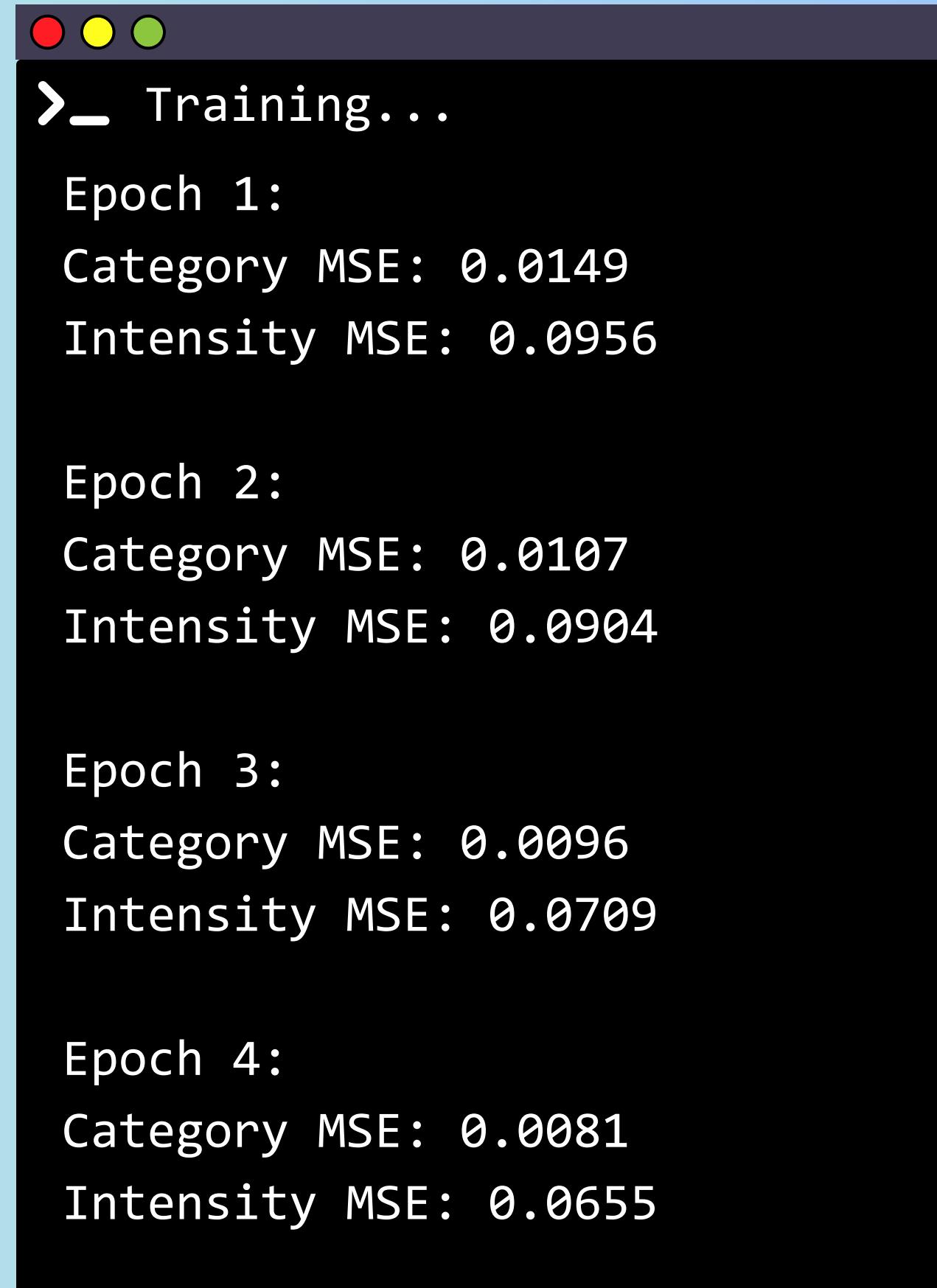
My mind feels like it can't find
joy anymore. Even simple tasks
feel overwhelming these days.

Extracted Concerns:

```
['can't find joy',  
'overwhelming']
```

[5] Concern Classifier

Fine tuned the Roberta classifier with our dataset with input as modified sentences and the extracted emotion and labels as category of mental health concern and its intensity.



The image shows a terminal window with a dark background and light-colored text. At the top, it says '>_ Training...'. Below that, it displays four epochs of training results, each consisting of two lines: 'Category MSE:' followed by a numerical value, and 'Intensity MSE:' followed by another numerical value. The numerical values show a general downward trend across the four epochs.

```
>_ Training...
Epoch 1:
Category MSE: 0.0149
Intensity MSE: 0.0956

Epoch 2:
Category MSE: 0.0107
Intensity MSE: 0.0904

Epoch 3:
Category MSE: 0.0096
Intensity MSE: 0.0709

Epoch 4:
Category MSE: 0.0081
Intensity MSE: 0.0655
```

Concern Classifier

Fine tuned the Roberta classifier with our dataset with input as modified sentences and the extracted emotion and labels as category of mental health concern and its intensity.

```
>_ Inference...
Category Evaluation:
Validation F1 Score: 0.8507
Validation Accuracy: 0.9507
Validation Precision: 0.8597
Validation Recall: 0.8454

Intensity Evaluation:
Mean Squared Error (MSE):
0.0587
```

Concern Classifier: Results

```
>_
Enter text for Concern and Intensity prediction (or type 'exit' to quit):
I am feeling hopeful about my recovery, and it's making a positive difference in my daily routine.
The predicted concern is Positive Outlook
The predicted intensity of the concern is 7
The predicted concern is Insomnia
The predicted intensity of the concern is 1
The predicted concern is Mixed Emotions
The predicted intensity of the concern is 2
```

```
>_
Enter text for Concern and Intensity prediction (or type 'exit' to quit):
Every day I'm feeling very low, and it's affecting my ability to focus at work. The simplest tasks feel overwhelming, and I can't seem to find motivation to do anything productive.
The predicted concern is Depression
The predicted intensity of the concern is 8
The predicted concern is Anxiety
The predicted intensity of the concern is 7
The predicted concern is Stress
The predicted intensity of the concern is 7
```

[6] Timeline-Based Sentiment Analyzer

- Tracks the progression or improvement of mental health concerns over time.
- User's history is extracted at certain time intervals by implementing the previous methods.
- Database stores the intensity of each category at each time interval.

Week	Sentence	Anxiety	Depression	Eating Disorder
1	"I worry about my weight constantly and often feel like I'm not good enough."	6	5	7
2	"Feeling anxious about my looks and my self-worth is affecting my mood daily."	7	6	6
3	"The stress of looking a certain way is making me feel low and I'm not enjoying my meals."	8	7	8
4	"I feel a bit better but still struggle with anxiety and eating issues every day."	5	5	6
5	"I've started caring less about my looks but still have anxious moments about it."	4	4	5

Example database

Timeline-Based Sentiment Analyzer



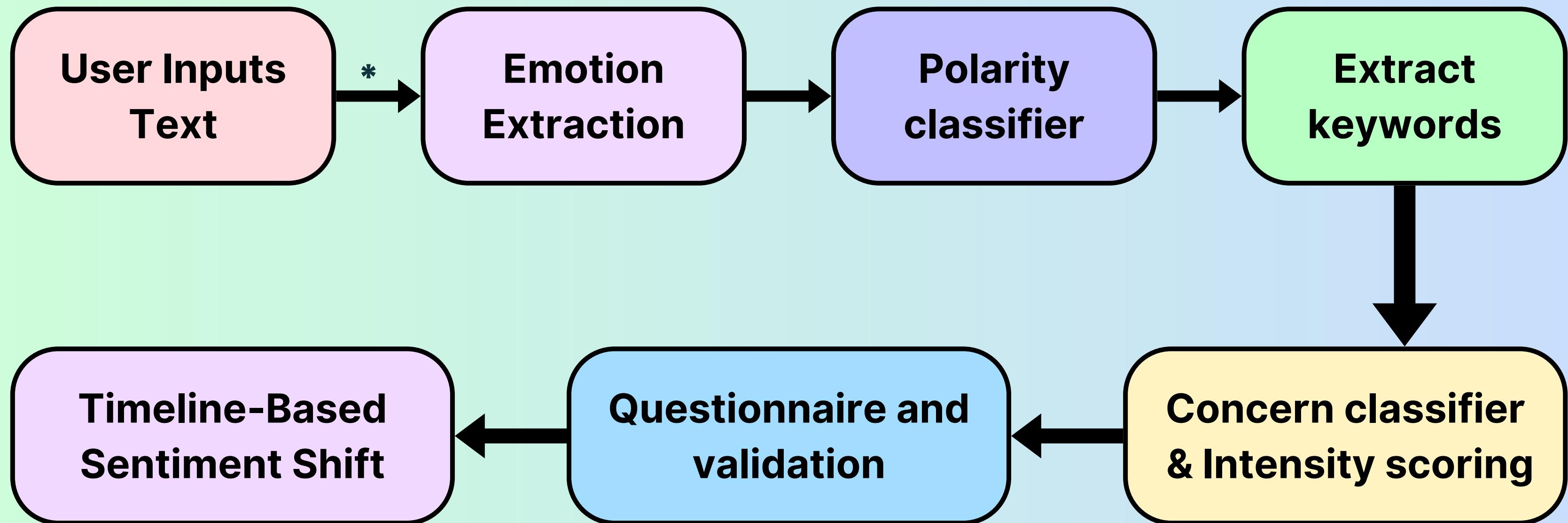
User 1



User 2

Graphs of the example database

Work Flow: Inference



*USP: Handling Multilingual Input

The user can give input in any language. We have integrated Google translator which translates the input to English to process further.



USP: Handling Multilingual Input

```
>_
Enter text for polarity prediction (or type 'exit' to quit):
कौटुंबिक अपेक्षा आणि कामाचा दबाव मला चिरडत आहे. मला असं वाटतंय की मी सगळ्यांनाच नापास करत आहे.

Detected language: mr

Translated text: Family expectations and work pressures are crushing me. I feel like I'm failing everyone.

Predicted polarity: -1
```

USP: Handling Multilingual Input

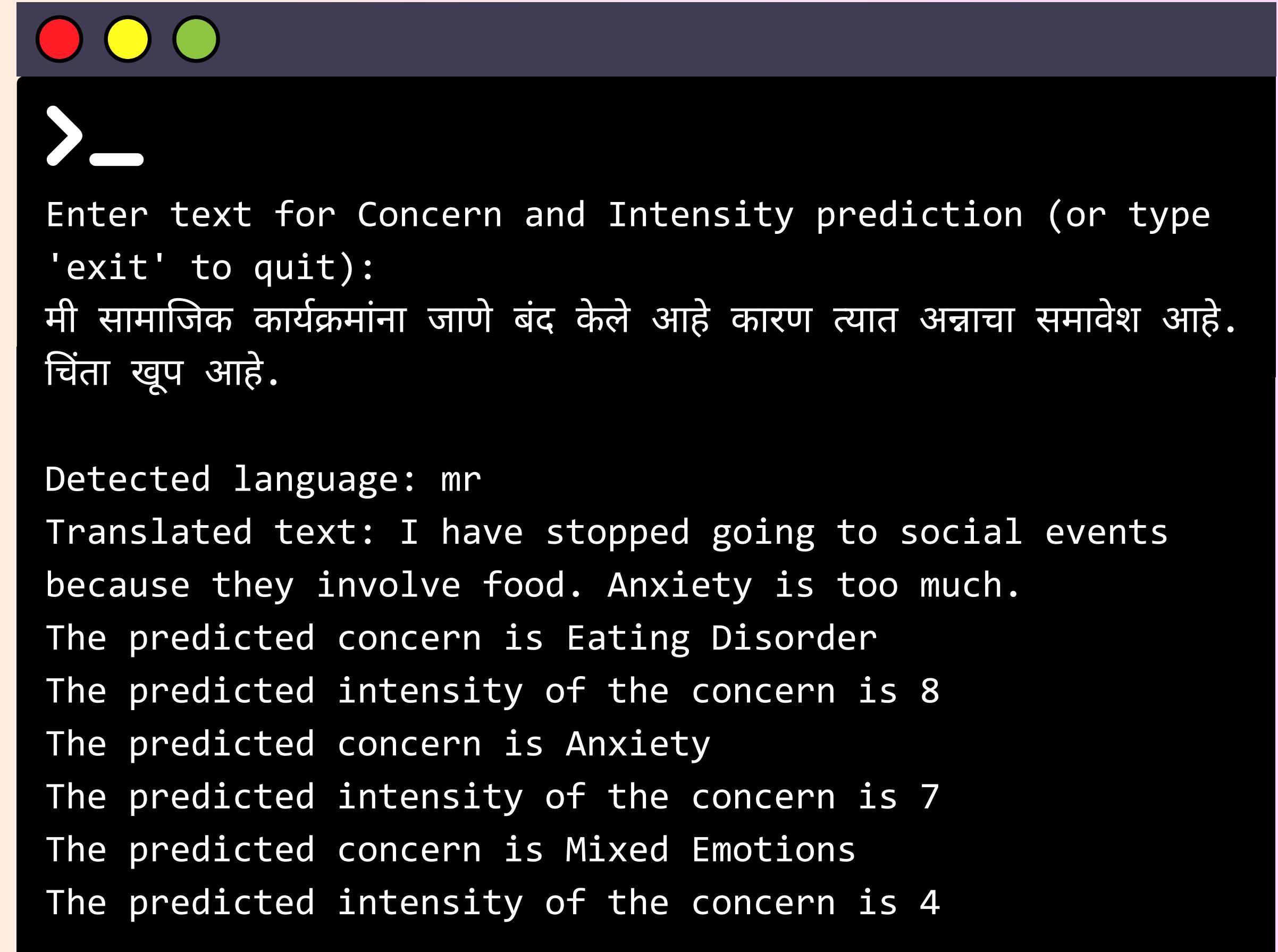
```
>_
Enter text for polarity prediction (or type 'exit' to quit): నేను త్వరలో బాగుపడతానని నాకు నేను చెబుతూనే ఉన్నాను, కానీ ఈ ఆరోగ్య చింతలను వదిలివేయడం కష్టం.

Detected language: te

Translated text: I keep telling myself I'll get better soon, but it's hard to let go of these health worries.

Predicted polarity: -1
```

USP: Handling Multilingual Input



The screenshot shows a terminal window with three colored window control buttons (red, yellow, green) at the top. The text area starts with a command prompt (>_). Below it, instructions are given: "Enter text for Concern and Intensity prediction (or type 'exit' to quit):". A sentence in Marathi is entered: "मी सामाजिक कार्यक्रमांना जाणे बंद केले आहे कारण त्यात अन्नाचा समावेश आहे. चिंता खूप आहे." The output below shows the detected language as "mr", the translated text in English, and the predicted concerns and their intensities.

```
>_
Enter text for Concern and Intensity prediction (or type 'exit' to quit):
मी सामाजिक कार्यक्रमांना जाणे बंद केले आहे कारण त्यात अन्नाचा समावेश आहे.
चिंता खूप आहे.

Detected language: mr
Translated text: I have stopped going to social events
because they involve food. Anxiety is too much.
The predicted concern is Eating Disorder
The predicted intensity of the concern is 8
The predicted concern is Anxiety
The predicted intensity of the concern is 7
The predicted concern is Mixed Emotions
The predicted intensity of the concern is 4
```

USP: Questionnaire for verification

After the concern category and its intensity is predicted by our model, we do a cross verification by asking some simple questions to the user more specifically regarding the concern identified. The type of questions chosen are inspired from the Mindpeers app.



USP: Questionnaire for verification

For example:

Eating Disorder: How often do you skip meals?

- a) Never
- b) Rarely
- c) Sometimes
- d) Often



USP: Questionnaire for verification

Scores are calculated from these questions and are compared with the intensity given by the model.

If the intensities do not match, we recommend consulting a therapist.



Questionnaire

Enter disorders (comma-separated):

Stress, Positive Outlook

How often do you feel overwhelmed?

- Never
- Rarely
- Sometimes
- Often

Do you feel like you have enough time to relax?

- Yes, plenty
- Enough
- A little
- Not at all

How often do you feel pressured by your responsibilities?

- Never
- Rarely
- Sometimes
- Often

Do you find it easy to manage your daily tasks?

- Always
- Often
- Sometimes
- Rarely

How often do you feel tense or on edge?

- Never



OUR TEAM : rm - rf



Ketaki Shetye



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Abhinav Raundhal



Yash Shinde

Thank
you