Prompt file for Data Analysis Assignment.

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Dashboard

For seeing all the code live interactively,

Visit Dashboard

https://eda-analysis-iby-0.streamlit.app/

Contents

1 Introduction

This document outlines the process of using ChatGPT to generate prompts for results and analysis of the project, extracted from the data.

1.1 Outline of the Document

- Prompts used for data analysis
- Prompts used for Streamlit Dashboard
- Prompts used for project results
- Prompts used for LaTeX writing

2 Data Preparation and Integration

In this section, I explain how the data was prepared and important features were extracted from the three provided CSV files.

2.1 Extracting Key Features from Emotion Data from each CSV file and making single DATAFRAME

Initial Prompt:

Prompt

```
movie_id image_seq   angry disgust  fear  happy sad   surprise neutral
    dominant_emotion
0  93663f94-bf0a-4ce8-a29a-a5236cc7fe6a   0  4.31735  0.000594 2.879790
    1.65035  2.779980 0.600814 87.77110 neutral
1  93663f94-bf0a-4ce8-a29a-a5236cc7fe6a   1  53.22530 2.981640 12.736800
    1.52347  1.051320 27.216800   1.26462  angry

this is data of csv file of every emotion data and this is student 1.. there
    are 10
such students, so 10 such df_emotion, so i want to make
combined df where two most frequent emotion data throughtout
the video of the student reflects  All df_emotion csv files are emotion_data
    folder.
```

Chatpgt gave wrong response to the initial prompt. The response was giving wrong results.
So i further explained what i intended to do

Refined Prompt:

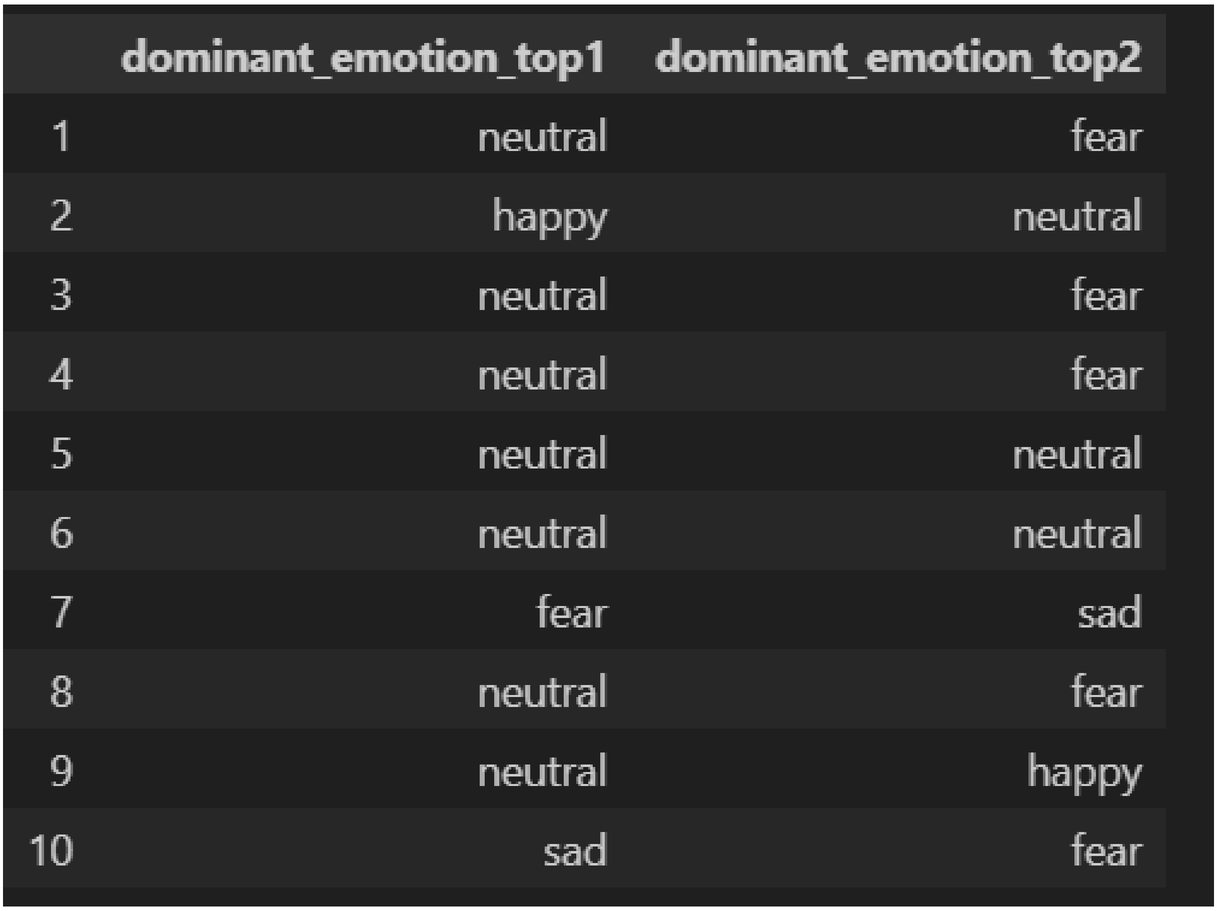
```
You are doing it incorrectly. I want to first calculate the most frequent
of every single emotion CSV and then make one column out of it.
Then, finally make 10 columns out of 10 CSV files with column names
dominat\_top1, dominant\_top2 emotions. From every emotion CSV, find
2 max frequency dominant features and then add that.
```

For this prompt, response from the chatgpt was:

```
import pandas as pd
import os

# Path to the folder containing emotion data
folder_path = 'emotion_data'

# Initialize an empty dictionary to store top 2 dominant emotions for each student
dominant_emotions = {'student_top1': [], 'student_top2': []}

# Iterate over all files in the folder (assuming 10 files: emotion-df1.csv to emotion-df10.csv)
for i in range(1, 11):
    file_name = f'{i}/emotion.csv'
    file_path = os.path.join(folder_path, file_name)

    # Read the CSV file into a DataFrame
    df = pd.read_csv(file_path)

    # Find the 2 most frequent dominant emotions
    top_emotions = df['dominant_emotion'].value_counts().nlargest(2).index.tolist()

    # Append the top 2 emotions for this student (add NaN if there's less than 2 emotions)
    dominant_emotions['student_top1'].append(top_emotions[0] if len(top_emotions) > 0 else None)
    dominant_emotions['student_top2'].append(top_emotions[1] if len(top_emotions) > 1 else None)

# Create a DataFrame for top emotions for every student
df_dominantEmotion_for_everystudent = pd.DataFrame(dominant_emotions)

# Rename columns to reflect student numbers correctly (top1 and top2)
df_dominantEmotion_for_everystudent.columns = [
    f'student_{i}_dominant_emotion_top1' if 'top1' in col else f'student_{i}_dominant_emotion_top2'
    for i, col in enumerate(df_dominantEmotion_for_everystudent.columns, start=1)
]

# Set index to range from 1 to 10
df_dominantEmotion_for_everystudent.index = range(1, 11)

# Print the final DataFrame
print(df_dominantEmotion_for_everystudent)
```

With the help of this code, two most freq dominant emotions were extracted from each emotion CSV file and added to the final dataframe.

Now the final dataframe has 10 columns with features top_1_dominant, top_2_dominant emotion.



	dominant_emotion_top1	dominant_emotion_top2
1	neutral	fear
2	happy	neutral
3	neutral	fear
4	neutral	fear
5	neutral	neutral
6	neutral	neutral
7	fear	sad
8	neutral	fear
9	neutral	happy
10	sad	fear

2.2 Integrating transcript data with emotion data

Prompt:

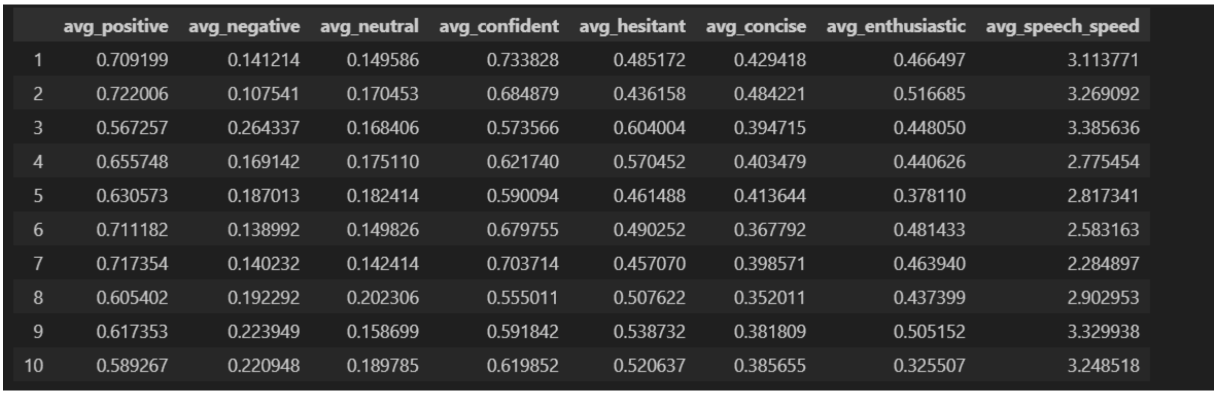
'Prompt'

```
id   "neutral  confident  hesitant   concise  enthusiastic  speech_speed
0    0.267454   0.846701  0.845698  0.635805      0.647783      2.517986
1    0.260410   0.679283  0.733701  0.544145      0.417390      3.217822

this is data of csv file of every transcript data and this is student 1.. there
    are 10
such students, so 10 such df_transcript , so i want to make
combined df where two most frequent text data throughtout
the video of the student reflects  All df_transcript files are transcript_data
    folder.
```

The response from the chatgpt awesome this time.

```
# Path to the folder containing transcript data
folder_path = 'transcript_data'

# Initialize a list to store average DataFrames for each student
average_dfs = []

for f in os.listdir(folder_path):
    id = f.split('.')[0]
    file_path = os.path.join(folder_path, f)
    features = ['positive', 'negative', 'neutral', 'confident', 'hesitant',
    'concise', 'enthusiastic', 'speech_speed']
    df = pd.read_csv(file_path, usecols=features)

    # Calculate averages
    new_features = ['avg_positive', 'avg_negative', 'avg_neutral',
    'avg_confident', 'avg_hesitant', 'avg_concise', 'avg_enthusiastic',
    'avg_speech_speed']
    avg_values = df[features].mean().values

    # Create a new DataFrame with averages and id
    new_df = pd.DataFrame([avg_values], columns=new_features)
    new_df['id'] = id

    # Append to the list of average DataFrames
    average_dfs.append(new_df)

# Combine all average DataFrames into a single DataFrame
final_df = pd.concat(average_dfs, ignore_index=True)

print(final_df)
```

Using above code, It extracted the above features of transcript data of each student and added to the final dataframe.



	avg_positive	avg_negative	avg_neutral	avg_confident	avg_hesitant	avg_concise	avg_enthusiastic	avg_speech_speed
1	0.709199	0.141214	0.149586	0.733828	0.485172	0.429418	0.466497	3.113771
2	0.722006	0.107541	0.170453	0.684879	0.436158	0.484221	0.516685	3.269092
3	0.567257	0.264337	0.168406	0.573566	0.604004	0.394715	0.448050	3.385636
4	0.655748	0.169142	0.175110	0.621740	0.570452	0.403479	0.440626	2.775454
5	0.630573	0.187013	0.182414	0.590094	0.461488	0.413644	0.378110	2.817341
6	0.711182	0.138992	0.149826	0.679755	0.490252	0.367792	0.481433	2.583163
7	0.717354	0.140232	0.142414	0.703714	0.457070	0.398571	0.463940	2.284897
8	0.605402	0.192292	0.202306	0.555011	0.507622	0.352011	0.437399	2.902953
9	0.617353	0.223949	0.158699	0.591842	0.538732	0.381809	0.505152	3.329938
10	0.589267	0.220948	0.189785	0.619852	0.520637	0.385655	0.325507	3.248518

Note

Now we have to merge the transcript data with the emotion data.
For that we have to merge the dataframes on the basis of student id.

Prompt for merging the emotion_df and transcript_df:

```
[title=Prompt]
    df_dominantEmotion_for_everystudent
```

```
and final_df add these df on index
```

response from the chatgpt:

```
final_df_with_emotions = pd.concat([final_df,
    df_dominantEmotion_for_everystudent], axis=1)

# Print the final merged DataFrame
print(final_df_with_emotions.head(10))
```

Using the above code, the emotion data and transcript data were merged on the basis of student id. The final dataframe after merging the emotion and transcript data is shown below:

Final Dataframe

id	avg_positive	avg_negative	avg_neutral	avg_confident
1	0.709199	0.141214	0.149586	0.733828
2	0.722006	0.107541	0.170453	0.684879

avg_hesitant	avg_concise	avg_enthusiastic	avg_speech_speed
0.485172	0.429418	0.466497	3.113771
0.436158	0.484221	0.516685	3.269092

dominant_emotion_top1	dominant_emotion_top2
neutral	fear
happy	neutral

2.3 Now, Integrating the gaze_df with the final_df_with_emotions

But before that i have to extract the key features from all 10 gaze data and make a single gaze_df. Prompt for this:

```
        i have gaze_df of 10 students
in each csv of student there are
   movie_id image_seq   gaze  blink eye_offset
0  93663f94-bf0a-4ce8-a29a-a5236cc7fe6a    1  1  0  6.2253
1  93663f94-bf0a-4ce8-a29a-a5236cc7fe6a    2  1  0  22.7274

data like this
now i want to make merged_gaze_df of all 10 students how can i do this?
```

Response:

I am just showing the code here. The whole response is here

```
# Read all 10 gaze CSV files and store them in a list
folder_path = 'emotion_data'
dfs= []
for i in range(1, 11):
    file_name = f'{i}/gaze.csv'
    file_path = os.path.join(folder_path, file_name)

    df = pd.read_csv(file_path)
    aggregated_df = df.groupby('movie_id').agg({
        'gaze': 'mean',          # Average gaze data over all frames
        'blink': 'sum',          # Total blinks across all frames
        'eye_offset': ['mean',   # Average eye_offset over the entire video
                        'max',    # Maximum eye_offset
                        'min',    # Minimum eye_offset
                        'std'],   # Standard deviation of eye_offset
        'image_seq': 'count'     # Count the number of frames
    }).reset_index()
    aggregated_df.columns = ['_'.join(col).strip() if isinstance(col, tuple)
    else col for col in aggregated_df.columns]
    dfs.append(aggregated_df)
    aggregated_df.head(2)


# print(dfs)

final_gaze_df = pd.concat(dfs)
```

3 Data Preprocessing

Prompt: "I have to check whether there are any missing values in the final DataFrame or not and also check the basic statistics of the final DataFrame."

```
import os

folder_path = 'emotion_data'
#  if there is any data missing print the missing data
def check_dataframe(df):
    missing_values = df.isnull().sum()
    print("Missing values in each column:\n", missing_values)

    basic_statistics = df.describe()
    print("\nBasic statistics of the DataFrame:\n", basic_statistics)

for i in range(1, 11):
    file_name = f'{i}/emotion.csv'
    file_path = os.path.join(folder_path, file_name)

    if os.path.exists(file_path):
        df = pd.read_csv(file_path)
        print(f"Data from {file_path}:")
        check_dataframe(df)
    else:
        print(f"File {file_path} does not exist.")
```

from the results, i got following observations from the running this code:-

- As the Count of all the features is 10, means there is not Null values.
- The standard devaition of all the features is also very low compared to the mean, indicating that the data is not spread out(low chances of outliers).
- As i have already done the encoding of the categorical features, so no need to do it again.

4 Prompts for Analysis on the DataFrame made above

4.1 Basic Statistics

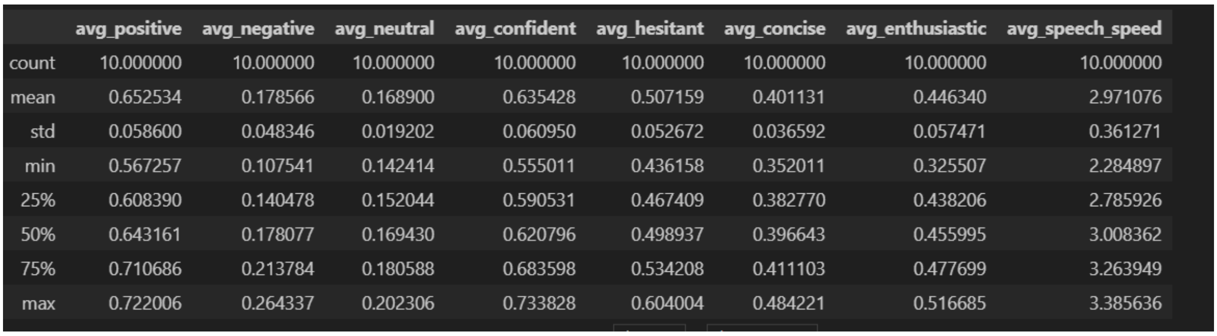
Prompt:

```
How to know whether there are any missing values in the final DataFrame?
or just give me description of the dataframe.
```

Response:

```
print(final_df_with_emotions.describe())
```

The basic statistics of the final DataFrame are as follows:



	avg_positive	avg_negative	avg_neutral	avg_confident	avg_hesitant	avg_concise	avg_enthusiastic	avg_speech_speed
count	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000
mean	0.652534	0.178566	0.168900	0.635428	0.507159	0.401131	0.446340	2.971076
std	0.058600	0.048346	0.019202	0.060950	0.052672	0.036592	0.057471	0.361271
min	0.567257	0.107541	0.142414	0.555011	0.436158	0.352011	0.325507	2.284897
25%	0.608390	0.140478	0.152044	0.590531	0.467409	0.382770	0.438206	2.785926
50%	0.643161	0.178077	0.169430	0.620796	0.498937	0.396643	0.455995	3.008362
75%	0.710686	0.213784	0.180588	0.683598	0.534208	0.411103	0.477699	3.263949
max	0.722006	0.264337	0.202306	0.733828	0.604004	0.484221	0.516685	3.385636

4.2 Correlation Analysis

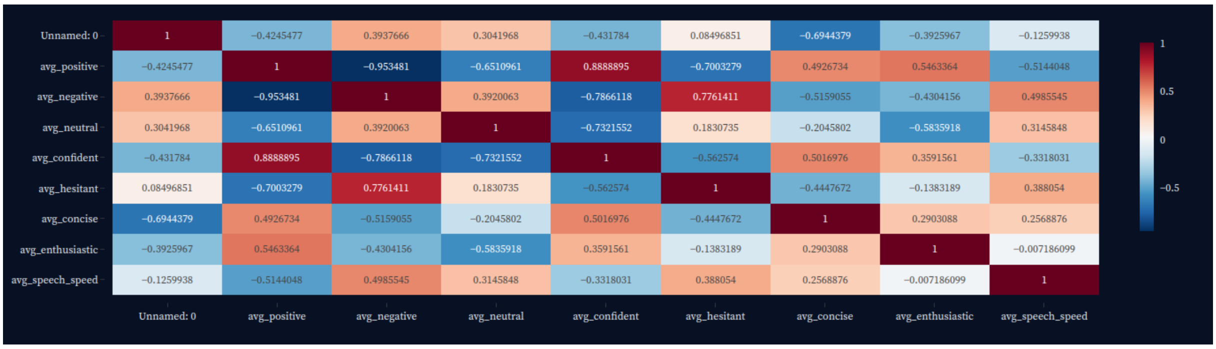
Now i did correlation analysis on the final DataFrame to understand the relationship between different features. **Prompt:**

```
Now, calculate the correlation matrix of the final DataFrame final\_df.
```

Response:

```
correlation_matrix = final_df_with_emotions.corr()
print(correlation_matrix)
```

Wrtitng and running the code, there was a error in chatgpt response, but I corrected it and ran the code. The correlation matrix is shown below:



	Unnamed: 0	avg_positive	avg_negative	avg_neutral	avg_confident	avg_hesitant	avg_concise	avg_enthusiastic	avg_speech_speed
Unnamed: 0	1	−0.4245477	0.3937666	0.3041968	−0.431784	0.08496851	−0.6944379	−0.3925967	−0.1259938
avg_positive	−0.4245477	1	−0.953481	−0.6510961	0.8888895	−0.7003279	0.4926734	0.5463364	−0.5144048
avg_negative	0.3937666	−0.953481	1	0.3920063	−0.7866118	0.7761411	−0.5159055	−0.4304156	0.4985545
avg_neutral	0.3041968	−0.6510961	0.3920063	1	−0.7321552	0.1830735	−0.2045802	−0.5835918	0.3145848
avg_confident	−0.431784	0.8888895	−0.7866118	−0.7321552	1	−0.562574	0.5016976	0.3591561	−0.3318031
avg_hesitant	0.08496851	−0.7003279	0.7761411	0.1830735	−0.562574	1	−0.4447672	−0.1383189	0.388054
avg_concise	−0.6944379	0.4926734	−0.5159055	−0.2045802	0.5016976	−0.4447672	1	0.2903088	0.2568876
avg_enthusiastic	−0.3925967	0.5463364	−0.4304156	−0.5835918	0.3591561	−0.1383189	0.2903088	1	−0.007186099
avg_speech_speed	−0.1259938	−0.5144048	0.4985545	0.3145848	−0.3318031	0.388054	0.2568876	−0.007186099	1

4.3 Based on the final_df, I asked for analysis on the data.

Prompt:

```
now probelm statement is
In this task, you will work with a dataset of 10 candidates containing emotion
    scores, transcript scores, and the corresponding transcripts extracted from
    their introduction videos. Your goal is to use the ChatGPT with your prompt
    engineering skills along with performing Exploratory Data Analysis (EDA) on
    the data provided, to generate valuable and actionable insights from the
    data.
Actionable insights include:
1. Can we recruit the candidate or not? With suitable reasons from the data.
2. Analysis of communication skills and finding areas of expertise based on
    data.
3. Any other insights which help us make decision about the candidate are also
    welcomed.
This task is designed to assess your ability to preprocess data, create
    effective prompts, and perform EDA to extract meaningful and actionable
    information.

Main flow should be like this:
- give plots idea to perform some exploratory data analysis (EDA) on the
    datasets.
- how to analysis to generate insights about each candidate.
- recommendations based on those insights.
- Finally give a scoring mechanism to rank the students
- Any other insights is welcomed.
```

Response:

As the result of this response is very large, i am not pasting it here. But the link for the response is here But the crux of the response chatgpt is :

1. EDA Plots: Box plots, scatter plots, word clouds, heatmaps, and bar charts to visualize key metrics.
2. Analysis: Emotional stability, communication skills, and expertise areas via correlation analysis, sentiment analysis, and text-based NLP.
3. Recommendations: Tailored based on emotional and communication performance.
4. Scoring Mechanism: Combine emotional stability, transcript quality, and communication clarity for ranking.
5. Any Aditional insights

So based on the response of the chatgpt, i started implementing each section one by one.

Note

In the responses, I am just showing the text response of the chatgpt. The code is not pasted here.
I will explicity include the code in different file or if the link for the chatgpt is mentioned, then
no issues. If the response will be too long , i will just give what i understood from the response.
and will paste the link for the response.

- Communication Scoring: **Prompts for this section:**

```
I want to plot and find the relationship between following features, give
    with code and logic :-

a)  relationship between conciseness and enthusiasm of the students.
b)  relationship between avg_speech_speed and avg_hesitant and between
    avg_speech_speed and avg_confident.
c)  relationship between all three text scores and confidence of the
    students.
d)  Create a word cloud from the transcript to identify frequently used
    words and phrases.
```

In the response of this prompt, chatpgt gave codes for relations i wanted to find. I am not pasting the code here. Link for the chatgpt response is here

- Emotional State and Body Language Analysis: **Prompts for this section:**

Prompt

```
so in the data frame , i have eye_offset data of each frame of video of
    each student(10 total)
which can be postive or negative .
Answer this:
How to use eye_offset for whole video for every student to find how much
    his eyes deviates??
To determine the emotional Stability --how to achieve this

To determine how the emotions are changing--means what is the variation
    over the video

To Body Language Analysis on the basis of columns of gaze_df which are
    blink_sum, eye_offset, gaze_score.

give a Framework to do all the above tasks
```

Response:

Response

```
To analyze the eye offset data and determine emotional stability, changes in emotions, and body language, you can follow this framework:
1. Emotional Stability Analysis
Objective: Determine how much a students eyes deviate throughout the video to gauge emotional stability.
Calculate Mean and Standard Deviation:
Compute the mean and standard deviation of the eye_offset for each student over the entire video.

Stability Metric: Lower standard deviation indicates more stability; higher indicates more fluctuation.

Cumulative Deviation:
Calculate the cumulative deviation over time to assess how the deviation accumulates.

Visualization:
Plot the eye_offset values over time to visualize stability.
Use rolling windows to smooth the data and highlight trends.

3. Emotional Variation Analysis
Objective: Analyze how emotions change over time within the video.

Calculate Moving Average:
Compute the moving average of the eye_offset to observe trends and variations.

Variation Metrics:
Measure the variance or standard deviation over time windows to capture emotional changes.

Visualization:
Create time series plots of eye_offset and its moving average.
Use heatmaps to show variation intensity over time.

4. Body Language Analysis
Objective: Analyze body language based on blink_sum, eye_offset, and gaze_score.

Correlate Metrics:
Compute correlations between eye_offset, blink_sum, and gaze_score.
Analyze how these metrics interact to provide insights into body language.

Blink Frequency:
Analyze the blink_sum to determine blinking patterns and their relation to emotional states.

Gaze Score Analysis:
Evaluate gaze_score to understand gaze direction and how it correlates with eye offset and blinking.

Body Language Patterns:
Combine all metrics to identify patterns such as increased blinking with large eye offsets or shifts in gaze.

Visualization:
Plot eye_offset, blink_sum, and gaze_score together to observe how they change over time.
Use scatter plots to explore correlations between metrics.
```

Further Prompts for this section:

prompt

what is eye-offset can u explain??

Response:

response

```
Eye offset is the distance between the center of the screen and the point
    where the user is looking.
It is used to measure the stability of the user's gaze.
A higher eye offset indicates that the user's gaze is less stable.
```

Prompts for analysing gaze_df:

```
No, i want U to give Eye Offset Standard Deviation analysis for every
    student on the basis of
1.Too much Eye Movements:
2. Moderate Eye Movements:
3. Stable Eye Movements:
```

5 Scoring of the Students based on the data.

Prompt:

So i had already some latex code, on that i asked chatgpt to give me the scoring mechanism for the students based on the data. So my prompt was like this:

response

```
based on the data, do the changes in the latex also provide insights acc
    to the data
and comparison with other students (ranking in every feature), and use
    tcolorbox for heading only.
```

Response: The response of the chatgpt was NOTvery good. It gave me the scoring mechanism just on the basis of few features.

Refined Prompt:

Refined Prompt

```
Analysis the data deeply and on the basis of all the features of each
    student, give a scoring mechanism such that
1) It is robust
2) divides the student into highly fit for the role
3) Okk for the role
4) Not for the role
5) Main focus should be on transcript data(postive,negative,neutral) ,
    emotion thorughtout the video, confidence, hesitance, speech,speed,
    body language, enthusiam
```

Response: This time, response was amazing, it gave a very nice framework to calculate and rank the students based on the data.
Though values used for the scoring were random, but the framework was very good.

Response

```
I will assign a weighted score to each feature, where each feature's
    contribution to the final score is proportional to its importance for
    the role. The focus will be primarily on the transcript data,
    confidence, enthusiasm, and body language. Heres how it can be
    structured:

a. Transcript Data (40% of total score):
Positive Transcript: +10 points for values  0.7, scaled down for lower
    values.
Negative Transcript: -10 points for values  0.25, scaled down for lower
    values.
Neutral Transcript: No direct impact, but consider it when evaluating
    other factors like enthusiasm.
b. Confidence (20% of total score):
+10 points for values  0.7, scaled down for lower values.
c. Hesitance (10% of total score):
-10 points for values  0.5, scaled down for lower values.
d. Enthusiasm (15% of total score):
+10 points for values  0.5, scaled down for lower values.
e. Speech Speed (5% of total score):
For values around 3.0, full score (e.g., 0.5 around the mean). Deviations
    from the optimal speed reduce the score.
f. Body Language (10% of total score):
Gaze Score: +5 points for scores  0.8, scaled down for lower scores.
Blink Sum: -5 points for blinks  20, scaled up for fewer blinks.
Eye Offset: Penalties for extreme offsets (high deviation in gaze).
3. Score Calculation
Using this weighted framework, we will calculate the score for each
    student. The total score will then classify them into:

Highly Fit for the Role: Score  75
Okay for the Role: Score between 55 and 74
Not Fit for the Role: Score < 55
```

This was the original response, here values used for the scoring and weightwage were not good. So i changed them.

To see complete prompts and responses(including wrong one), click here

6 Conclusion

This section summarizes the key findings and insights from the data analysis project.

Prompt:

Prompt

```
    Based on the analysis of the data, provide a conclusion for the
project.
    Include key insights, recommendations, and any additional
observations.
```

Response:

Response

```
    Based on the analysis of the data, the following conclusions can
be drawn:
    1. Students with high positive sentiment, confidence, and
enthusiasm are more likely to be successful in the role.
    2. Communication skills, including concise speech and moderate
speech speed, are important for effective communication.
    3. Emotional stability and body language play a significant role
in conveying confidence and enthusiasm.
    4. Students with stable eye movements and low eye offset are more
likely to maintain focus and attention.
    5. Recommendations: Provide training in emotional intelligence,
communication skills, and body language to improve student performance.
    6. Additional observations: The scoring mechanism can be further
refined based on additional data and feedback from experts.
```

ありがとうございました!

Thank You!