eda_reddit_data

July 25, 2025

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from collections import Counter
import re

# Load your dataset
reddit_df = pd.read_csv("data/reddit_top2000_posts_per_subreddit.csv")

# Ensure date is in datetime format
reddit_df['created_utc'] = pd.to_datetime(reddit_df['created_utc'],␣
 ↪errors='coerce')
reddit_df['title'] = reddit_df['title'].fillna('').astype(str)
reddit_df['text'] = reddit_df['text'].fillna('').astype(str)
```

[2]:
```
# Dataset shape
print("Shape:", reddit_df.shape)
```

```
Shape: (11933, 9)
```

[3]:
```
# Display the first few rows of the dataframe
reddit_df.head()
```

[3]:

	subreddit	id	title	text	author
0	depression	cd0hjp	Shout out to the particular hell that is funct…	This is me. Don’t get me wrong, it’s better th…	NaN
1	depression	i3ajk8	I hate that people don’t understand that i don…		Nathanvic13
2	depression	ccaxvm	If 10 years ago someone told me that in 10 yea…	But here I am, 24 years old man and doing exac…	coolmast3r
3	depression	g9ndgw	It’s like I died at 15, but my body just kept …	I’m trapped inside. Does anyone else get that …	thecruelandthecrazy
4	depression	dpl4bu	High-functioning depression: I feel like I'm l…	I read a lot of posts on here of people strugg…	D6uglh7cu

	score	num_comments	created_utc

```
0   6675           345 2019-07-14 07:53:40
1   4728           257 2020-08-04 01:57:38
2   4423           218 2019-07-12 13:36:38
3   4176           306 2020-04-28 13:40:28
4   4097           347 2019-10-31 09:36:19

                                                  url
0  https://www.reddit.com/r/depression/comments/c…
1  https://www.reddit.com/r/depression/comments/i…
2  https://www.reddit.com/r/depression/comments/c…
3  https://www.reddit.com/r/depression/comments/g…
4  https://www.reddit.com/r/depression/comments/d…
```

[4]:
```
# Display the last few rows of the dataframe
reddit_df.tail()
```

[4]:
```
           subreddit       id  \
11928  socialanxiety  1lmrejp
11929  socialanxiety  1jl76dp
11930  socialanxiety  1j6ih1c
11931  socialanxiety  1lgx8u4
11932  socialanxiety  1m8dt2w

                                                  title  \
11928  I accidentally became a regular at my favorite…
11929                          Asked out girl, got mocked
11930  Social anxiety is not "irrational" when you're…
11931                          This disorder defeated me.
11932  I just saw a man with his penis out and now I …

                                                   text  \
11928  They give me extra things and write nice messa…
11929  Well, this put me right back in high school.\n…
11930  How do you even fight this, when there's a lit…
11931  Social anxiety has destroyed my life. It ruine…
11932  I had to go downtown to pick something up at a…

                    author  score  num_comments         created_utc  \
11928          GamblerJolly    778            51 2025-06-28 16:47:25
11929  Hairy-Razzmatazz-927    767           118 2025-03-27 15:53:28
11930       wszechswietlna     712            63 2025-03-08 14:37:35
11931               zikarta    682           123 2025-06-21 14:00:43
11932         bnnuyprincess    653            45 2025-07-24 19:27:45

                                                   url
11928  https://www.reddit.com/r/socialanxiety/comment…
11929  https://www.reddit.com/r/socialanxiety/comment…
```

```
11930  https://www.reddit.com/r/socialanxiety/comment…
11931  https://www.reddit.com/r/socialanxiety/comment…
11932  https://www.reddit.com/r/socialanxiety/comment…
```

[5]:
```
# Column types and null values
reddit_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11933 entries, 0 to 11932
Data columns (total 9 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   subreddit     11933 non-null  object
 1   id            11933 non-null  object
 2   title         11933 non-null  object
 3   text          11933 non-null  object
 4   author        9748 non-null   object
 5   score         11933 non-null  int64
 6   num_comments  11933 non-null  int64
 7   created_utc   11933 non-null  datetime64[ns]
 8   url           11933 non-null  object
dtypes: datetime64[ns](1), int64(2), object(6)
memory usage: 839.2+ KB
```

[6]:
```
# Summary stats for numeric columns
reddit_df.describe()
```

[6]:

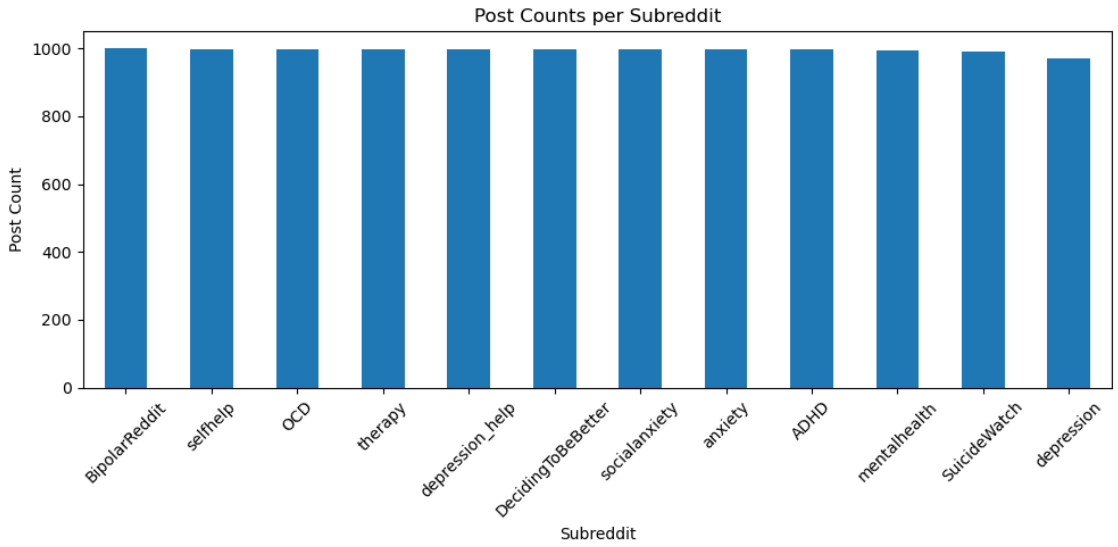
	score	num_comments	created_utc
count	11933.000000	11933.000000	11933
mean	1204.334786	100.787396	2020-12-17 17:50:40.276627968
min	24.000000	0.000000	2011-05-31 13:51:36
25%	141.000000	26.000000	2020-01-14 12:23:18
50%	739.000000	54.000000	2020-10-28 07:20:56
75%	1684.000000	107.000000	2021-07-28 11:56:10
max	27942.000000	18643.000000	2025-07-25 01:32:19
std	1444.670461	273.940355	NaN

[7]:
```
# Count missing values
reddit_df.isnull().sum()
```

[7]:
```
subreddit          0
id                 0
title              0
text               0
author          2185
score              0
num_comments       0
created_utc        0
```

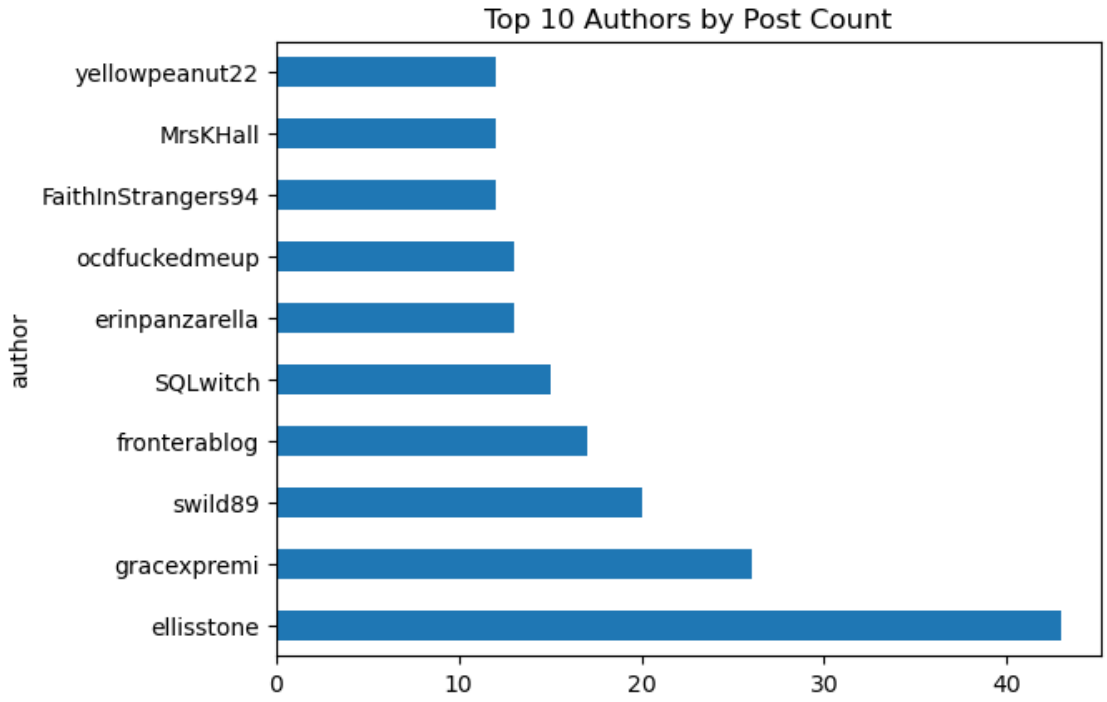
```
url                0
dtype: int64
```

[8]:
```
import matplotlib.pyplot as plt

# Count plot by subreddit
reddit_df['subreddit'].value_counts().plot(kind='bar', figsize=(10, 5),␣
 ↪title='Post Counts per Subreddit')
plt.xlabel("Subreddit")
plt.ylabel("Post Count")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



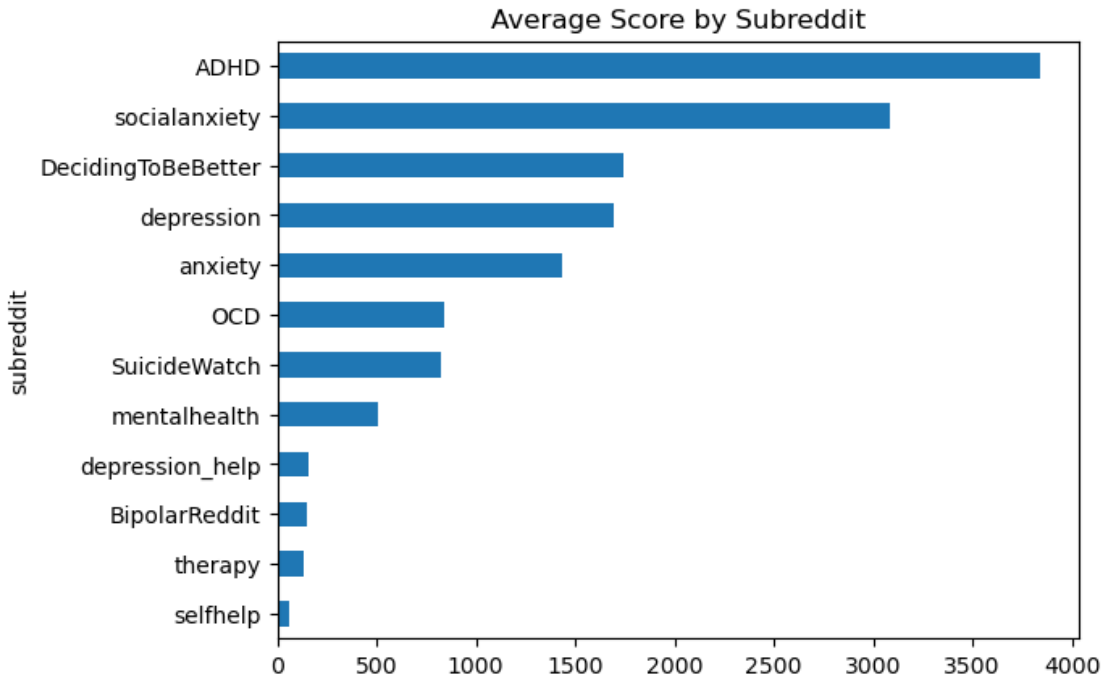
[9]:
```
reddit_df['author'].value_counts().head(10).plot(kind='barh', title="Top 10␣
 ↪Authors by Post Count")
```

[9]:
```
<Axes: title={'center': 'Top 10 Authors by Post Count'}, ylabel='author'>
```

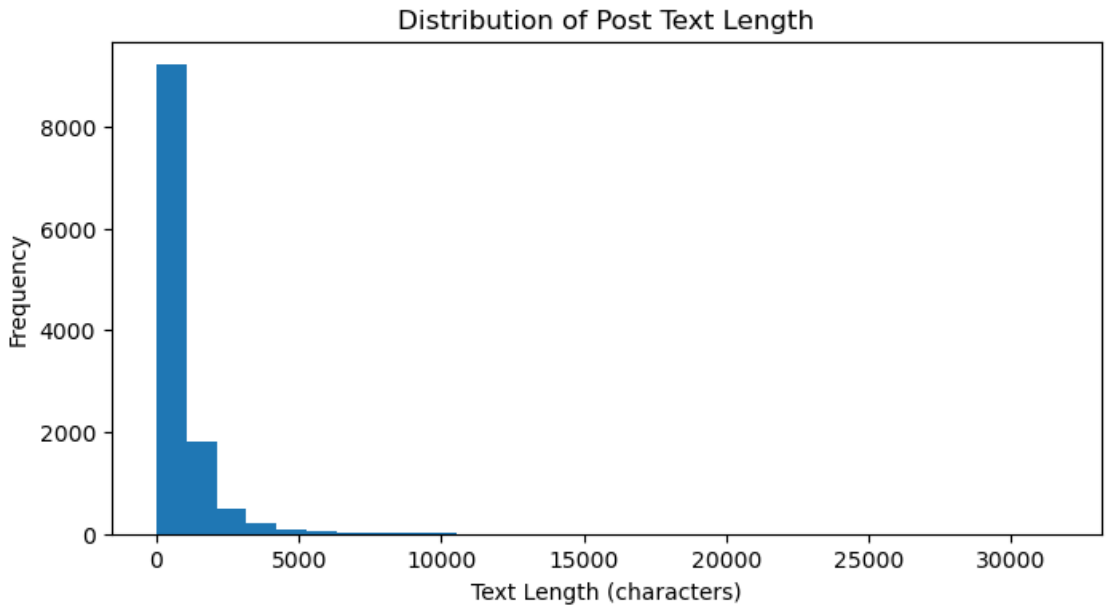


[10]:
```
reddit_df.groupby('subreddit')['score'].mean().sort_values().plot(kind='barh',␣
↪title="Average Score by Subreddit")
```

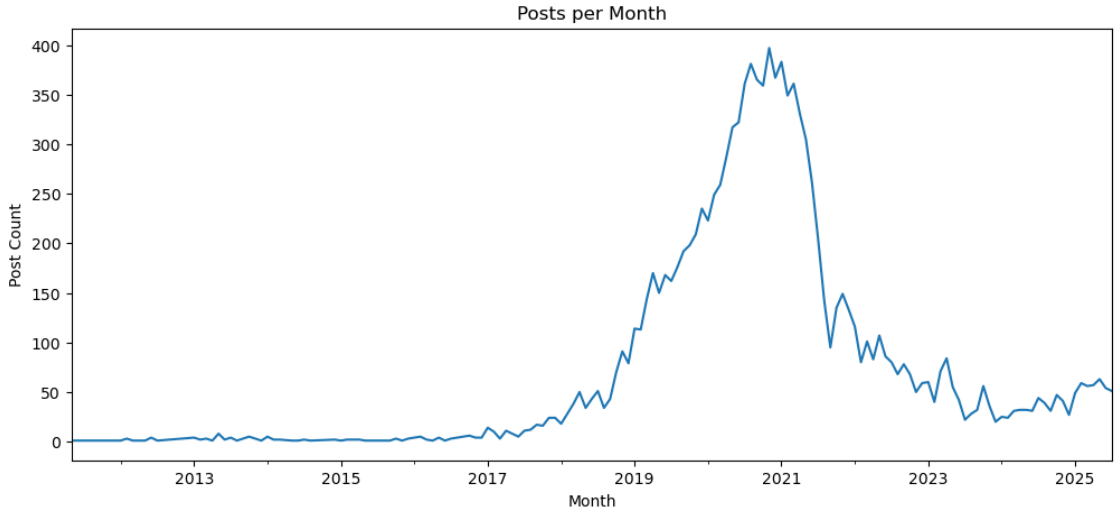
[10]: <Axes: title={'center': 'Average Score by Subreddit'}, ylabel='subreddit'>



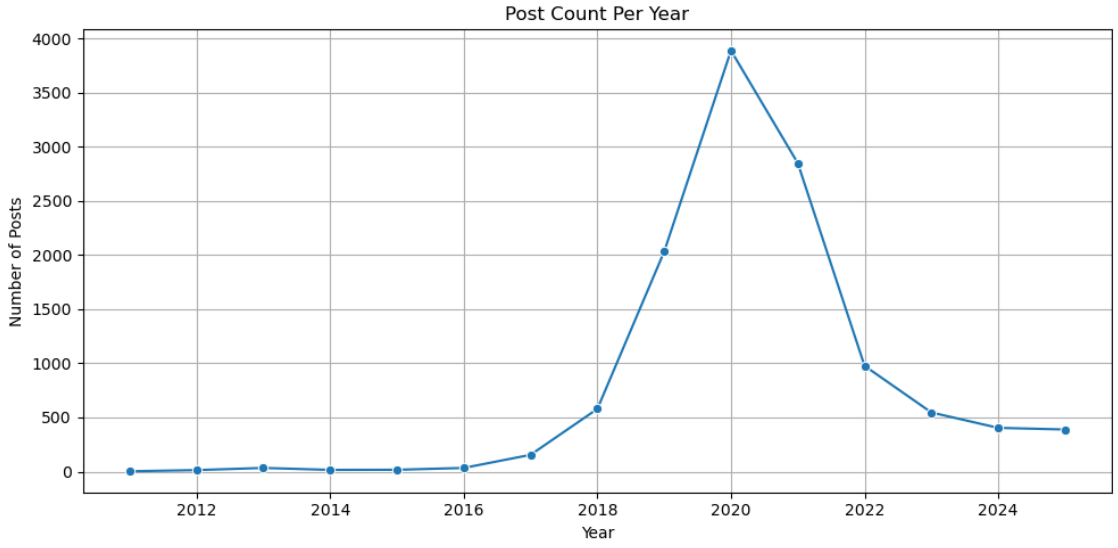
[11]:
```
# Add new column: text length
reddit_df['text_length'] = reddit_df['text'].fillna('').apply(len)

# Histogram of text lengths
reddit_df['text_length'].plot(kind='hist', bins=30, figsize=(8, 4),␣
 ↪title='Distribution of Post Text Length')
plt.xlabel("Text Length (characters)")
plt.show()
```



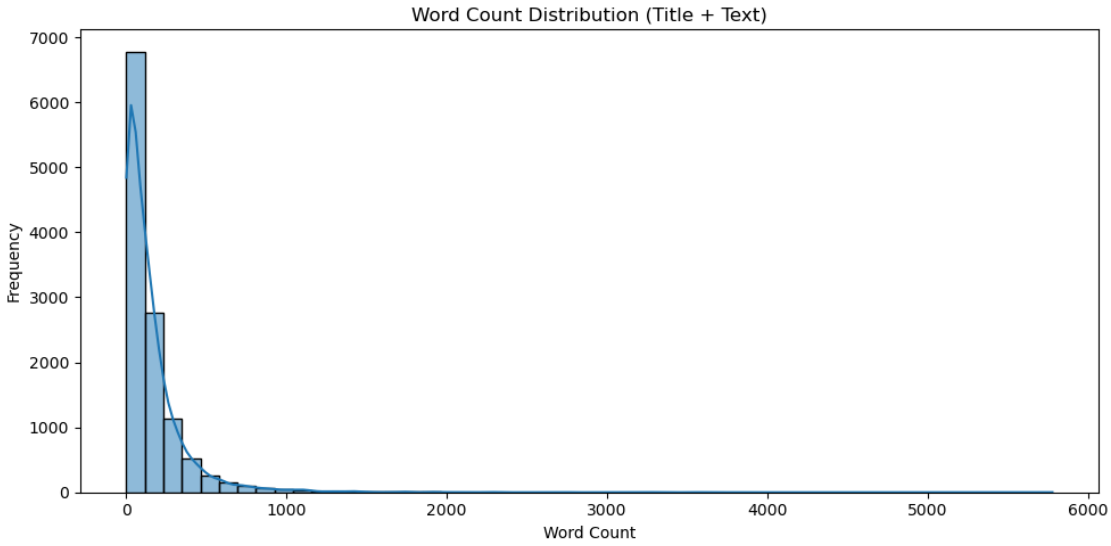
[12]:
```
# Convert to datetime if needed
reddit_df['created_utc'] = pd.to_datetime(reddit_df['created_utc'])

# Plot post counts over time
reddit_df['created_utc'].dt.to_period('M').value_counts().sort_index().
 ↪plot(kind='line', figsize=(12, 5), title='Posts per Month')
plt.xlabel("Month")
plt.ylabel("Post Count")
plt.show()
```



[13]:
```
reddit_df['year'] = reddit_df['created_utc'].dt.year
yearly_counts = reddit_df['year'].value_counts().sort_index()

plt.figure(figsize=(10, 5))
sns.lineplot(x=yearly_counts.index, y=yearly_counts.values, marker="o")
plt.title('Post Count Per Year')
plt.xlabel('Year')
plt.ylabel('Number of Posts')
plt.grid(True)
plt.tight_layout()
plt.show()
```



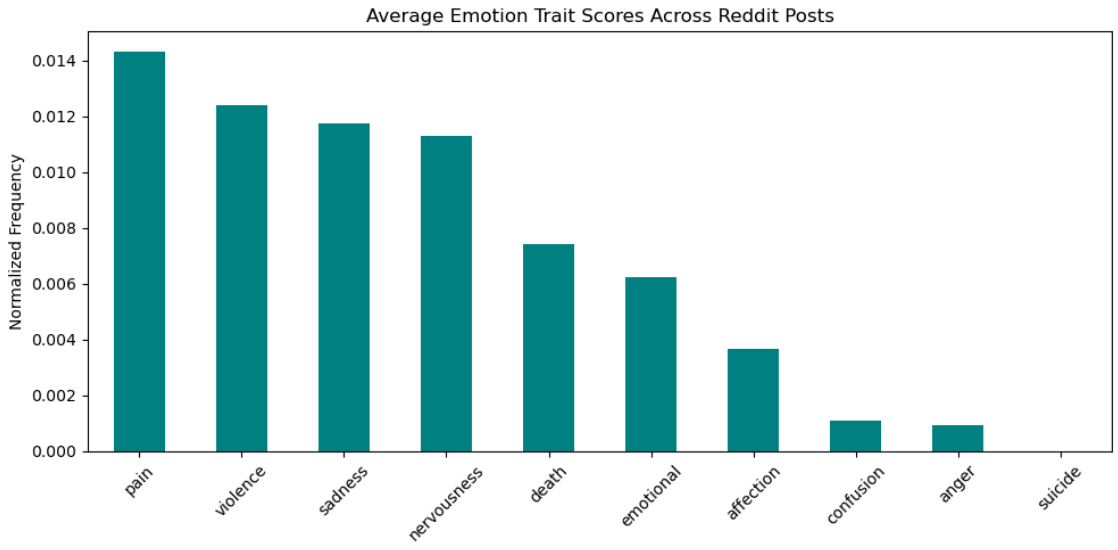
[14]:
```
reddit_df['word_count'] = reddit_df['title'].str.split().str.len() +␣
 ↪reddit_df['text'].str.split().str.len()

plt.figure(figsize=(10, 5))
sns.histplot(reddit_df['word_count'], bins=50, kde=True)
plt.title('Word Count Distribution (Title + Text)')
plt.xlabel('Word Count')
plt.ylabel('Frequency')
plt.tight_layout()
plt.show()
```



[15]:
```
from empath import Empath
import pandas as pd

# Initialize Empath
lexicon = Empath()

# Combine text and title
reddit_df['combined_text'] = reddit_df['title'].fillna('') + ' ' +␣
 ↪reddit_df['text'].fillna('')

# Select some emotion-relevant categories
selected_categories = [
    'sadness', 'nervousness', 'anger', 'violence', 'suicide',
    'death', 'pain', 'emotional', 'confusion', 'affection'
]

# Apply Empath analysis row by row
```

```
def extract_emotions(text):
    traits = lexicon.analyze(text, categories=selected_categories,␣
 ↪normalize=True)
    return pd.Series(traits)

# Apply to top N rows for speed (e.g., 2000)
emotion_df = reddit_df['combined_text'].head(2000).apply(extract_emotions)
reddit_df[selected_categories] = emotion_df

# Save for later use if needed
reddit_df.to_csv("data/reddit_with_emotions.csv", index=False)
```

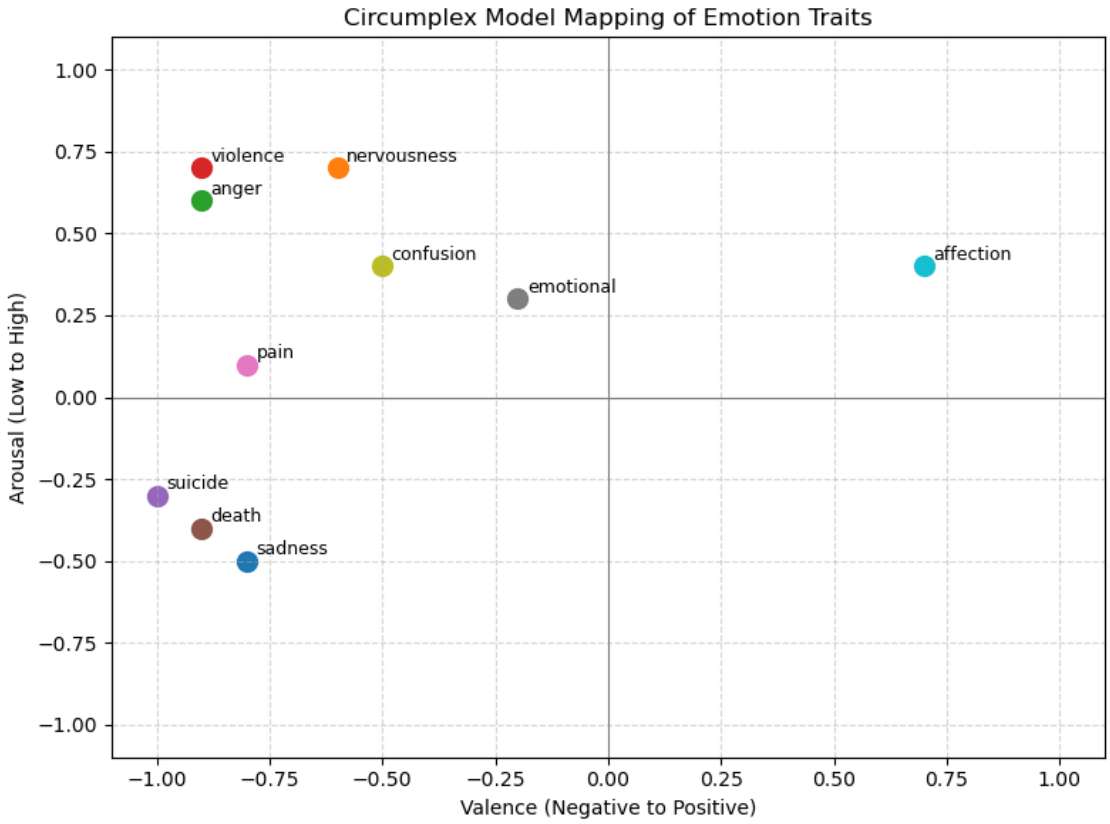
[16]:
```
import matplotlib.pyplot as plt

# Mean emotion scores across all posts
mean_emotions = reddit_df[selected_categories].mean().
 ↪sort_values(ascending=False)

# Bar plot
mean_emotions.plot(kind='bar', figsize=(10,5), color='teal')
plt.title("Average Emotion Trait Scores Across Reddit Posts")
plt.ylabel("Normalized Frequency")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



[17]:
```
import pandas as pd
import matplotlib.pyplot as plt
```

```
# Define a mapping of selected Empath categories to valence & arousal
circumplex_map = {
    'sadness': (-0.8, -0.5),
    'nervousness': (-0.6, 0.7),
    'anger': (-0.9, 0.6),
    'violence': (-0.9, 0.7),
    'suicide': (-1.0, -0.3),
    'death': (-0.9, -0.4),
    'pain': (-0.8, 0.1),
    'emotional': (-0.2, 0.3),
    'confusion': (-0.5, 0.4),
    'affection': (0.7, 0.4)
}

# Convert to DataFrame
circum_df = pd.DataFrame.from_dict(circumplex_map, orient='index',␣
 ↪columns=['valence', 'arousal'])
circum_df.index.name = 'trait'
circum_df.reset_index(inplace=True)
```

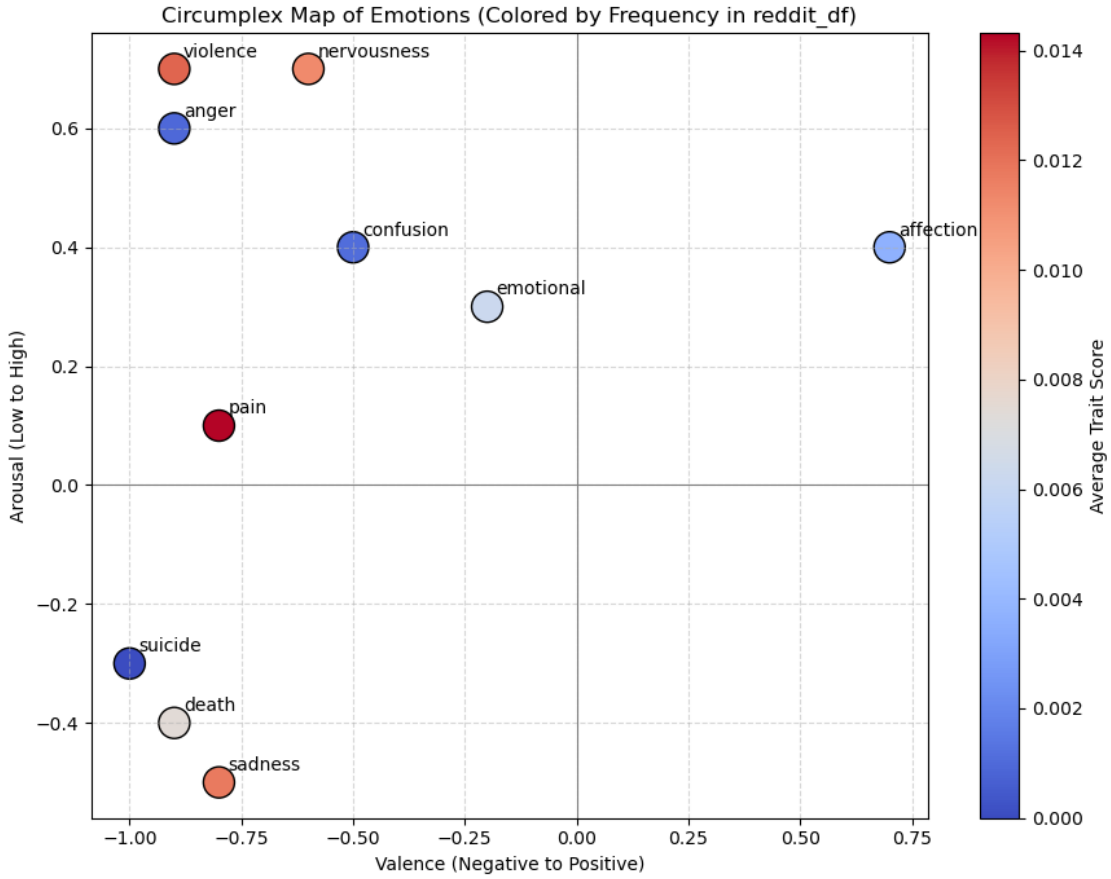
[18]:
```
plt.figure(figsize=(8, 6))

# Scatter plot
for _, row in circum_df.iterrows():
    plt.scatter(row['valence'], row['arousal'], s=100, label=row['trait'])
    plt.text(row['valence'] + 0.02, row['arousal'] + 0.02, row['trait'],␣
 ↪fontsize=9)

# Axes formatting
plt.axhline(0, color='gray', linewidth=0.8)
plt.axvline(0, color='gray', linewidth=0.8)
plt.xlim(-1.1, 1.1)
plt.ylim(-1.1, 1.1)
plt.xlabel('Valence (Negative to Positive)')
plt.ylabel('Arousal (Low to High)')
plt.title('Circumplex Model Mapping of Emotion Traits')
plt.grid(True, linestyle='--', alpha=0.5)
plt.tight_layout()
plt.show()
```



[19]:
```
# Only using the 10 traits we analyzed
selected_traits = [
    'sadness', 'nervousness', 'anger', 'violence', 'suicide',
    'death', 'pain', 'emotional', 'confusion', 'affection'
]

# Calculate average score across all posts
avg_trait_scores = reddit_df[selected_traits].mean().rename('avg_score')

# Merge with circumplex map
circum_df = pd.DataFrame.from_dict({
    'sadness': (-0.8, -0.5),
    'nervousness': (-0.6, 0.7),
    'anger': (-0.9, 0.6),
    'violence': (-0.9, 0.7),
    'suicide': (-1.0, -0.3),
    'death': (-0.9, -0.4),
    'pain': (-0.8, 0.1),
    'emotional': (-0.2, 0.3),
    'confusion': (-0.5, 0.4),
```

```
    'affection': (0.7, 0.4)
}, orient='index', columns=['valence', 'arousal'])

circum_df.index.name = 'trait'
circum_df.reset_index(inplace=True)

# Merge average score
circum_df['avg_score'] = circum_df['trait'].map(avg_trait_scores)
```

[20]:
```
import matplotlib.pyplot as plt

plt.figure(figsize=(9, 7))

# Color intensity reflects average strength of trait in your data
scatter = plt.scatter(
    circum_df['valence'],
    circum_df['arousal'],
    c=circum_df['avg_score'],
    cmap='coolwarm',
    s=300,
    edgecolor='black'
)

# Annotate each point
for _, row in circum_df.iterrows():
    plt.text(row['valence'] + 0.02, row['arousal'] + 0.02, row['trait'],␣
 ↪fontsize=10)

# Add axes
plt.axhline(0, color='gray', linewidth=0.8)
plt.axvline(0, color='gray', linewidth=0.8)

plt.colorbar(scatter, label='Average Trait Score')
plt.title('Circumplex Map of Emotions (Colored by Frequency in reddit_df)')
plt.xlabel('Valence (Negative to Positive)')
plt.ylabel('Arousal (Low to High)')
plt.grid(True, linestyle='--', alpha=0.5)
plt.tight_layout()
plt.show()
```



[21]:
```python
# Add quadrant labels
def label_quadrant(row):
    if row.valence >= 0 and row.arousal >= 0:
        return "Positive & High Arousal"
    elif row.valence >= 0 and row.arousal < 0:
        return "Positive & Low Arousal"
    elif row.valence < 0 and row.arousal >= 0:
        return "Negative & High Arousal"
    else:
        return "Negative & Low Arousal"

circum_df['quadrant'] = circum_df.apply(label_quadrant, axis=1)

# Group by quadrant
quad_summary = circum_df.groupby('quadrant')[['trait', 'avg_score']].apply(
    lambda df: df.sort_values(by='avg_score', ascending=False)
).reset_index(drop=True)

# Display summary table
```

```
import pandas as pd
from IPython.display import display
display(quad_summary)
```

```
         trait  avg_score
0         pain   0.014312
1     violence   0.012401
2  nervousness   0.011286
3    emotional   0.006247
4    confusion   0.001109
5        anger   0.000933
6      sadness   0.011744
7        death   0.007411
8      suicide   0.000000
9    affection   0.003678
```