00_main_pipeline

October 12, 2025

1 Main Pipeline Notebook

1.1 TJAnalytix Pipeline - Topic Modeling and Sentiment Analysis

This master notebook serves as the central controller for executing the entire workflow for the TJAnalytix sentiment analysis workflow. This sequentially runs all modular notebooks that correspond to the key phases of the project including:

1. Data Acquisition - Calling the Reddit API to acquire data.
2. Raw Exploratory Data Analysis - Performing EDA on the acquired raw data.
3. Data Cleaning and EDA - Cleaning raw data and performing EDA on cleaned data.
4. Topic Modeling - Perform Topic Modeling and Sentiment Analysis on the cleaned data.

Each phase in encapsulated in a standalone notebook to ensure clarity, modularity, and reusability. This master notebook orchestrates these steps using Jupyter's `%run` magic commend, ensuring that all phases execute in a logical, reproducible order.

1.2 Set Pipeline Variables and Import Libraries

This section will set the global pipeline variables and import the required libraries to run this master notebook.

[12]:

```
# set pipeline variable
IS_PIPELINE_RUN = True
%store IS_PIPELINE_RUN

IS_PIPELINE_TEST = False
%store IS_PIPELINE_TEST
```

```
Stored 'IS_PIPELINE_RUN' (bool)
Stored 'IS_PIPELINE_TEST' (bool)
```

[13]:

```
# import libraries
from pathlib import Path

# set dataset folder location
dataset_folder = Path("../datasets")
```

2 Data Acquisition

This section will check if the data files necessary to run the pipeline already exist. If it does not exist, it will run the data acquisition notebook and create the files required to continue the pipeline.

[14]:

```
# check if pipeline files exist
# if run the acquisition notebook if it does not exist
expected_files = [
    Path("../datasets/Palo_Alto_pipeline_reddit.pkl"),
    Path("../datasets/Oklahoma_City_pipeline_reddit.pkl"),
]

if not all(p.exists() for p in expected_files):
    print("Performing data acquisition.")
    get_ipython().run_line_magic("run", "./01_data_scraping_reddit.ipynb")
else:
    print("All files necessary to execute the pipeline exist.")
    print("Data acquisition skipped...")
```

```
All files necessary to execute the pipeline exist.
Data acquisition skipped…
```

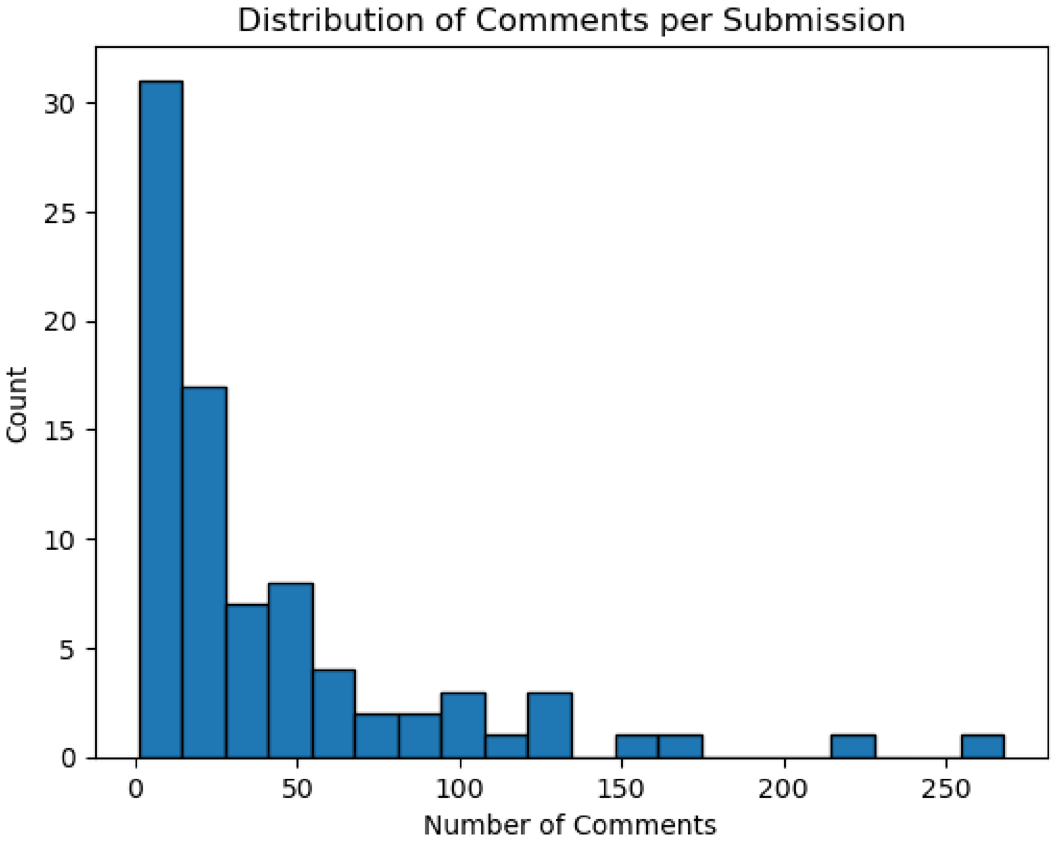
3 Raw Data - Exploratory Data Analysis

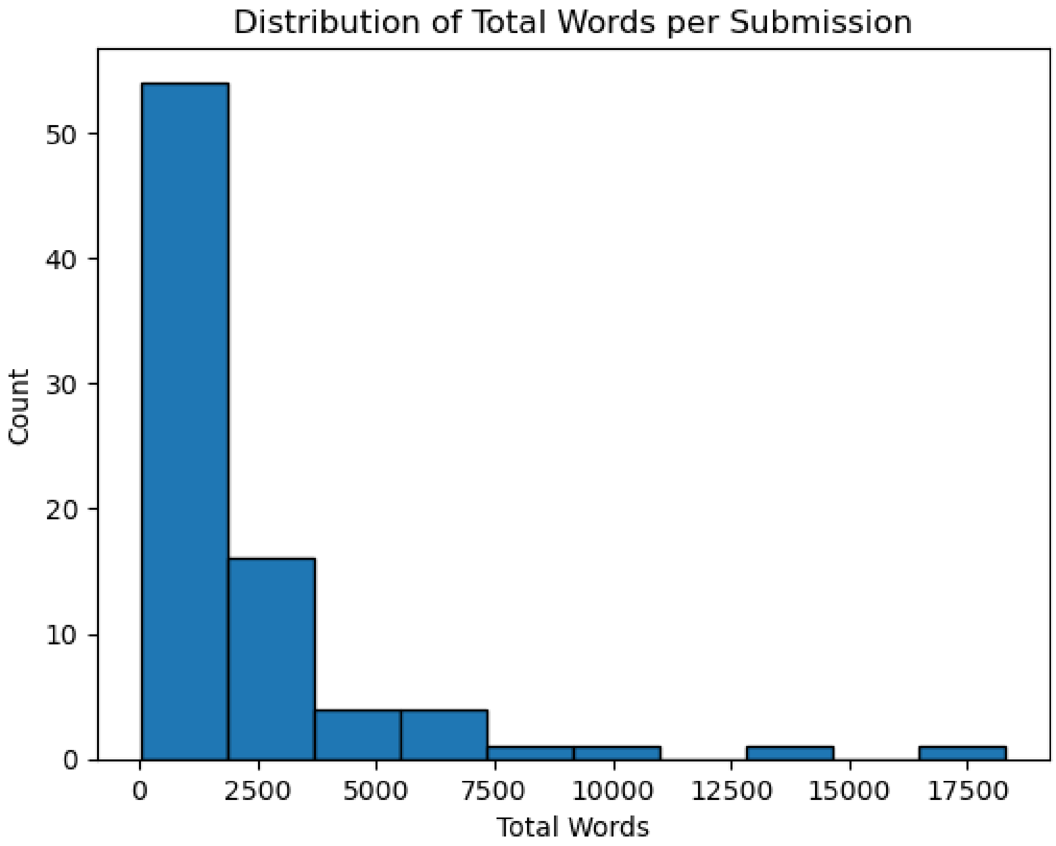
This section performs exploratory data analysis on the raw data acquired for the pipeline.

[15]:

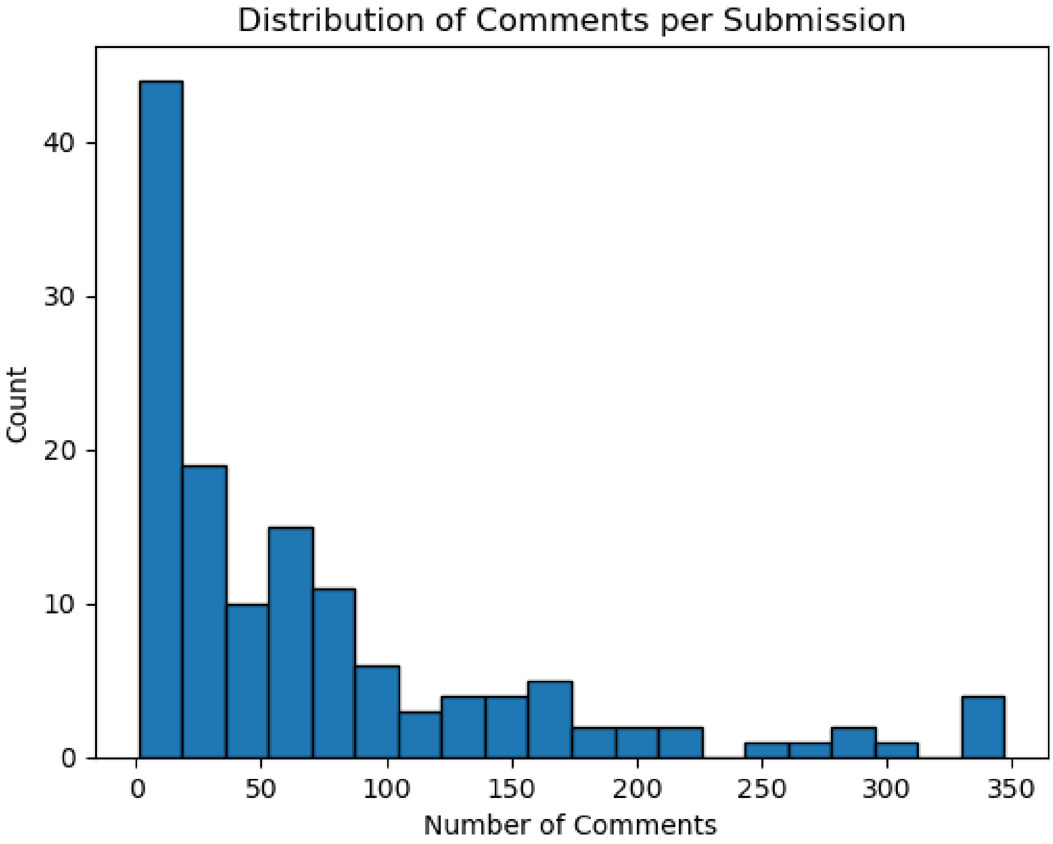
```
print("Performing EDA on Raw Data")
%run ./02_eda_raw.ipynb
```

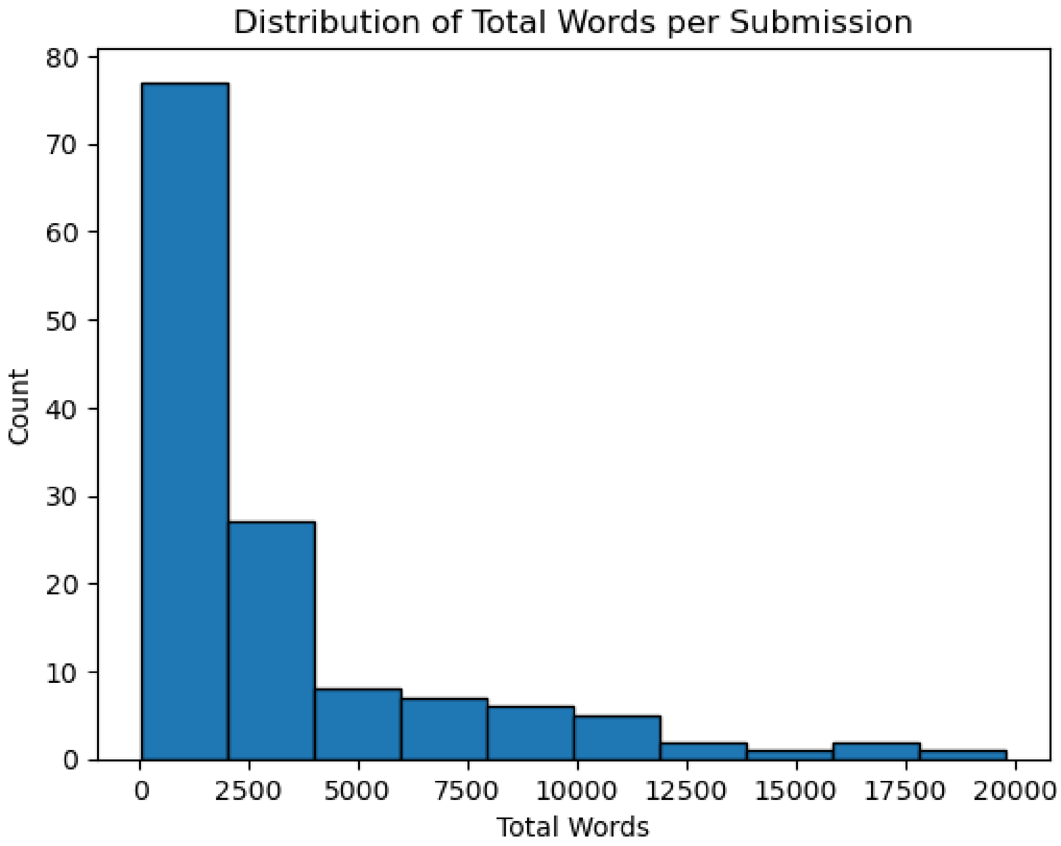
```
Performing EDA on Raw Data
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 82 entries, 0 to 81
Data columns (total 7 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   source           82 non-null     object
 1   query            82 non-null     object
 2   topic            82 non-null     object
 3   comments_nested  82 non-null     object
 4   comments_flat    82 non-null     object
 5   num_comments     82 non-null     int64
 6   total_words      82 non-null     int64
dtypes: int64(2), object(5)
memory usage: 4.6+ KB
```


Distribution of Comments per Submission
Count
30
25
20
15
10
5
0
0
50
100
150
200
250
Number of Comments



```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 136 entries, 0 to 135
Data columns (total 7 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   source           136 non-null    object
 1   query            136 non-null    object
 2   topic            136 non-null    object
 3   comments_nested  136 non-null    object
 4   comments_flat    136 non-null    object
 5   num_comments     136 non-null    int64
 6   total_words      136 non-null    int64
dtypes: int64(2), object(5)
memory usage: 7.6+ KB
```


Distribution of Comments per Submission
Count
0
10
20
30
40
0
50
100
150
200
250
300
350
Number of Comments



4 Data Cleaning and EDA

This section performs data cleaning on the acquired data. Exploratory Data Analysis is also performed on the cleaned data.

[16]:

```
print("Performing Data Cleaning and Saving Cleaned Data")
%run ./03_eda.ipynb
```

```
Performing Data Cleaning and Saving Cleaned Data
dataset1: 82 posts
dataset2: 136 posts
dataset1:
  Total posts: 82
  Total comments: 3331
  Average comment length: 28.0 words
  Total tokens: 92053

dataset2:
  Total posts: 136
  Total comments: 9953
  Average comment length: 21.9 words
  Total tokens: 225733

dataset1:
     word  count
0  people    756
1    like    692
2  school    682
3     get    522
4   would    497

dataset2:
     word  count
0    like   2071
1  people   1654
2     one   1324
3   would   1300
4     get   1160

 Saved dataset1 → Palo_Alto_cleaned_pipeline_reddit.pkl
 Saved dataset2 → Oklahoma_City_cleaned_pipeline_reddit.pkl
```

5 Topic Modeling and Sentiment Analysis

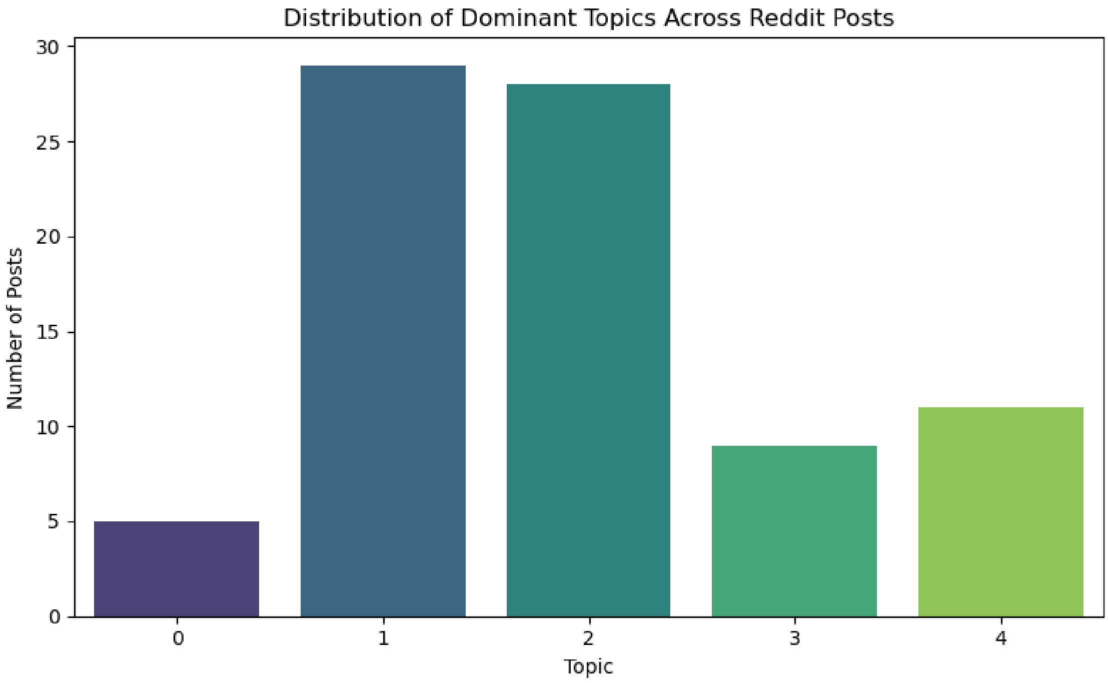
This section performed topic modeling and sentiment analysis on the cleaned data acquired from the previous notebook.

[17]:
```
print("Performing Topic Modeling")
%run ./04_topic_modeling.ipynb
```

```
Performing Topic Modeling
Loading dataset from: ../datasets/Palo_Alto_cleaned_pipeline_reddit.pkl
 Dataset loaded successfully.
Shape: (82, 11)
Using 82 documents for topic modeling.
Document-term matrix shape: (82, 5537)

 Topic 1:
jewish, california, people, like, think, map, bay, states, water, area

 Topic 2:
people, like, think, know, really, time, dont, scott, women, good

 Topic 3:
school, kids, schools, high, like, parents, people, good, don, bay

 Topic 4:
people, portland, like, jazz, stanford, make, really, school, money, student
```

```
 Topic 5:
like, students, people, years, make, time, school, work, dont, nyc
```

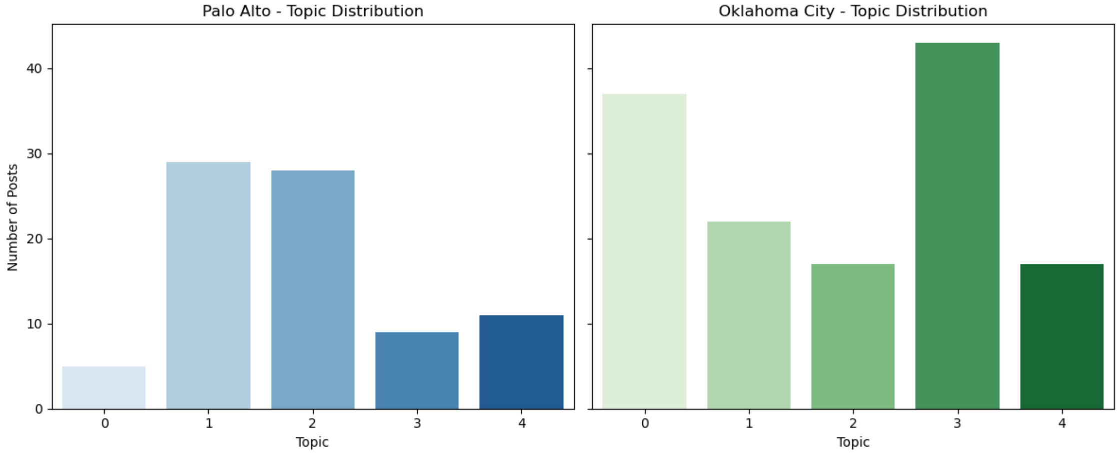
```
/tmp/ipykernel_762131/2597249984.py:49: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.countplot(x="dominant_topic", data=df, palette="viridis")
```



```
 Topic 0 Example Posts:
Example 1: bohemian grove prevalent enough make map even drew owl course napa
produced grape juice 1920 1933  idea dumbarton bridge older golden gate bay
bridge   ha two women representing mills college fun look back history luther
burbank getting cred experimental farm hoot    bridges    bay bridge yet
e…

Example 2: nearly unbroken stretch protestors along el camino palo alto tesla
sunnyvale 7 miles actually protest el camino real today 7 miles long stretched
palo alto sunnyvale beyond clarification protest stretched part palo alto
sunnyvale another protest started embarcadero el camino real turned walking
marc…
```

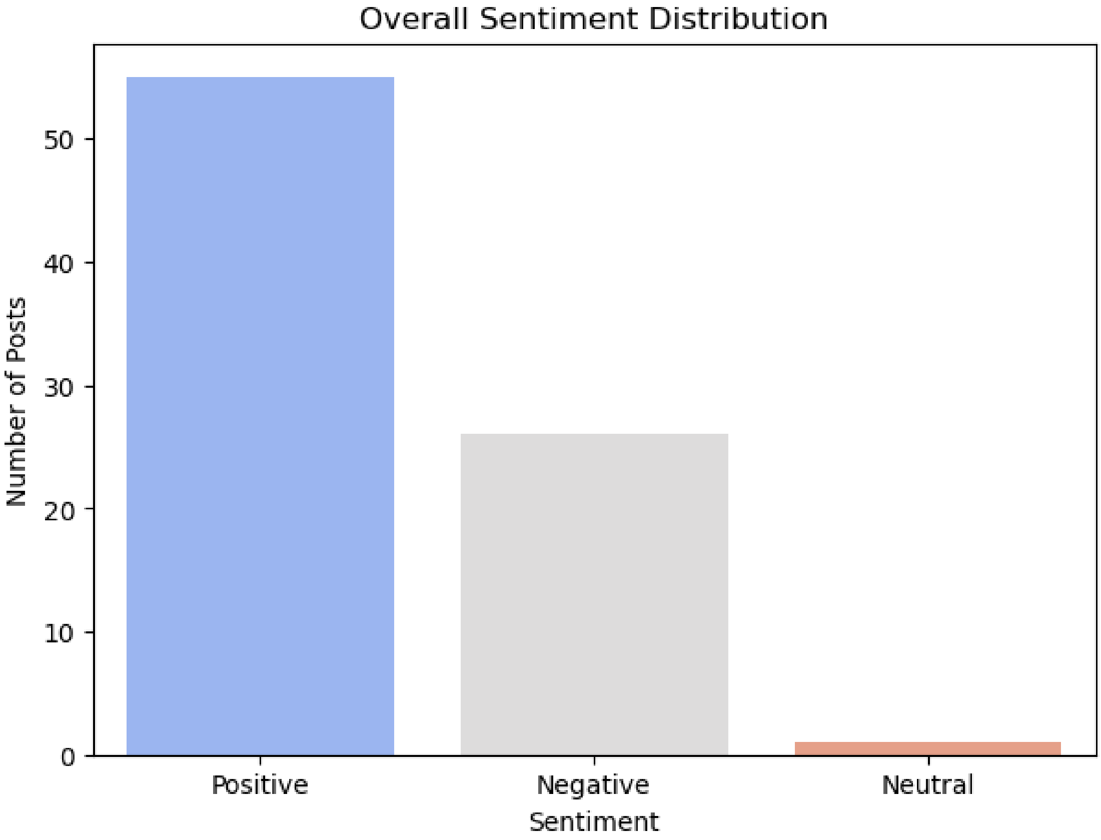
```
  Topic 1 Example Posts:
Example 1: almost schools funded public rather whims megarich something clout
taxes think wife would better looks like they're bird feather good know theyre
pieces shit hope trump comes anyway appologize dumb question public school would
receiving title 1 federal funding crazy whole school shut one guy stops f…

Example 2: delete facebook delete ig delete whatsapp meta reprehensible business
model bowed fascists faster anyone billionaire stops giving back communities
given time stop funding buy groceries local farmers stop using social media
zuckerberg used people pr social capital longer useful mission greed power dr…


  Topic 2 Example Posts:
Example 1: quote another comment topic year ago zhong went gunn high school
affluent topperforming school palo alto filled high achieving kids many follow
parentss footsteps tech jobs theyre vying spots many top schools high achieving
classmates put zhong top 9 class 485 high sat score likely singular gunn mea…

Example 2: fuck best ensure successful 18 something happens need somewhere go
door wife agrees always open kids 10 husband plan let stay long need it's
expensive long they're helpful respectful live us forever dude never gonna
relationship kids adults heck kids stay home long need provided they're
workinggoing…


  Topic 3 Example Posts:
Example 1: gifgiphydyvzo6mjcedgk method acting get ready role prisoner true
story 2015 like jonah hills method acting whole time thats role end real raw
authentic…

Example 2: palo alto politician bestselling author tells parents raise
emotionally healthy children admitting yearlong sexual affair student dean
stanford university 13 years ago julie lythcotthaims serves palo alto city
council friday confirmed relationship happening stanford honored 2010 award
contributions …


  Topic 4 Example Posts:
Example 1: cant argue regarded dd well done sir guys afford buy calls expensive
pull fake makes nvda look ok representatives families least required report
moves execute month prints halfway good nvda leaps promise never question queen
trading imgemotet52th524271 sup sluts lets get panw ceo said earnings decli…

Example 2: oh palo altans survive live close regular folks educate children
happy someone lives teacher apartment complex owned school district know it's
blessing whoever able get nothing like able afford place close work good fact
places needed illustrates failure cities regulatory framework places use allow
```

```
…

 Loaded datasets:
Palo Alto: (82, 11)  | Oklahoma City: (136, 11)
  Palo Alto posts: 82
  Oklahoma City posts: 136

  Palo Alto Topics:

   Topic  \
0      1
1      2
2      3
3      4
4      5

                                                                      Top Words
0        jewish, california, people, like, think, map, bay, states, water, area
1             people, like, think, know, really, time, dont, scott, women, good
2            school, kids, schools, high, like, parents, people, good, don, bay
3  people, portland, like, jazz, stanford, make, really, school, money, student
4            like, students, people, years, make, time, school, work, dont, nyc


  Oklahoma City Topics:

   Topic                                                              Top Words
0      1     like, team, game, nba, player, year, think, really, time, players
1      2            like, work, years, people, job, time, atc, im, think, know
2      3  people, like, think, know, time, really, dont, family, remember, got
3      4        people, like, think, im, dont, state, want, vote, know, school
4      5     like, people, kobe, live, years, house, school, im, tornado, home
/tmp/ipykernel_762131/3312971749.py:86: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.countplot(ax=axes[0], x="dominant_topic", data=palo_df, palette="Blues")
/tmp/ipykernel_762131/3312971749.py:91: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.countplot(ax=axes[1], x="dominant_topic", data=okc_df, palette="Greens")
```

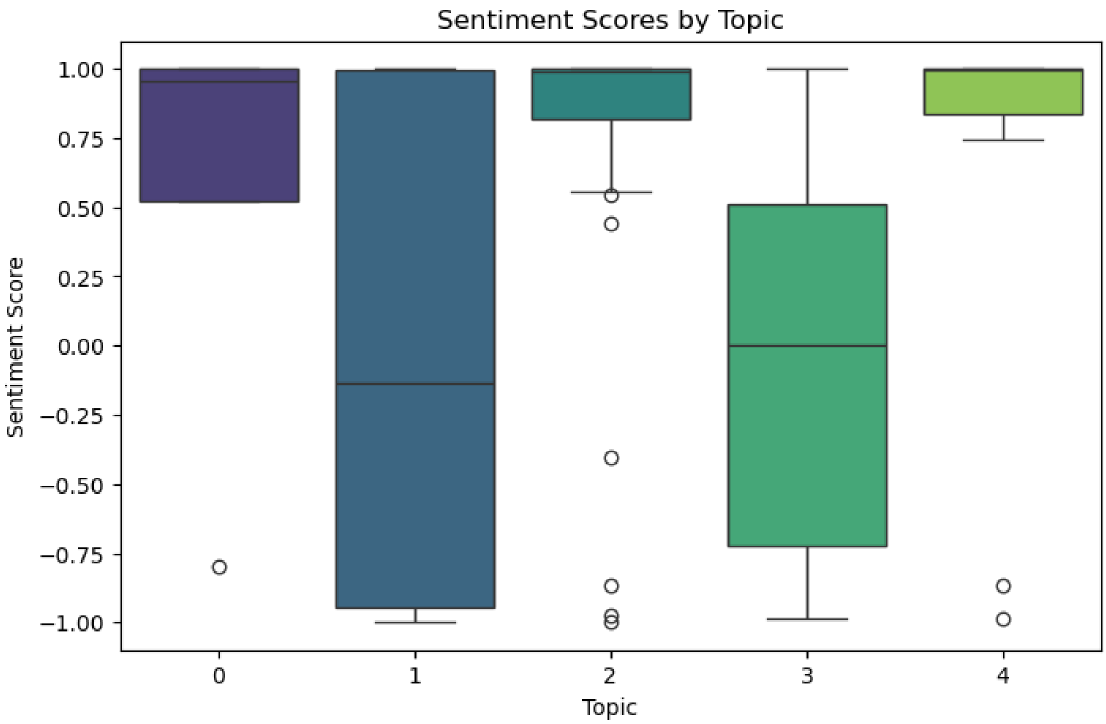


```
        District  Posts  Top Topic IDs
0      Palo Alto     82              1
1  Oklahoma City    136              3
```

```
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     /home/junc/nltk_data…
[nltk_data]   Package vader_lexicon is already up-to-date!
/tmp/ipykernel_762131/780126870.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.countplot(x="sentiment_label", data=df, palette="coolwarm")
```

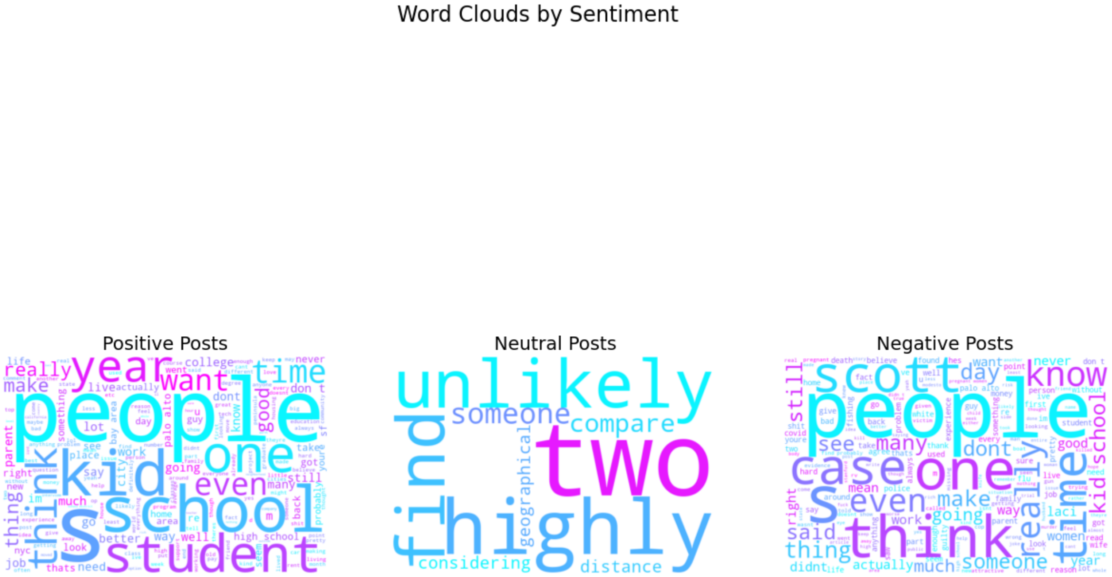


```
/tmp/ipykernel_762131/780126870.py:11: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.boxplot(x="dominant_topic", y="sentiment_score", data=df,
palette="viridis")
```



```
Requirement already satisfied: wordcloud in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (1.9.4)
Requirement already satisfied: numpy>=1.6.1 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
wordcloud) (2.3.3)
Requirement already satisfied: pillow in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
wordcloud) (11.3.0)
Requirement already satisfied: matplotlib in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
wordcloud) (3.10.6)
Requirement already satisfied: contourpy>=1.0.1 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (1.3.3)
Requirement already satisfied: cycler>=0.10 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (4.60.0)
Requirement already satisfied: kiwisolver>=1.3.1 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (1.4.9)
Requirement already satisfied: packaging>=20.0 in
```

```
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (25.0)
Requirement already satisfied: pyparsing>=2.3.1 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (3.2.5)
Requirement already satisfied: python-dateutil>=2.7 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
matplotlib->wordcloud) (2.9.0.post0)
Requirement already satisfied: six>=1.5 in
/home/junc/miniconda3/envs/ads509-streamlit/lib/python3.11/site-packages (from
python-dateutil>=2.7->matplotlib->wordcloud) (1.17.0)
```


Word Clouds by Sentiment
Positive Posts
people
school
student
kid
one
year
think
time
want
even
really
good
Neutral Posts
unlikely
two
highly
find
someone
compare
geographical
considering
distance
Negative Posts
people
think
case
one
scott
know
time
really
even
school
kid
make
many
dont
said
thing
someone