sentiment_analysis

March 16, 2025

[44]:
```
import requests
import lxml
from bs4 import BeautifulSoup
import pandas as pd
import matplotlib.pyplot as plt
```

[4]:
```
def new_data(cursor, school_id):
    data = {
        "query":"query TeacherSearchPaginationQuery(\n  $count: Int!\n  $cursor:
 ↪ String\n  $query: TeacherSearchQuery!\n) {\n  search: newSearch {\n    ...
 ↪TeacherSearchPagination_search_1jWD3d\n  }\n}\n\nfragment␣
 ↪TeacherSearchPagination_search_1jWD3d on newSearch {\n  teachers(query:␣
 ↪$query, first: $count, after: $cursor) {\n    didFallback\n    edges {\n    ␣
 ↪ cursor\n      node {\n        ...TeacherCard_teacher\n        id\n       ␣
 ↪__typename\n      }\n    }\n    pageInfo {\n      hasNextPage\n     ␣
 ↪endCursor\n    }\n    resultCount\n    filters {\n      field\n      options␣
 ↪{\n        value\n        id\n      }\n    }\n  }\n}\n\nfragment␣
 ↪TeacherCard_teacher on Teacher {\n  id\n  legacyId\n  avgRating\n ␣
 ↪numRatings\n  ...CardFeedback_teacher\n  ...CardSchool_teacher\n  ...
 ↪CardName_teacher\n  ...TeacherBookmark_teacher\n}\n\nfragment␣
 ↪CardFeedback_teacher on Teacher {\n  wouldTakeAgainPercent\n ␣
 ↪avgDifficulty\n}\n\nfragment CardSchool_teacher on Teacher {\n  department\n␣
 ↪ school {\n    name\n    id\n  }\n}\n\nfragment CardName_teacher on Teacher␣
 ↪{\n  firstName\n  lastName\n}\n\nfragment TeacherBookmark_teacher on Teacher␣
 ↪{\n  id\n  isSaved\n}\n",
        "variables":{
            "count": 8,
            "cursor": cursor,
            "query":{
                "text":"",
                "schoolID":school_id,
                "fallback":True,
                #"departmentID":"RGVwYXJ0bWVudC0xNDA=",
            }
        }
    }
    return data
```

[5]:
```
def fetch_info(dic):
    name = dic['node']['firstName'] + " " + dic['node']['lastName']
    lid = "/professor?tid=" + str(dic['node']['legacyId'])
    department = dic['node']['department']
    rating = dic['node']['avgRating']
    return name, department, rating

#prof_list = result['data']['search']['teachers']['edges']

#[fetch_info(prof) for prof in prof_list]
```

[12]:
```
def fetch_profs(school_id):
    endpoint = 'https://www.ratemyprofessors.com/graphql'
    headers = {
        "Authorization": "Basic dGVzdDp0ZXN0",
        "User-Agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:136.0)␣
↪Gecko/20100101 Firefox/136.0"
        #"Cookie":␣
↪"AWSALB=AbwlpXoOgh8jzRRTyJeNIbsjQXFxt1kFTfGPDsY4oP1NrRRc6XpFWBxYTUpFryN+9eCYMAl5om17jlmcAnj
↪␣
↪AWSALBCORS=AbwlpXoOgh8jzRRTyJeNIbsjQXFxt1kFTfGPDsY4oP1NrRRc6XpFWBxYTUpFryN+9eCYMAl5om17jlmc
↪ ccpa-notice-viewed-02=true; previousSchoolID=1073;␣
↪ad_blocker_overlay_2019=false; cid=PXNma9PY7p-20230408;␣
↪RMP_AUTH_COOKIE_VERSION=v01"
    }

    # first query
    data = {
        "query":"query TeacherSearchResultsPageQuery(\n  $query:␣
↪TeacherSearchQuery!\n  $schoolID: ID\n) {\n  search: newSearch {\n    ...
↪TeacherSearchPagination_search_1ZLmLD\n  }\n  school: node(id: $schoolID)␣
↪{\n    __typename\n    ... on School {\n      name\n    }\n    id\n ␣
↪}\n}\n\nfragment TeacherSearchPagination_search_1ZLmLD on newSearch {\n ␣
↪teachers(query: $query, first: 8, after: \"\") {\n    didFallback\n    edges␣
↪{\n      cursor\n      node {\n        ...TeacherCard_teacher\n        id\n ␣
↪      __typename\n      }\n    }\n    pageInfo {\n      hasNextPage\n     ␣
↪endCursor\n    }\n    resultCount\n    filters {\n      field\n      options␣
↪{\n        value\n        id\n      }\n    }\n  }\n}\n\nfragment␣
↪TeacherCard_teacher on Teacher {\n  id\n  legacyId\n  avgRating\n ␣
↪numRatings\n  ...CardFeedback_teacher\n  ...CardSchool_teacher\n  ...
↪CardName_teacher\n  ...TeacherBookmark_teacher\n}\n\nfragment␣
↪CardFeedback_teacher on Teacher {\n  wouldTakeAgainPercent\n ␣
↪avgDifficulty\n}\n\nfragment CardSchool_teacher on Teacher {\n  department\n␣
↪ school {\n    name\n    id\n  }\n}\n\nfragment CardName_teacher on Teacher␣
↪{\n  firstName\n  lastName\n}\n\nfragment TeacherBookmark_teacher on Teacher␣
↪{\n  id\n  isSaved\n}\n",
        "variables":{
```

```
            "query":{
                "text":"",
                "schoolID":school_id,
                "fallback":True,
                #"departmentID":"RGVwYXJ0bWVudCOxNDA=",
            },
            "schoolID": school_id
        }
    }

    response = requests.post(endpoint, headers = headers, json=data)
    result = response.json()

    prof_list = result['data']['search']['teachers']['edges']
    df = [fetch_info(prof) for prof in prof_list]

    cursor = result['data']['search']['teachers']['pageInfo']['endCursor']

    flag = True
    while flag:
        data = new_data(cursor, school_id)

        # Create a session
        session = requests.Session()
        session.headers.update(headers)
        response = session.post(endpoint, headers=headers, json=data)
        result = response.json()

        prof_list = result['data']['search']['teachers']['edges']
        df.extend([fetch_info(prof) for prof in prof_list])
        cursor = result['data']['search']['teachers']['pageInfo']['endCursor']

        flag = result['data']['search']['teachers']['pageInfo']['hasNextPage']

    return df
```

[13]:
```
df = fetch_profs("U2Nob29sLTEwNzM=")
```

[14]:
```
df[:5]
```

[14]:
```
[('Bryan Enderle', 'Chemistry', 4.6),
 ('Korana Burke', 'Mathematics', 2.9),
 ('Marc Facciotti', 'Biomedical Engineering', 3),
 ('Andrew Farris', 'Statistics', 2.4),
 ('Diego Yankelevich', 'Engineering', 2.2)]
```

[15]:
```
df1 = pd.DataFrame(df, columns=['Name', 'Department', 'Rating'])
df1.head()
```

[15]:

	Name	Department	Rating
0	Bryan Enderle	Chemistry	4.6
1	Korana Burke	Mathematics	2.9
2	Marc Facciotti	Biomedical Engineering	3.0
3	Andrew Farris	Statistics	2.4
4	Diego Yankelevich	Engineering	2.2

[16]:
```
avg_rating = sum(df1['Rating']) / len(df1['Rating'])
avg_rating
```

[16]:
```
3.744439481911539
```

[17]:
```
def get_data(cursor):
    data = {
        "query":"query SchoolRatingsListQuery(  $count: Int!  $id: ID!  $cursor:
 ↪ String) {  node(id: $id) {    __typename    ... on School {      ...
 ↪SchoolRatingsList_school_1G22uz    }    id  }}fragment␣
 ↪SchoolRatingFooter_rating on SchoolRating {  id  comment  flagStatus ␣
 ↪legacyId  ...Thumbs_schoolRating}fragment SchoolRatingFooter_school on␣
 ↪School {  id  legacyId  ...Thumbs_school}fragment␣
 ↪SchoolRatingSuperHeader_school on School {  name  legacyId}fragment␣
 ↪SchoolRating_rating on SchoolRating {  clubsRating  comment  date ␣
 ↪facilitiesRating  foodRating  happinessRating  internetRating ␣
 ↪locationRating  opportunitiesRating  reputationRating  safetyRating ␣
 ↪socialRating  legacyId  flagStatus  createdByUser  ...
 ↪SchoolRatingFooter_rating}fragment SchoolRating_school on School {  ...
 ↪SchoolRatingSuperHeader_school  ...SchoolRatingFooter_school}fragment␣
 ↪SchoolRatingsList_school_1G22uz on School {  id  name  city  state  country ␣
 ↪legacyId  ratings(first: $count, after: $cursor) {    edges {      cursor   ␣
 ↪  node {        ...SchoolRating_rating        id        __typename      }   ␣
 ↪}    pageInfo {      hasNextPage      endCursor    }  }  ...
 ↪SchoolRating_school}fragment Thumbs_school on School {  id ␣
 ↪legacyId}fragment Thumbs_schoolRating on SchoolRating {  id  legacyId ␣
 ↪thumbsDownTotal  thumbsUpTotal  userThumbs {    computerId    thumbsUp   ␣
 ↪thumbsDown    id  }}",
        "variables":{
            "id":"U2Nob29sLTMwMjM=",
            "count": 10,
            "cursor": cursor
        }
    }
    return data
```

[18]:
```python
def get_review(dic):
    review = dic['node']['comment']
    return review
```

[19]:
```python
def fetch_univ(college_id):
    endpoint = 'https://www.ratemyprofessors.com/graphql'
    headers = {
        "Authorization": "Basic dGVzdDp0ZXN0",
        "User-Agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:136.0)␣
↪Gecko/20100101 Firefox/136.0"
    }

    # first query
    data = {
        "query":"query SchoolRatingsListQuery(  $count: Int!  $id: ID!  $cursor:
↪ String) {  node(id: $id) {    __typename    ... on School {      ...
↪SchoolRatingsList_school_1G22uz    }    id  }}fragment␣
↪SchoolRatingFooter_rating on SchoolRating {  id  comment  flagStatus ␣
↪legacyId  ...Thumbs_schoolRating}fragment SchoolRatingFooter_school on␣
↪School {  id  legacyId  ...Thumbs_school}fragment␣
↪SchoolRatingSuperHeader_school on School {  name  legacyId}fragment␣
↪SchoolRating_rating on SchoolRating {  clubsRating  comment  date ␣
↪facilitiesRating  foodRating  happinessRating  internetRating ␣
↪locationRating  opportunitiesRating  reputationRating  safetyRating ␣
↪socialRating  legacyId  flagStatus  createdByUser  ...
↪SchoolRatingFooter_rating}fragment SchoolRating_school on School {  ...
↪SchoolRatingSuperHeader_school  ...SchoolRatingFooter_school}fragment␣
↪SchoolRatingsList_school_1G22uz on School {  id  name  city  state  country ␣
↪legacyId  ratings(first: $count, after: $cursor) {    edges {      cursor    ␣
↪  node {        ...SchoolRating_rating        id        __typename      }    ␣
↪}    pageInfo {      hasNextPage      endCursor    }  }  ...
↪SchoolRating_school}fragment Thumbs_school on School {  id ␣
↪legacyId}fragment Thumbs_schoolRating on SchoolRating {  id  legacyId ␣
↪thumbsDownTotal  thumbsUpTotal  userThumbs {    computerId    thumbsUp    ␣
↪thumbsDown    id  }}",
        "variables":{
            "id":college_id,
            "count": 10,
            "cursor": "YXJyYXljb25uZWN0aW9uOjI5"
        }
    }

    response = requests.post(endpoint, headers = headers, json=data)
    result = response.json()

    review_list = result['data']['node']['ratings']['edges']
    df = [get_review(review) for review in review_list]
```

```
    cursor = result['data']['node']['ratings']['pageInfo']['endCursor']

    flag = True
    while flag:
        data = get_data(cursor)

        # Create a session
        session = requests.Session()
        session.headers.update(headers)

        response = session.post(endpoint, headers=headers, json=data)

        result = response.json()

        review_list = result['data']['node']['ratings']['edges']
        df.extend([get_review(review) for review in review_list])
        cursor = result['data']['node']['ratings']['pageInfo']['endCursor']

        flag = result['data']['node']['ratings']['pageInfo']['hasNextPage']

    return df
```

[20]:
```
df = fetch_univ('U2Nob29sLTE5NTM=')
```

[21]:
```
new_df = [x for x in df if x != 'None.' and x != 'Not Specified.']
```

[22]:
```
df_reviews = pd.DataFrame(new_df, columns=['Review'])
df_reviews.head()
```

[22]:

	Review
0	Very quiet, calm campus. Gorgeous plant-life. …
1	only because i have to …
2	You need to be on their case 247 they don'…
3	Great Campus that went through a pretty big ov…
4	Peaceful, clean campus without a lot of people…

[23]:
```
from textblob import TextBlob


# Performs sentiment analysis for each university
review_polarity = []

for i in range(len(df_reviews['Review'])):
  opinion = TextBlob(df_reviews['Review'][i])
  review_polarity.append(opinion.sentiment[0])
```

```
df_reviews['Polarity'] = review_polarity # Polarity is how positive the␣
 ↪sentiment is from 0 to 1
```

[24]:
```
df_reviews.head()
```

[24]:
```
                                              Review  Polarity
0  Very quiet, calm campus. Gorgeous plant-life. …  0.145655
1                          only because i have to …  0.000000
2  You need to be on their case 247 they don&#39;…  0.600000
3  Great Campus that went through a pretty big ov…  0.262824
4  Peaceful, clean campus without a lot of people…  0.195833
```

[25]:
```
avg_sentiment = sum(df_reviews['Polarity']) / len(df_reviews['Polarity'])
avg_sentiment
```

[25]:
```
0.35739338380461255
```

[26]:
```
import scripts.cccco as cccco
import scripts.college_scorecard as scorecard
import scripts.labor_market as labor_market
import scripts.join_tools as join_tools
```

[27]:
```
all_colleges = cccco.get_ccc_colleges()
```

[28]:
```
print(f"{all_colleges.shape[0]:,} rows")
all_colleges.head()
```

```
115 rows
```

[28]:
```
  CollegeID              CollegeName DistrictID                StreetAddress  \
0       021         Cuyamaca College        020  900 Rancho San Diego Parkway
1       022        Grossmont College        020  8800 Grossmont College Drive
2       031  Imperial Valley College        030            380 East Aten Road
3       051        MiraCosta College        050               1 Barnard Drive
4       061          Palomar College        060        1140 West Mission Road

          City      County    Zip ZipPlus4                MailingAddress  \
0    El Cajon  San Diego   92019     4304  900 Rancho San Diego Parkway
1    El Cajon  San Diego   92020     1799  8800 Grossmont College Drive
2    Imperial   Imperial   92251     9787            380 East Aten Road
3   Oceanside  San Diego   92056     3899               1 Barnard Drive
4  San Marcos  San Diego   92069     1487        1140 West Mission Road

  MailingCity MailingZip          Phone         WebsiteURL   Latitude  \
0    El Cajon      92019  619.660.4000    www.cuyamaca.edu  32.744890
```

```
1    El Cajon      92020  619.644.7000   www.grossmont.edu  32.817897
2    Imperial      92251  760.352.8320    www.imperial.edu  32.825859
3   Oceanside      92056  760.757.2121   www.miracosta.edu  33.188864
4  San Marcos      92069  760.744.1150     www.palomar.edu  33.147015

    Longitude                            LogoURL District
0 -116.935229            CuyamacaCollegeLogo.jpg     None
1 -117.005640          GrossmontCollegelogo.jpg      None
2 -115.502999  ImperialValleyCollegeLogocopy.jpg     None
3 -117.301064     Mira_Costa_College_Logo_4c.png     None
4 -117.183980             PalomarCollegeLogo.jpg     None
```

[29]:
```python
def get_id(college):
    url = 'https://www.ratemyprofessors.com/graphql'

    headers = {
        'User-Agent': 'Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:136.0)␣
 ↪Gecko/20100101 Firefox/136.0',
        'Authorization': 'Basic dGVzdDp0ZXN0',
        'Content-Type': 'application/json'
    }

    query = """
    query NewSearchSchoolsQuery(
      $query: SchoolSearchQuery
      $includeCompare: Boolean!
    ) {
      newSearch {
        schools(query: $query) {
          edges {
            node {
              id
              name
              city
              state
              name @include(if: $includeCompare)
            }
          }
        }
      }
    }
    """
    variables = {
        "query": {
            "text": college
        },
        "includeCompare": False
```

```
    }

    data = {
        'query': query,
        'variables': variables
        #'variables': '{"query":{"text":"De"},"includeCompare":false}'
    }

    # Create a session
    session = requests.Session()
    session.headers.update(headers)

    response = session.post(url, headers=headers, json=data)

    #print(response)
    #print(json.dumps(response.json(), indent=4))

    resp_js = response.json()

    name = response.
↪json()['data']['newSearch']['schools']['edges'][0]['node']['name']
    college_id = response.
↪json()['data']['newSearch']['schools']['edges'][0]['node']['id']
    #print(f'name={name}, id={id}')
    return college_id
```

[30]:
```
college_list = all_colleges['CollegeName']
college_list[:5]
```

[30]:
```
0           Cuyamaca College
1          Grossmont College
2    Imperial Valley College
3          MiraCosta College
4            Palomar College
Name: CollegeName, dtype: object
```

[31]:
```
get_id('Cuyamaca College')
```

[31]:
```
'U2Nob29sLTE5NTM='
```

[32]:
```
id_list = []
for college in college_list:
    college_id = get_id(college)
    id_list.append(college_id)
```

[33]:
```
len(id_list)
```

[33]:
```
115
```

[34]:
```
def get_sentiment(college_id):
    df = fetch_univ(college_id)
    new_df = [x for x in df if x != 'None.' and x != 'Not Specified.' and x !=␣
 ↪None]

    df_reviews = pd.DataFrame(new_df, columns=['Review'])

    # Performs sentiment analysis for each university
    review_polarity = []

    for i in range(len(df_reviews['Review'])):
      opinion = TextBlob(df_reviews['Review'][i])
      review_polarity.append(opinion.sentiment[0])

    df_reviews['Polarity'] = review_polarity # Polarity is how positive the␣
 ↪sentiment is from 0 to 1

    avg_sentiment = sum(df_reviews['Polarity']) / len(df_reviews['Polarity'])
    return avg_sentiment
```

[35]:
```
get_sentiment('U2Nob29sLTE5NTM=')
```

[35]:
```
0.35739338380461255
```

[36]:
```
sentiments = []
for college_id in id_list:
    sentiment = get_sentiment(college_id)
    sentiments.append(sentiment)
```

[37]:
```
sentiments[:10]
```

[37]:
```
[0.35739338380461255,
 0.35832603682449815,
 0.3566306631622127,
 0.37619490937351774,
 0.3706711926898746,
 0.36807474944085783,
 0.37755109258754405,
 0.3801100973309851,
 0.36868917101387044,
 0.36642735462434534]
```

[38]:
```
def get_rating(college_id):
    df = fetch_profs(college_id)
    df1 = pd.DataFrame(df, columns=['Name', 'Department', 'Rating'])
```

```
    avg_rating = sum(df1['Rating']) / len(df1['Rating'])
    return avg_rating
```

[39]:
```
get_rating("U2Nob29sLTE1ODA=")
```

[39]:
```
3.9940119760479034
```

[40]:
```
ratings = []
for college_id in id_list:
    rating = get_rating(college_id)
    ratings.append(rating)
```

[41]:
```
ratings[:10]
```

[41]:
```
[3.851304347826091,
 3.816608996539799,
 4.081674208144794,
 3.915432098765438,
 3.8887384948565296,
 3.96256983240224,
 3.8217654986522915,
 3.770818070818072,
 3.4189655172413795,
 3.8318857142857237]
```

[42]:
```
data = {'College': college_list, 'Sentiment': sentiments, 'Rating': ratings}
final_data = pd.DataFrame(data)
```

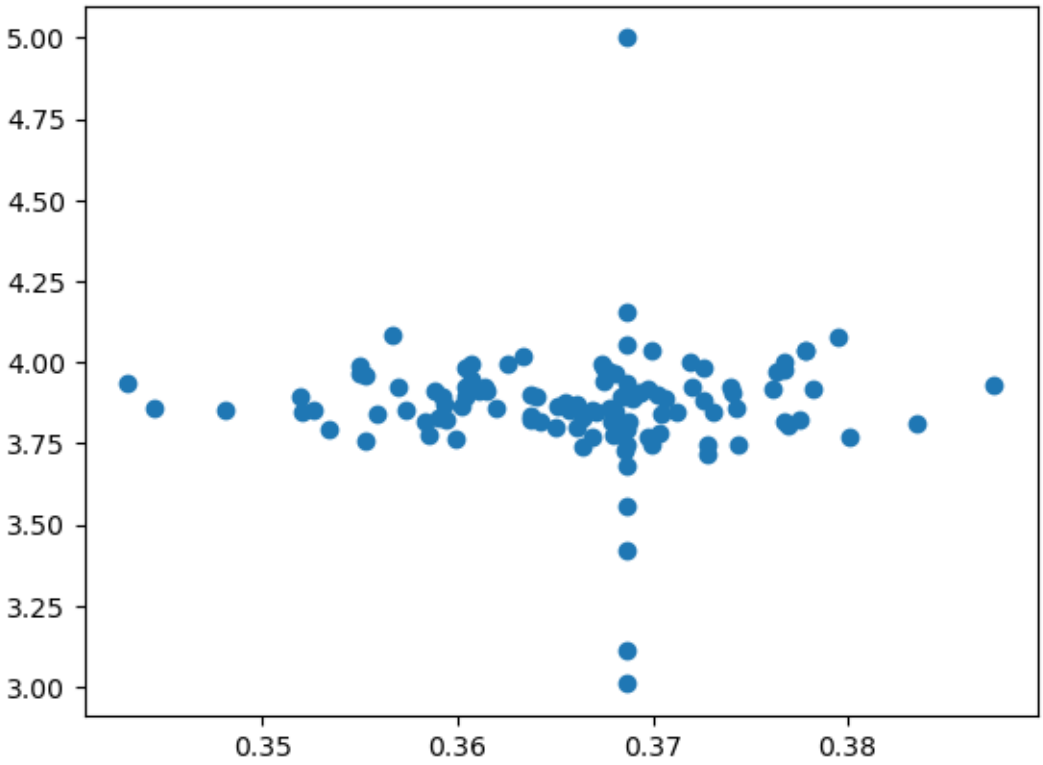
[43]:
```
final_data.head()
```

[43]:

	College	Sentiment	Rating
0	Cuyamaca College	0.357393	3.851304
1	Grossmont College	0.358326	3.816609
2	Imperial Valley College	0.356631	4.081674
3	MiraCosta College	0.376195	3.915432
4	Palomar College	0.370671	3.888738

[46]:
```
plt.scatter(final_data['Sentiment'], final_data['Rating'])
```

[46]:
```
<matplotlib.collections.PathCollection at 0x212799c6350>
```



[48]:
```
final_data.to_csv('project_data.csv')
```

[ ]:
```

```