GOOGLE_SEARCH_ANALYSIS_PROJECT

August 4, 2025

[6]:
```
pip install pandas matplotlib plotly seaborn pytrends
```

```
Defaulting to user installation because normal site-packages is not writeable
Looking in links: /usr/share/pip-wheels
Requirement already satisfied: pandas in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (2.1.4)
Requirement already satisfied: matplotlib in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (3.8.0)
Requirement already satisfied: plotly in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (5.19.0)
Requirement already satisfied: seaborn in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (0.12.2)
Requirement already satisfied: pytrends in ./.local/lib/python3.10/site-packages
(4.9.2)
Requirement already satisfied: numpy<2,>=1.22.4 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pandas) (1.26.4)
Requirement already satisfied: python-dateutil>=2.8.2 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pandas) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pandas) (2023.3)
Requirement already satisfied: contourpy>=1.0.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (1.2.0)
Requirement already satisfied: cycler>=0.10 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (1.4.4)
```

```
Requirement already satisfied: packaging>=20.0 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (23.2)
Requirement already satisfied: pillow>=6.2.0 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (10.2.0)
Requirement already satisfied: pyparsing>=2.3.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
matplotlib) (3.0.9)
Requirement already satisfied: tenacity>=6.2.0 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
plotly) (8.2.2)
Requirement already satisfied: requests>=2.0 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pytrends) (2.31.0)
Requirement already satisfied: lxml in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
pytrends) (4.9.3)
Requirement already satisfied: six>=1.5 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
python-dateutil>=2.8.2->pandas) (1.16.0)
Requirement already satisfied: charset-normalizer<4,>=2 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
requests>=2.0->pytrends) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
requests>=2.0->pytrends) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
requests>=2.0->pytrends) (2.0.7)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/anaconda-2024.02-py310/lib/python3.10/site-packages (from
requests>=2.0->pytrends) (2024.2.2)
Note: you may need to restart the kernel to use updated packages.
```

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import plotly.express as px
import seaborn as sns
from pytrends.request import TrendReq
```

Setup pytrend Library and Define Keyword

[2]:
```
pytrends = TrendReq(hl='en-US', tz=300)
keyword = 'Machine learning'
```

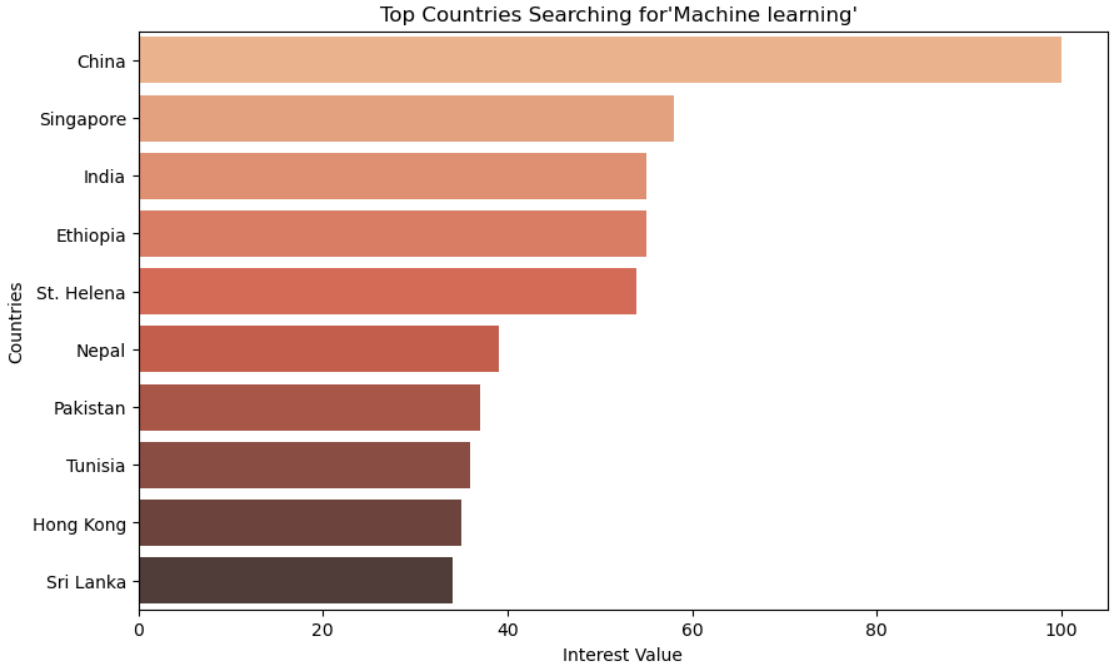
DATA REQUEST

[3]:
```
pytrends.build_payload(kw_list=[keyword],cat=0, timeframe='today 12-m',␣
↪geo='',gprop='')
```

COUNTRY WISE INTEREST

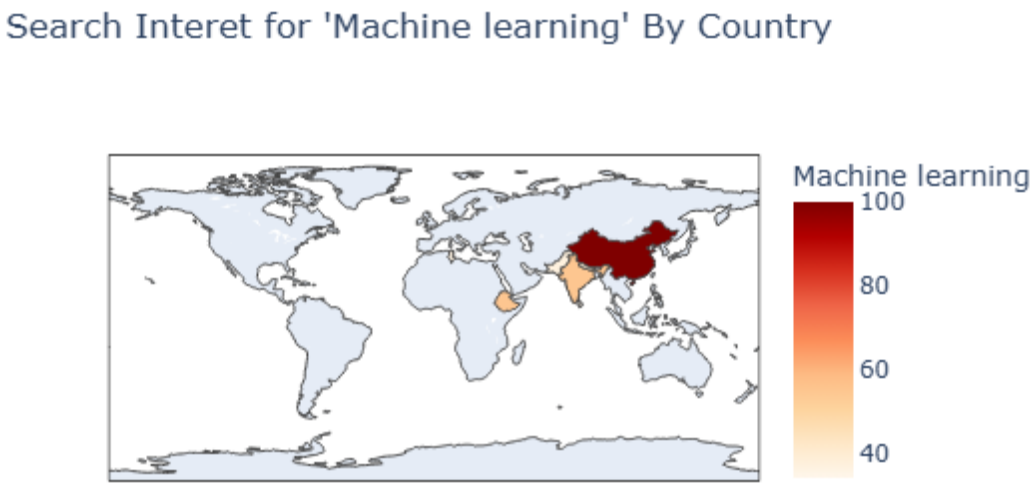
[4]:
```
region_data = pytrends.interest_by_region()
region_data = region_data.sort_values(by=keyword, ascending=False).head(10)
```

[5]:
```
plt.figure(figsize=(10,6))
sns.barplot(x= region_data[keyword],y= region_data.index,palette="OrRd_d")
plt.title(f"Top Countries Searching for'{keyword}' ")
plt.xlabel("Interest Value")
plt.ylabel("Countries")
plt.show()
```



WORLD MAP

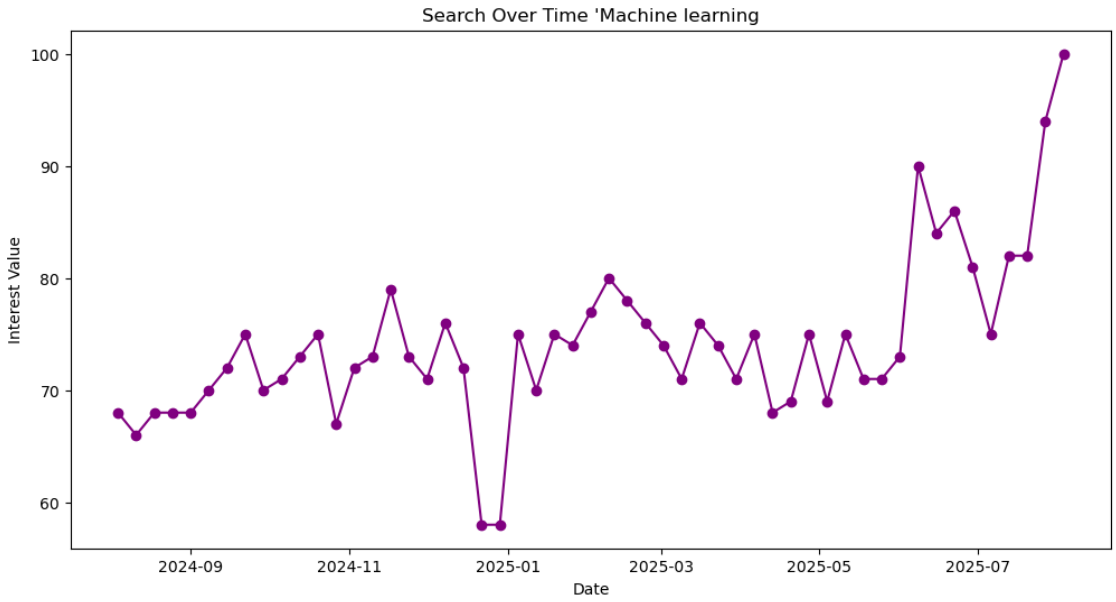
[6]:
```
region_data = region_data.reset_index()
fig = px.choropleth(region_data,
                    locations='geoName',
                    locationmode= 'country names',
                    color = keyword,
                    title=f"Search Interet for '{keyword}' By Country",
                    color_continuous_scale='OrRd')
fig.show()
```



TIMEWISE INTEREST

[9]:
```
time_df = pytrends.interest_over_time()
```

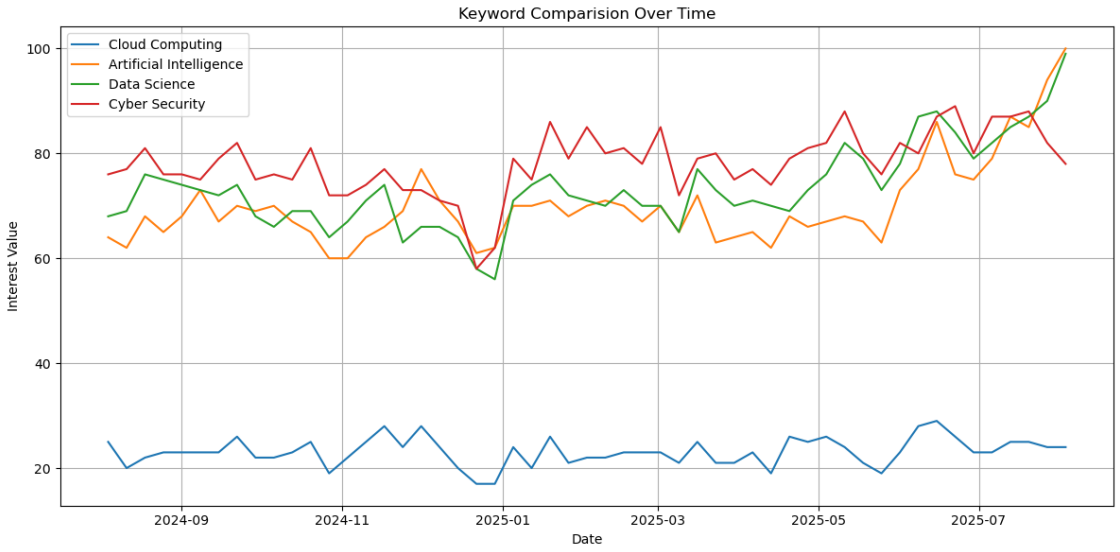
[10]:
```
plt.figure(figsize=(12,6))
plt.plot(time_df.index,time_df[keyword],marker= 'o',color= 'purple')
plt.title(f"Search Over Time '{keyword}")
plt.xlabel("Date")
plt.ylabel("Interest Value")
plt.show()
```



MULTIPLE KEYWORDS

[11]:
```
kw_list=["Cloud Computing","Artificial Intelligence","Data Science","Cyber␣
 ↪Security"]
pytrends.build_payload(kw_list,cat=0, timeframe='today 12-m', geo='',gprop='')
```

[12]:
```
compare_df= pytrends.interest_over_time()
plt.figure(figsize=(12,6))
for kw in kw_list:
  plt.plot(compare_df.index,compare_df[kw],label= kw)
plt.title("Keyword Comparision Over Time")
plt.xlabel("Date")
plt.ylabel("Interest Value")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()
```



Final Summary / Conclusion for Presentation As a data analyst, after examining Google search trends over the past 12 months for keywords like "Artificial Intelligence", "Cloud Computing", "Data Science", and "Cyber Security", I present the following insights:

Interest over Time:

AI and Data Science have shown a consistent high interest, especially in the last quarter.

Peaks in search interest correspond to likely industry events, announcements, or academic sessions.

Cyber Security shows short-lived spikes, indicating a reactionary trend to global security breaches.

Regional Interest:

Countries like India, United States, Singapore, and Canada frequently appear in the top 5 across all keywords.

This data highlights ideal geographic markets for promoting courses, tech services, or cloud-based solutions.

Keyword Comparison:

When compared over time, Artificial Intelligence leads in global interest.

Cloud Computing and Data Science follow closely but are still slightly behind AI.

Cyber Security, though lower in consistent popularity, has specific spikes, showing niche but urgent interest.

Strategic Insight:

Companies looking to expand tech offerings or education platforms should target regions with high interest.

Time-series peaks suggest ideal months to launch campaigns or product releases.

AI-focused content or solutions should be prioritized based on current trends.

[ ]: