Way to Google Data Analysis

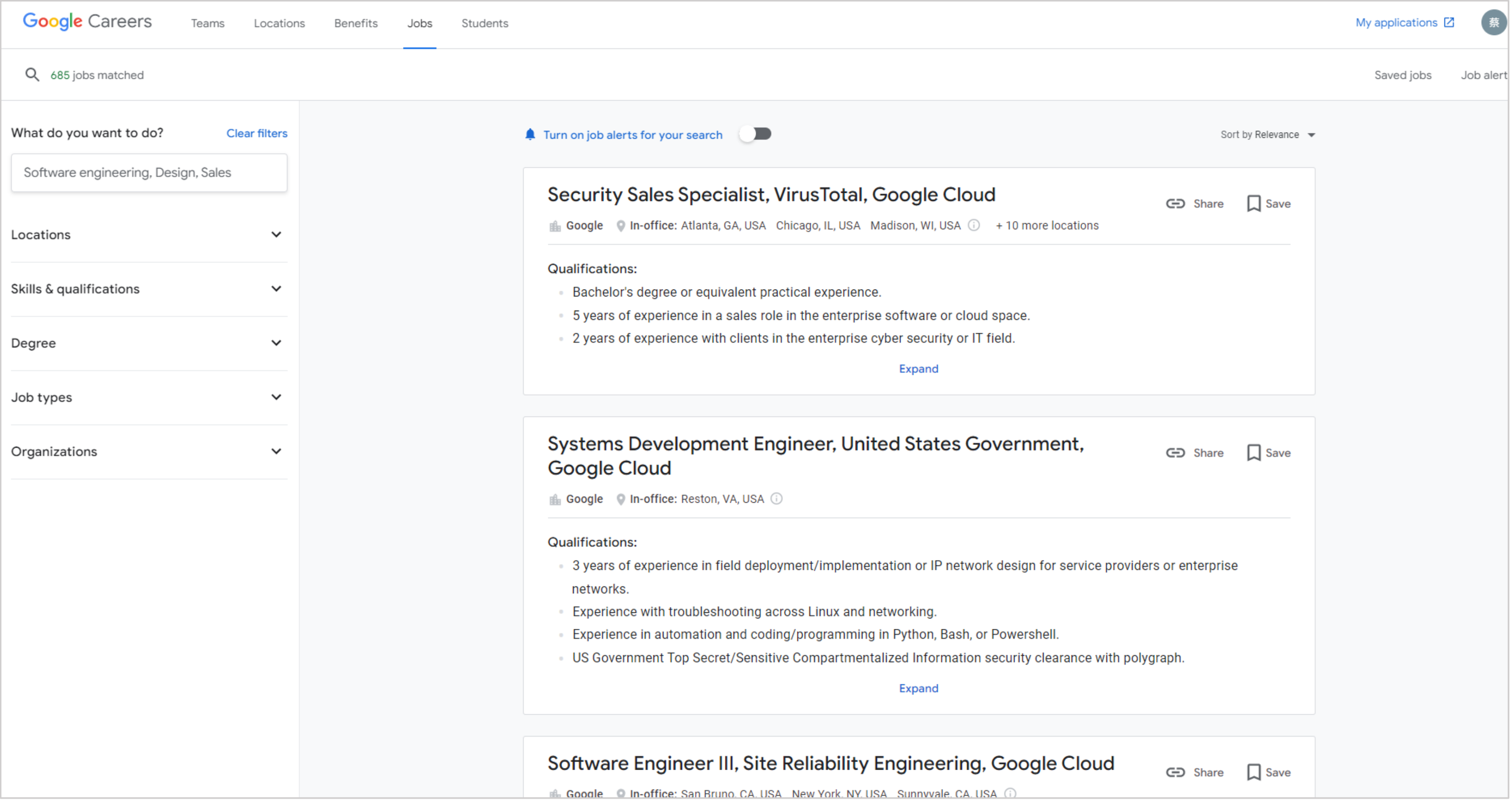
Python Data Analysis EDA Project

By Michael Tsai

Quick View

Demo of Project

Quick View – From Google Jobs



685 jobs matched

What do you want to do?

Software engineering, Design, Sales

Turn on job alerts for your search

Sort by Relevance

Security Sales Specialist, VirusTotal, Google Cloud

Google In-office: Atlanta, GA, USA Chicago, IL, USA Madison, WI, USA + 10 more locations

Qualifications:

- Bachelor's degree or equivalent practical experience.
- 5 years of experience in a sales role in the enterprise software or cloud space.
- 2 years of experience with clients in the enterprise cyber security or IT field.

Systems Development Engineer, United States Government, Google Cloud

Google In-office: Reston, VA, USA

Qualifications:

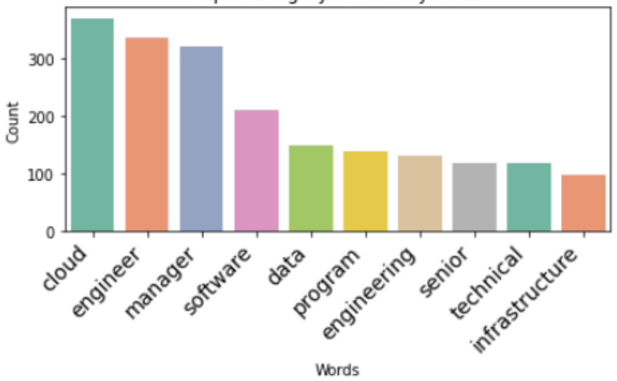
- 3 years of experience in field deployment/implementation or IP network design for service providers or enterprise networks.
- Experience with troubleshooting across Linux and networking.
- Experience in automation and coding/programming in Python, Bash, or Powershell.
- US Government Top Secret/Sensitive Compartmentalized Information security clearance with polygraph.

Software Engineer III, Site Reliability Engineering, Google Cloud

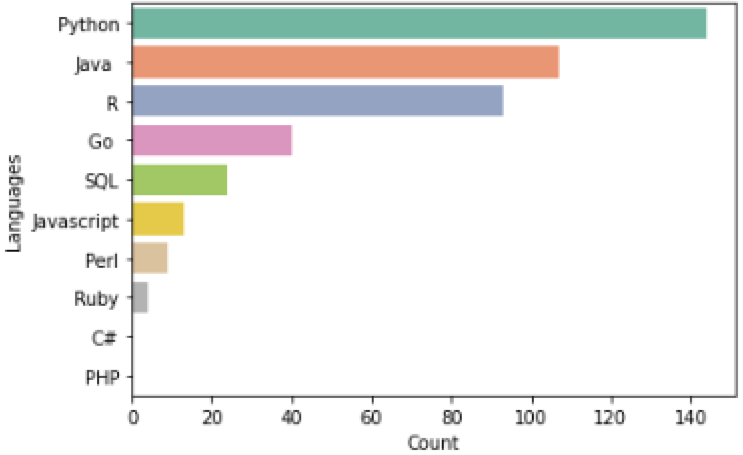
Google In-office: San Bruno, CA, USA New York, NY, USA Sunnyvale, CA, USA

Quick View – To Jobs Analysis Dashboard

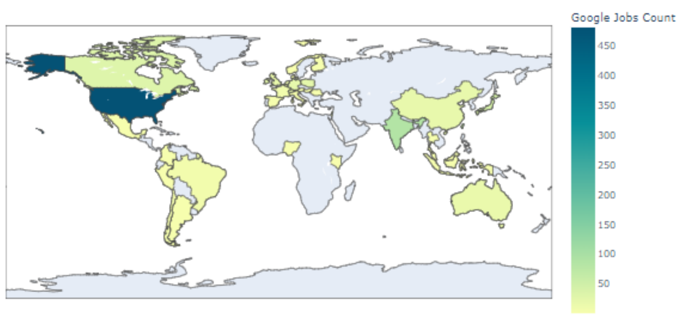
Top10 Google Job Title Keywords



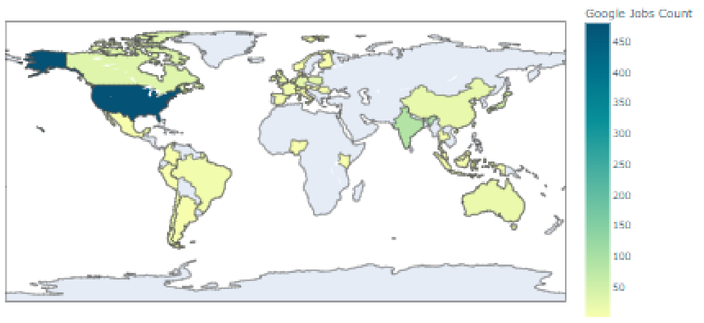
Most Popular Programming Languages for Google Job



Google Cloud Jobs World Map



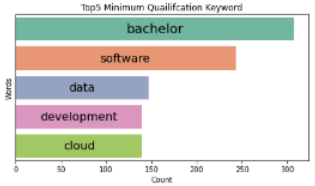
Google Engineer Jobs World Map



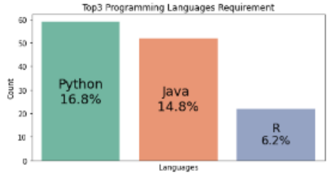
Google Cloud
Jobs Total Count:

352

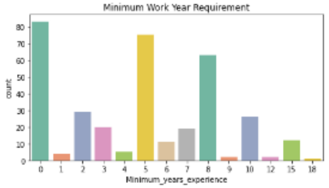
Top5 Minimum Quailifcation Keyword



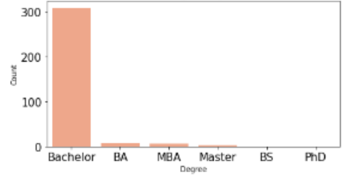
Top3 Programming Languages Requirement



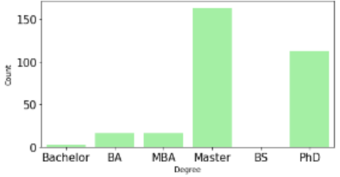
Minimum Work Year Requirement



Minimum Degree Requirement



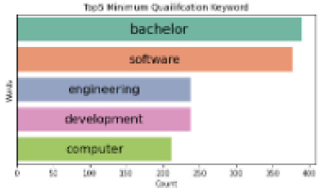
Preferred Degree Requirement



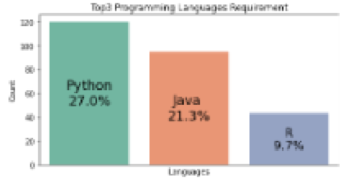
Google Engineer
Jobs Total Count:

445

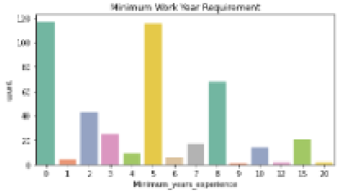
Top5 Minimum Qualification Keyword



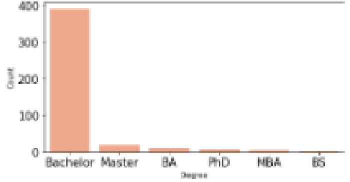
Top3 Programming Languages Requirement



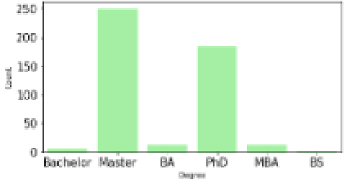
Minimum Work Year Requirement



Minimum Degree Requirement



Preferred Degree Requirement



Summary

One page project summary

Summary MT

Way to Google!

Goolge Jobs Analysis Project

Purpose:

Google is my dream company. I believe lots of data analyst want to join Google, just like me. I wonder what will it require to work in Google.

Questions/Tasks:

- □ What Programming languages does Google request the most?
- □ What about the requirement for degrees?
- □ Does work experience important? If so, how many years work experience is generally required?
- □ What is the most popular job type in Google now?

Python
Selenium
pandas
matplotlib
Seaborn
Kaggle
xlwings

Tools Used

Skills:

- Selenium web scraping
- pandas data cleaning &processing
- matplotlib data visualization

Data Preparation

Date Cleaning & Data Processing

Data Source

Data Name: Google Jobs All Information

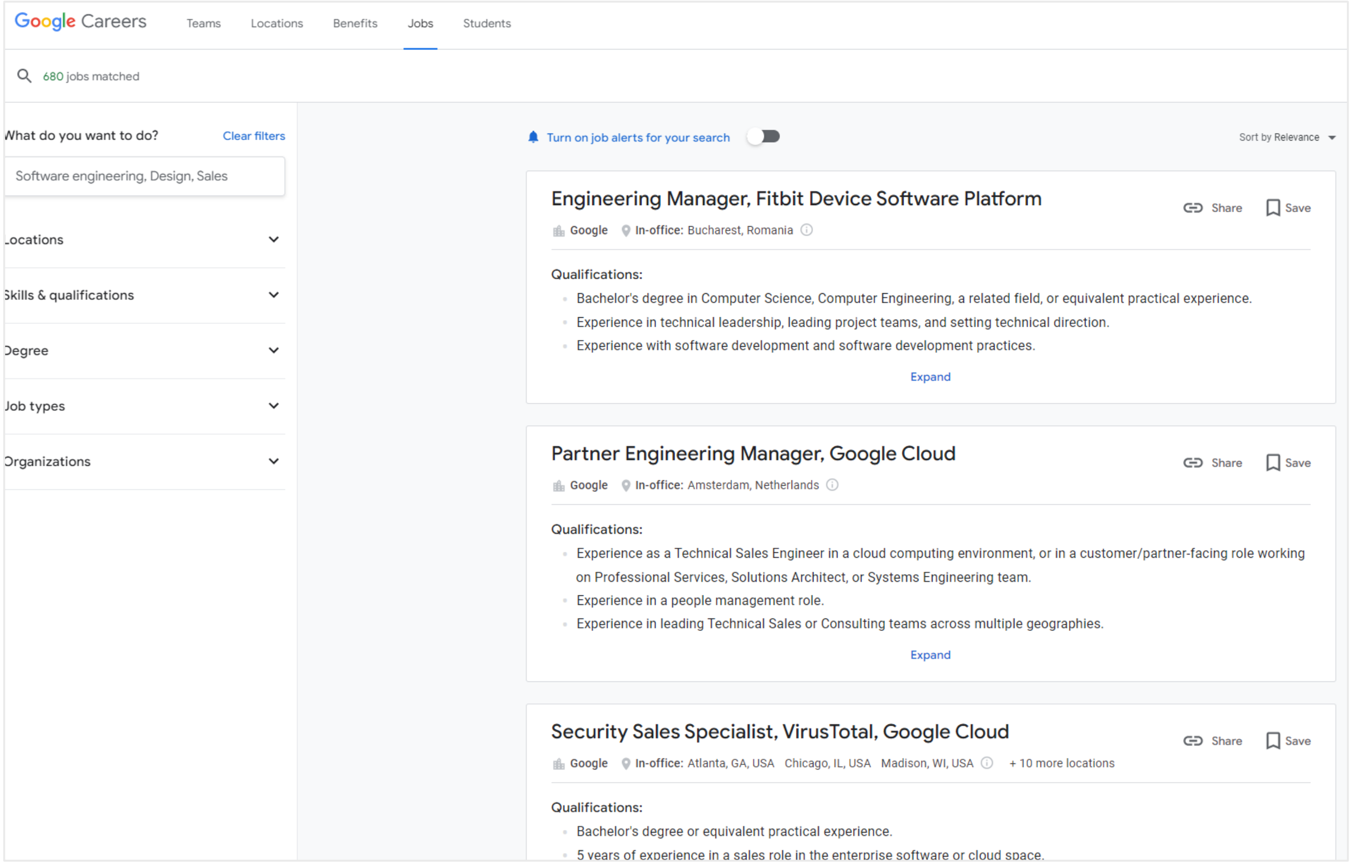
Source: [Google Careers Jobs]

Data Range: All the posts on January 21st 2023.

Data Size: 1K rows Data

Data information:

- Company
- Job title
- Location
- Post Date
- Link
- Minimum Qualificatoin
- Preferred Qualification
- Responsibilities
- About Job



680 jobs matched

What do you want to do? Clear filters

Software engineering, Design, Sales

Turn on job alerts for your search

Sort by Relevance

Engineering Manager, Fitbit Device Software Platform

Google In-office: Bucharest, Romania

Share Save

Qualifications:

- Bachelor's degree in Computer Science, Computer Engineering, a related field, or equivalent practical experience.
- Experience in technical leadership, leading project teams, and setting technical direction.
- Experience with software development and software development practices.

Expand

Partner Engineering Manager, Google Cloud

Google In-office: Amsterdam, Netherlands

Share Save

Qualifications:

- Experience as a Technical Sales Engineer in a cloud computing environment, or in a customer/partner-facing role working on Professional Services, Solutions Architect, or Systems Engineering team.
- Experience in a people management role.
- Experience in leading Technical Sales or Consulting teams across multiple geographies.

Expand

Security Sales Specialist, VirusTotal, Google Cloud

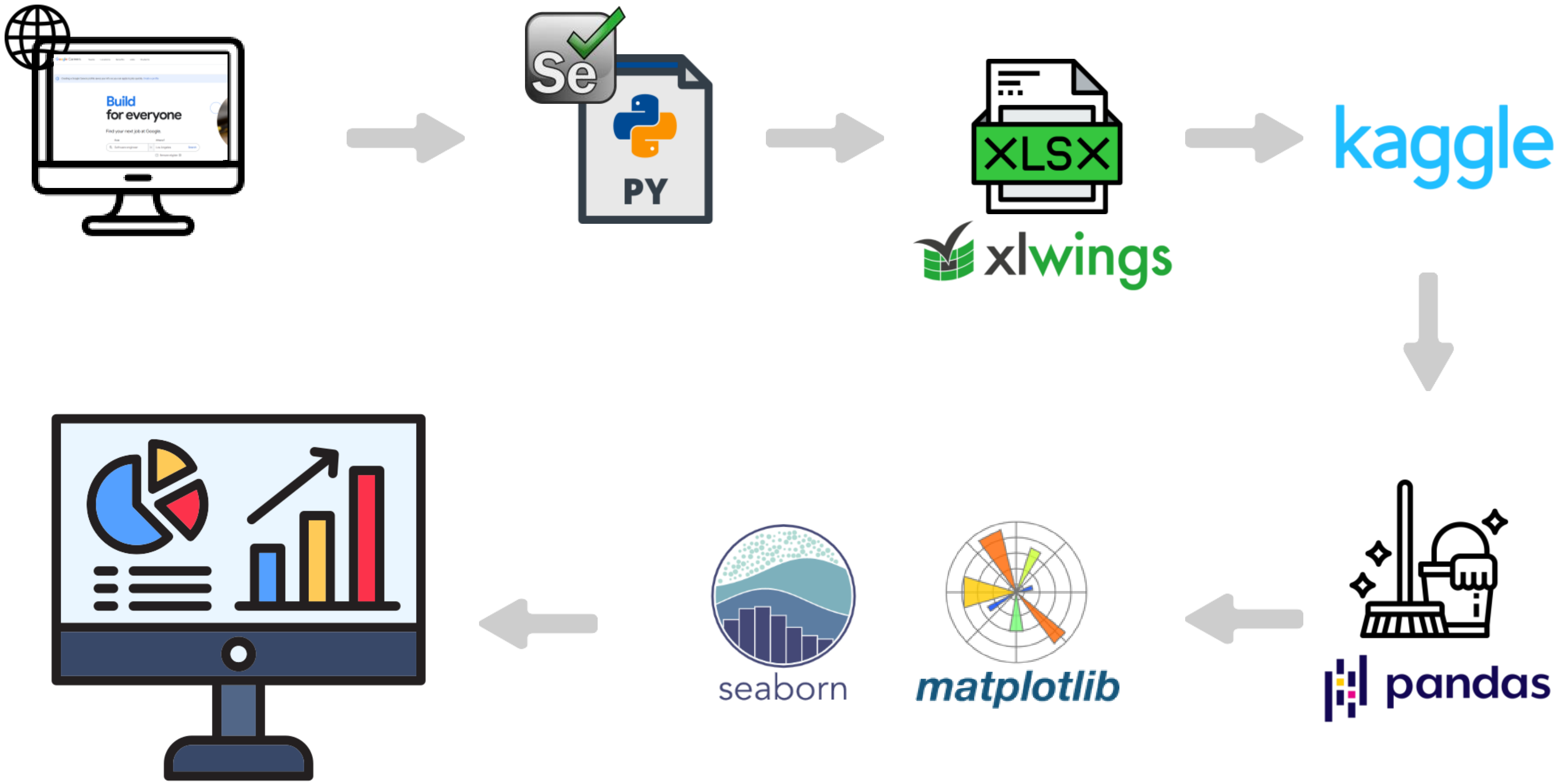
Google In-office: Atlanta, GA, USA Chicago, IL, USA Madison, WI, USA + 10 more locations

Share Save

Qualifications:

- Bachelor's degree or equivalent practical experience.
- 5 years of experience in a sales role in the enterprise software or cloud space.

Data Process



Python Code - Web Scraping

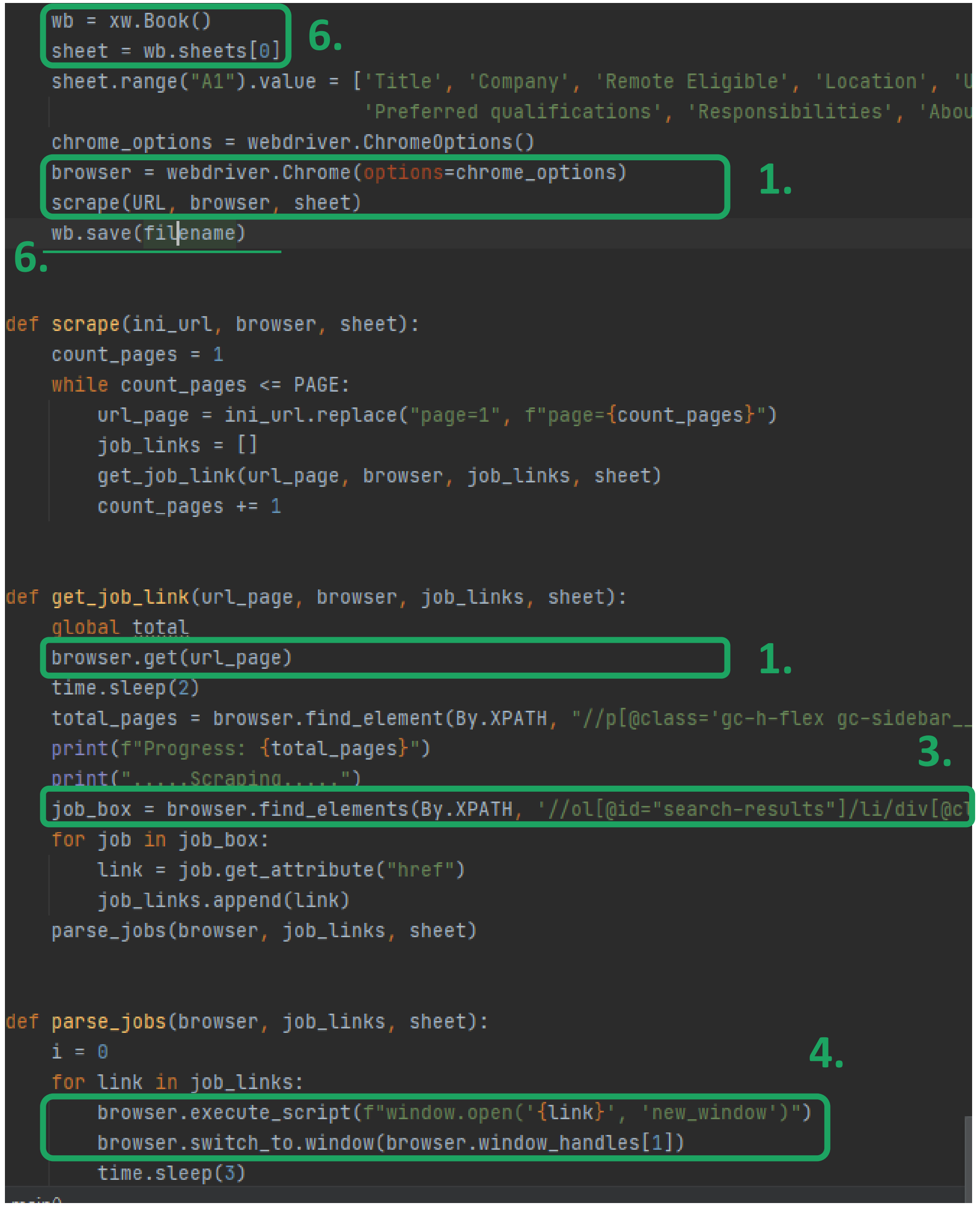
Target:

Simulate user enter Google careers website, scrap the information we need save the data in XLSX.

Python Script: Link

Key Skills:

1. Create ***Selenium Chrome driver*** and get in to assigned url
2. Pause by ***time.sleep()*** to avoid crash
3. Use Selenium ***find_elements() with X.path*** to find all the job link in current page
4. Create a new tab by ***Selenium executing java_script*** command.
5. Find information we need by Selenium find_elements() with X.path and add into dataframe
6. Use Xlwings to create XLSX file, write data in it and save it.

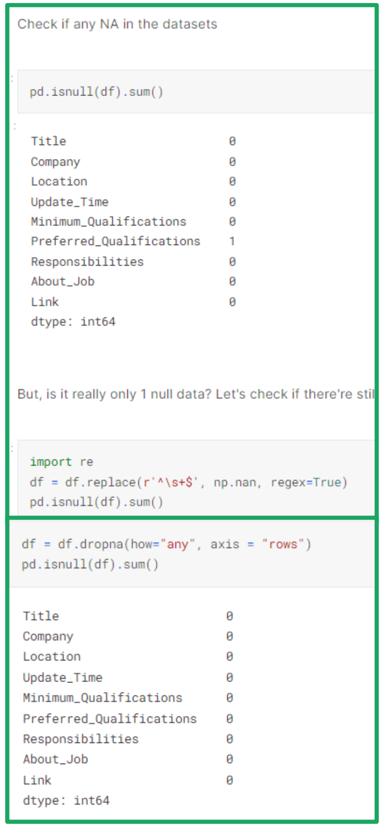


```python
    wb = xw.Book()
    sheet = wb.sheets[0]
    sheet.range("A1").value = ['Title', 'Company', 'Remote Eligible', 'Location', 'U
                               'Preferred qualifications', 'Responsibilities', 'Abou
    chrome_options = webdriver.ChromeOptions()
    browser = webdriver.Chrome(options=chrome_options)
    scrape(URL, browser, sheet)
    wb.save(filename)


def scrape(ini_url, browser, sheet):
    count_pages = 1
    while count_pages <= PAGE:
        url_page = ini_url.replace("page=1", f"page={count_pages}")
        job_links = []
        get_job_link(url_page, browser, job_links, sheet)
        count_pages += 1


def get_job_link(url_page, browser, job_links, sheet):
    global total
    browser.get(url_page)
    time.sleep(2)
    total_pages = browser.find_element(By.XPATH, "//p[@class='gc-h-flex gc-sidebar__
    print(f"Progress: {total_pages}")
    print(".....Scraping.....")
    job_box = browser.find_elements(By.XPATH, '//ol[@id="search-results"]/li/div[@cl
    for job in job_box:
        link = job.get_attribute("href")
        job_links.append(link)
    parse_jobs(browser, job_links, sheet)


def parse_jobs(browser, job_links, sheet):
    i = 0
    for link in job_links:
        browser.execute_script(f"window.open('{link}', 'new_window')")
        browser.switch_to.window(browser.window_handles[1])
        time.sleep(3)
```

Python Code – Data Cleaning

- Target: Simulate user enter Google careers website, scrap the information we need save the data in XLSX.
- Full Python Script on Kaggle: Link
- Key Skills:
  1. With ***str.contains()*** and ***re.findall()***, I can Identify and drop NA, incorrect and space only data.
  2. Organize the string into correct format by using ***column.apply(lambda…)***
  3. Extract the data (ex: country, keyword) we need from strings by using ***word_tokenize***, ***nltk.stopwords***, ***country_converter****…etc* through ***.apply(lambda…)***

1.



Check if any NA in the datasets

```
pd.isnull(df).sum()
```

```
Title                       0
Company                     0
Location                    0
Update_Time                 0
Minimum_Qualifications      0
Preferred_Qualifications    1
Responsibilities            0
About_Job                   0
Link                        0
dtype: int64
```

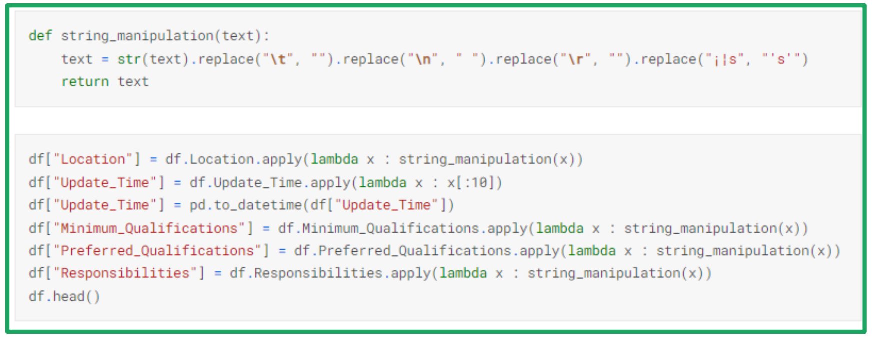
But, is it really only 1 null data? Let's check if there're stil

```
import re
df = df.replace(r'^\s+$', np.nan, regex=True)
pd.isnull(df).sum()
```

```
df = df.dropna(how="any", axis = "rows")
pd.isnull(df).sum()
```

```
Title                       0
Company                     0
Location                    0
Update_Time                 0
Minimum_Qualifications      0
Preferred_Qualifications    0
Responsibilities            0
About_Job                   0
Link                        0
dtype: int64
```

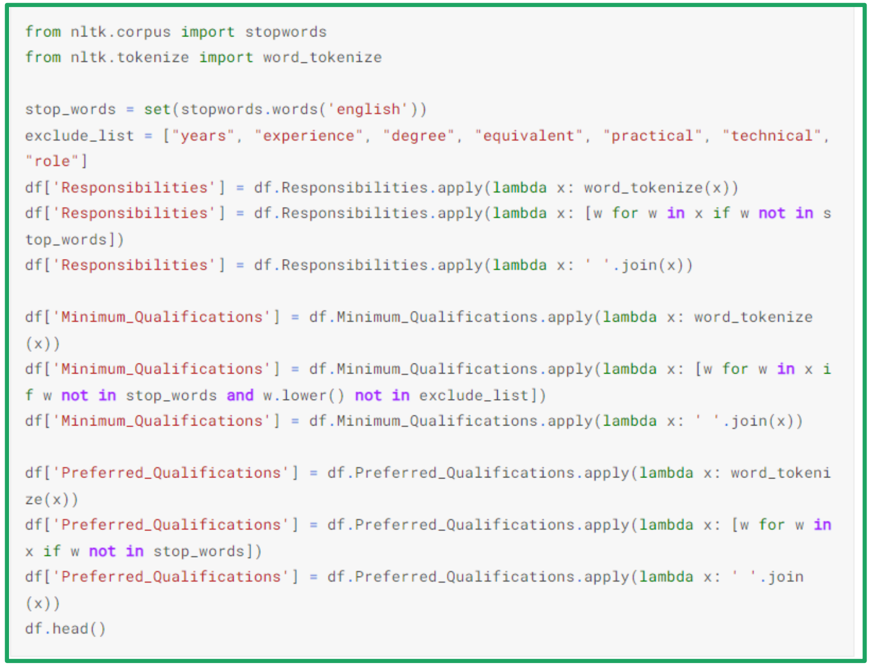
2.



```
def string_manipulation(text):
    text = str(text).replace("\t", "").replace("\n", " ").replace("\r", "").replace("¡¦s", "'s'")
    return text
```

```
df["Location"] = df.Location.apply(lambda x : string_manipulation(x))
df["Update_Time"] = df.Update_Time.apply(lambda x : x[:10])
df["Update_Time"] = pd.to_datetime(df["Update_Time"])
df["Minimum_Qualifications"] = df.Minimum_Qualifications.apply(lambda x : string_manipulation(x))
df["Preferred_Qualifications"] = df.Preferred_Qualifications.apply(lambda x : string_manipulation(x))
df["Responsibilities"] = df.Responsibilities.apply(lambda x : string_manipulation(x))
df.head()
```

3.



```
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize

stop_words = set(stopwords.words('english'))
exclude_list = ["years", "experience", "degree", "equivalent", "practical", "technical",
"role"]
df['Responsibilities'] = df.Responsibilities.apply(lambda x: word_tokenize(x))
df['Responsibilities'] = df.Responsibilities.apply(lambda x: [w for w in x if w not in s
top_words])
df['Responsibilities'] = df.Responsibilities.apply(lambda x: ' '.join(x))

df['Minimum_Qualifications'] = df.Minimum_Qualifications.apply(lambda x: word_tokenize
(x))
df['Minimum_Qualifications'] = df.Minimum_Qualifications.apply(lambda x: [w for w in x i
f w not in stop_words and w.lower() not in exclude_list])
df['Minimum_Qualifications'] = df.Minimum_Qualifications.apply(lambda x: ' '.join(x))

df['Preferred_Qualifications'] = df.Preferred_Qualifications.apply(lambda x: word_tokeni
ze(x))
df['Preferred_Qualifications'] = df.Preferred_Qualifications.apply(lambda x: [w for w in
x if w not in stop_words])
df['Preferred_Qualifications'] = df.Preferred_Qualifications.apply(lambda x: ' '.join
(x))
df.head()
```

Python Code – Data Analysis and Visualization (1/3)

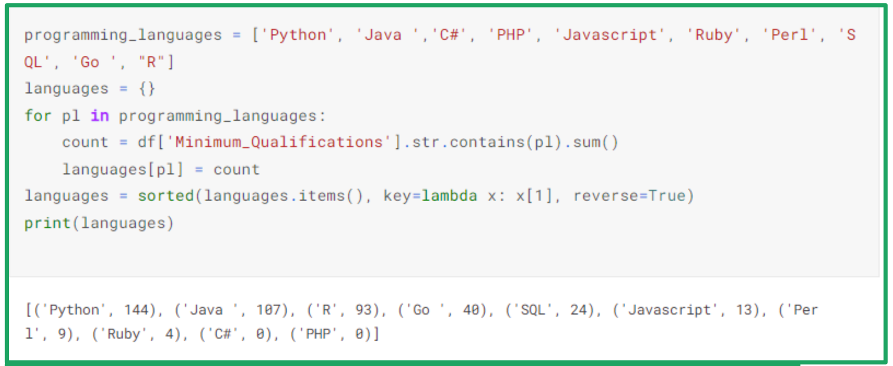
Target: Analyze the data and visualize the insight

Full Analysis Process on Kaggle: Link

Key Skills:

1. Using ***Counter()*** from collections module to count **the keyword appearance** from mass data for further analysis, such as degrees, programming languages, title keyword…
2. Using ***df.merge()*** to join related table and showing chart with ***plt.subplots()*** for easy compare.
3. Using **Seaborn** module to generate more recognizable and visually appealing charts
4. Using ***plotly.choroplethplotl()*** to generate geo map.
5. Defining a **huge function** to allow user to generate a **dashboard** based on the assigned position keyword, which will contain all the statistical data related to the job.

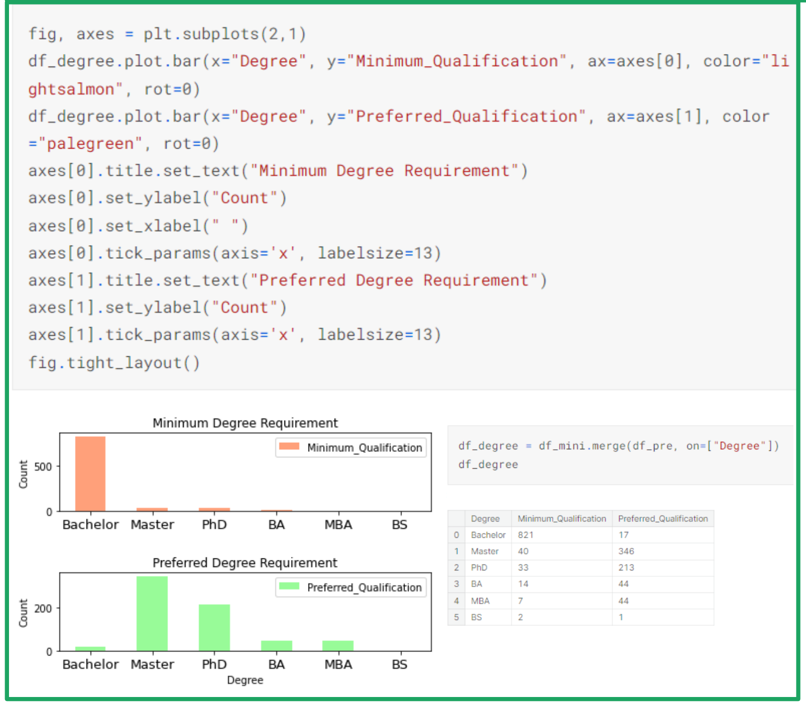
1.



```
programming_languages = ['Python', 'Java ','C#', 'PHP', 'Javascript', 'Ruby', 'Perl', 'S
QL', 'Go ', "R"]
languages = {}
for pl in programming_languages:
    count = df['Minimum_Qualifications'].str.contains(pl).sum()
    languages[pl] = count
languages = sorted(languages.items(), key=lambda x: x[1], reverse=True)
print(languages)
```

```
[('Python', 144), ('Java ', 107), ('R', 93), ('Go ', 40), ('SQL', 24), ('Javascript', 13), ('Per
l', 9), ('Ruby', 4), ('C#', 0), ('PHP', 0)]
```

2.

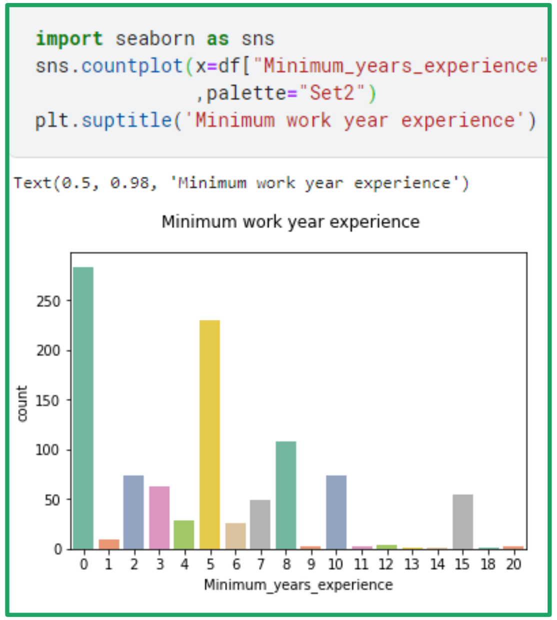


```
fig, axes = plt.subplots(2,1)
df_degree.plot.bar(x="Degree", y="Minimum_Qualification", ax=axes[0], color="li
ghtsalmon", rot=0)
df_degree.plot.bar(x="Degree", y="Preferred_Qualification", ax=axes[1], color
="palegreen", rot=0)
axes[0].title.set_text("Minimum Degree Requirement")
axes[0].set_ylabel("Count")
axes[0].set_xlabel(" ")
axes[0].tick_params(axis='x', labelsize=13)
axes[1].title.set_text("Preferred Degree Requirement")
axes[1].set_ylabel("Count")
axes[1].tick_params(axis='x', labelsize=13)
fig.tight_layout()
```

```
df_degree = df_mini.merge(df_pre, on=["Degree"])
df_degree
```

	Degree	Minimum_Qualification	Preferred_Qualification
0	Bachelor	821	17
1	Master	40	346
2	PhD	33	213
3	BA	14	44
4	MBA	7	44
5	BS	2	1

3.



```
import seaborn as sns
sns.countplot(x=df["Minimum_years_experience"]
             ,palette="Set2")
plt.suptitle('Minimum work year experience')
```

```
Text(0.5, 0.98, 'Minimum work year experience')
```

Python Code – Data Analysis and Visualization (2/3)

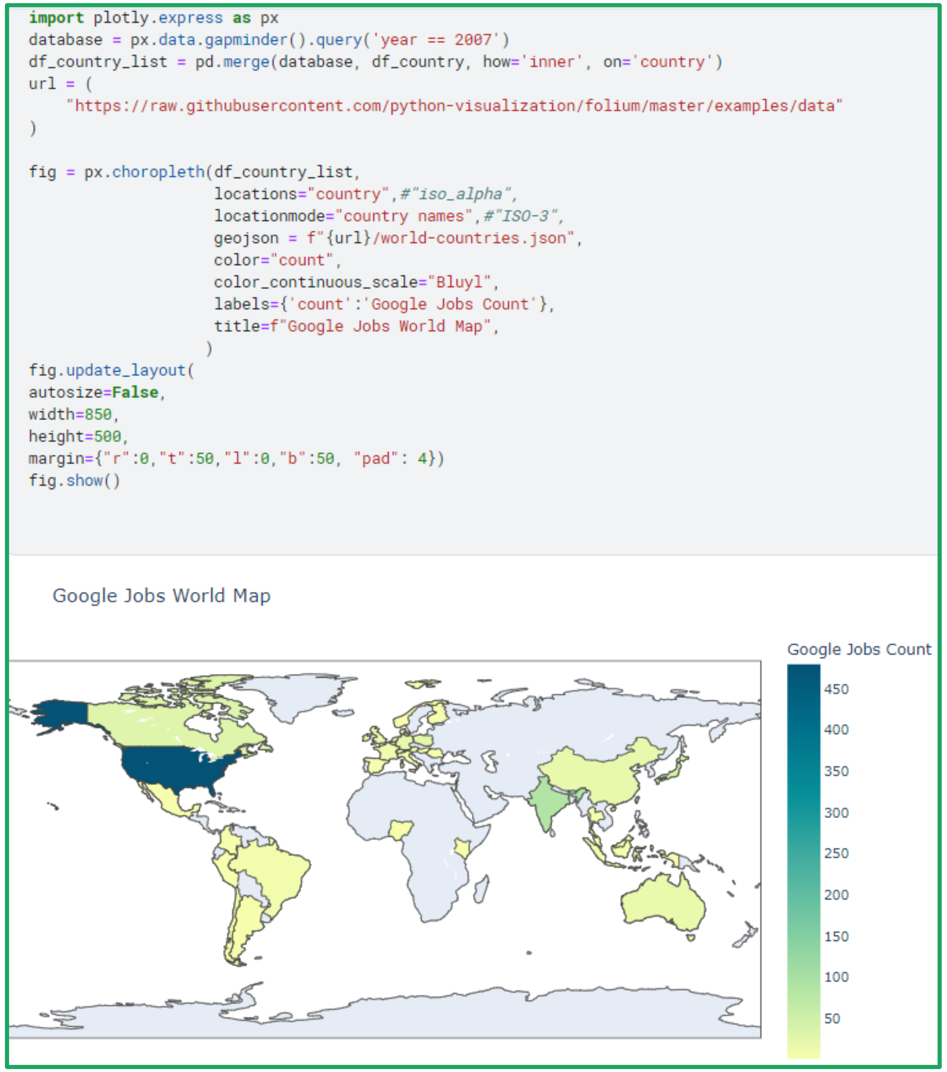
Target: Analyze the data and visualize the insight

Full Analysis Process on Kaggle: Link

Key Skills:

1. **Counting the keyword occurrence** from mass data for further analysis, such as degrees, programming languages…
2. Using ***df.merge()*** to join related table and showing chart with ***plt.subplots()*** for easy compare.
3. Using **Seaborn** module to generate more recognizable and visually appealing charts
4. Using ***plotly.choroplethplotl()*** to generate geo map to display job allocation.
5. Defining a **huge function** to allow user to **generate a dashboard in one picture** based on the assigned position keyword, which will contain all the statistical data related to the job.

4.



```
import plotly.express as px
database = px.data.gapminder().query('year == 2007')
df_country_list = pd.merge(database, df_country, how='inner', on='country')
url = (
    "https://raw.githubusercontent.com/python-visualization/folium/master/examples/data"
)

fig = px.choropleth(df_country_list,
                    locations="country",#"iso_alpha",
                    locationmode="country names",#"ISO-3",
                    geojson = f"{url}/world-countries.json",
                    color="count",
                    color_continuous_scale="Bluyl",
                    labels={'count':'Google Jobs Count'},
                    title=f"Google Jobs World Map",
                   )
fig.update_layout(
autosize=False,
width=850,
height=500,
margin={"r":0,"t":50,"l":0,"b":50, "pad": 4})
fig.show()
```

Python Code – Data Analysis and Visualization (3/3)

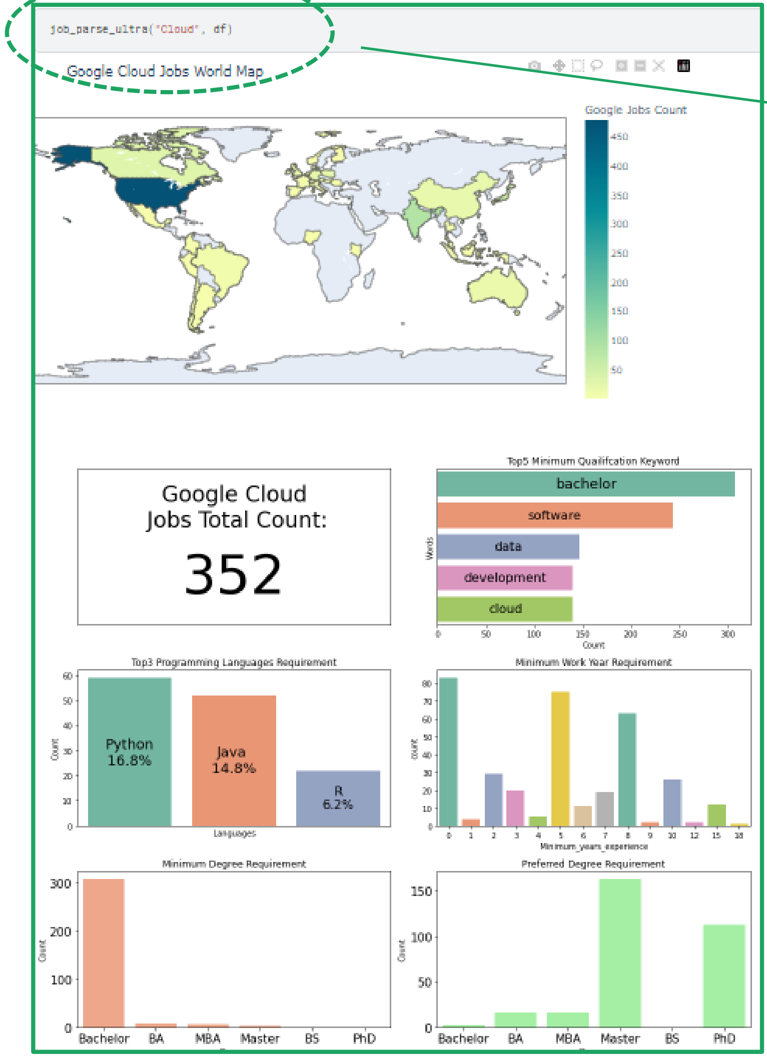
Target: Analyze the data and visualize the insight

Full Analysis Process on Kaggle: Link

Key Skills:

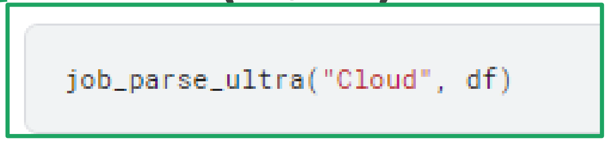
1. **Counting the keyword occurrence** from mass data for further analysis, such as degrees, programming languages…
2. Using ***df.merge()*** to join related table and showing chart with ***plt.subplots()*** for easy compare.
3. Using **Seaborn** module to generate more recognizable and visually appealing charts
4. Using ***plotly.choroplethplotl()*** to generate geo map to display job allocation.
5. Defining a **huge function** to allow user to **generate a dashboard in one picture** based on the assigned position keyword, which will contain all the statistical data related to the job.

5.



```
job_parse_ultra("Cloud", df)
```

Google Cloud
Jobs Total Count:
352



```
job_parse_ultra("Cloud", df)
```

Insight

Insight Finding during EDA

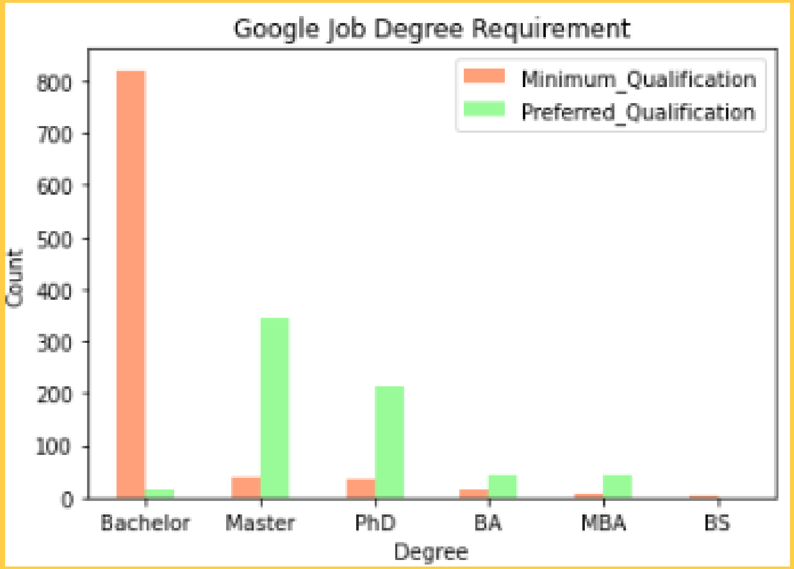
Insight 1 – Degree & Programming Languages

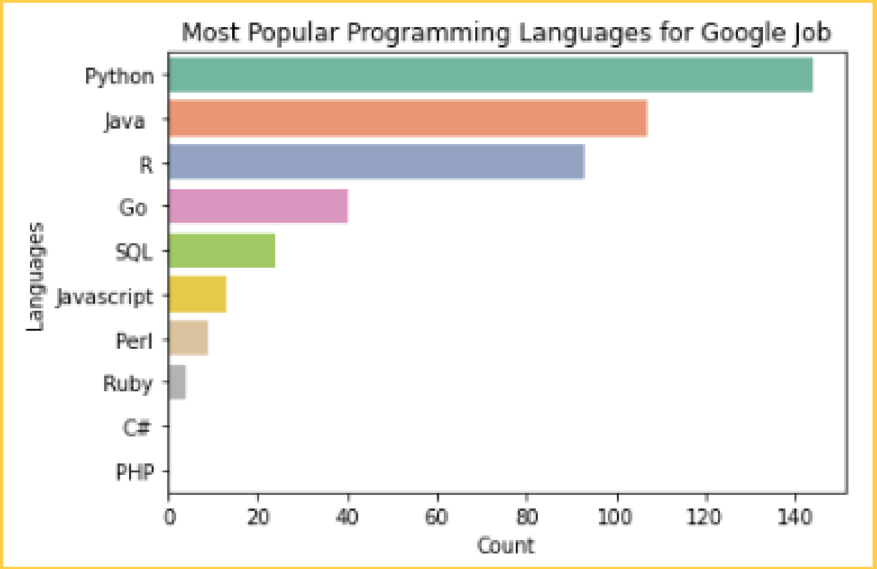
Degree Requirement:

You need **at least bachelor degree** to get in Google. **Master and MBA** make you **more competitive** than other candidates.

Programming Languages Requirement:

Python, **Java**, and **R** programming languages are the 3 most popular programming. Furthermore, the popularity of these 3 programming languages are significantly ahead of many other languages.

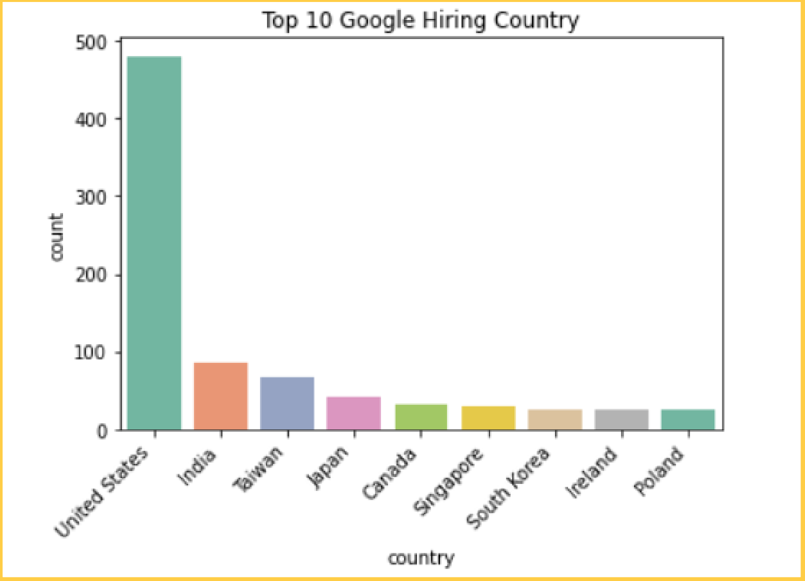


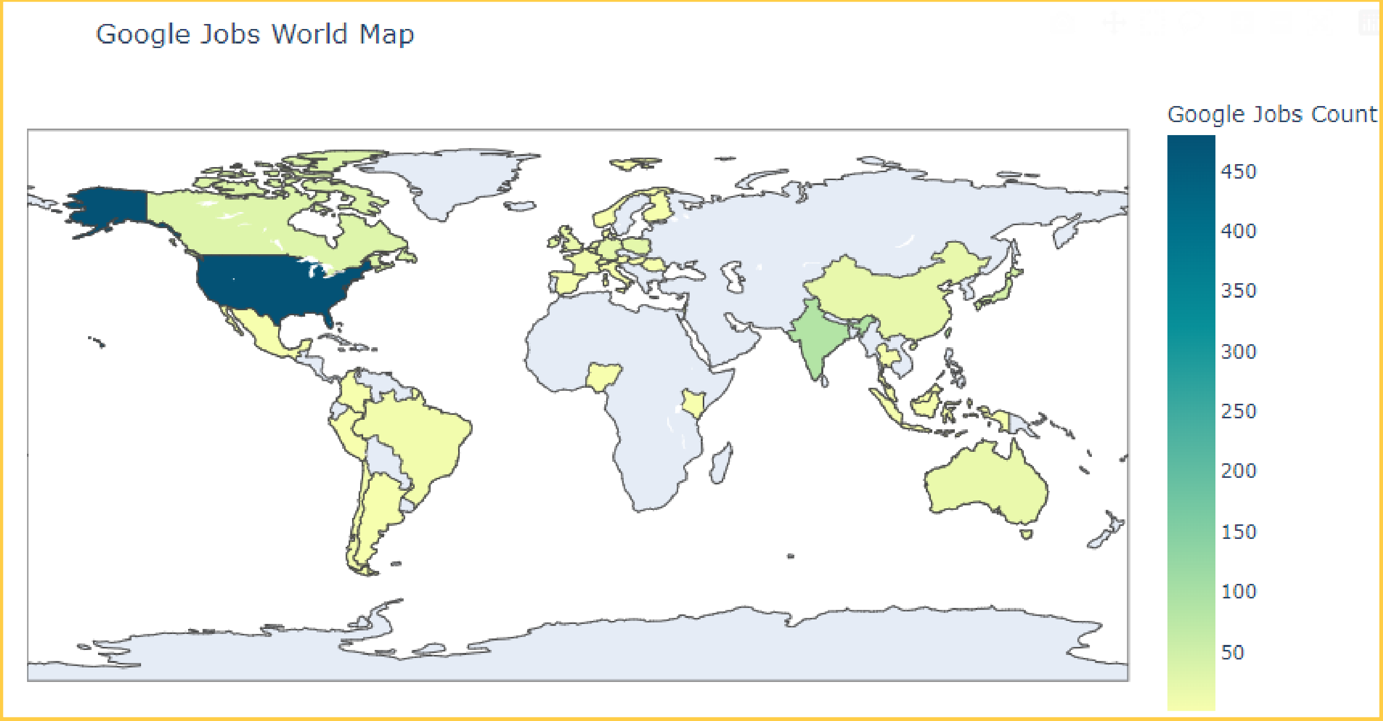


Insight 2 – Recruiting Location

In Google's global recruitment, **the United States stands out significantly** from other countries.

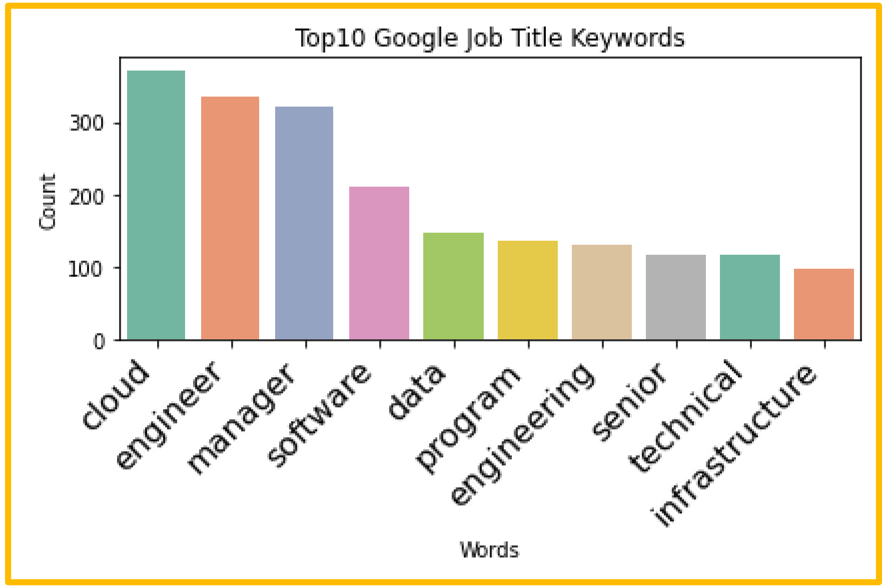
On top of that, **50% of the top 10 recruiting countries are in Asia**, which shows that Google also place a strong emphasis on the talent market in Asia, particularly in India, Taiwan, and Japan.

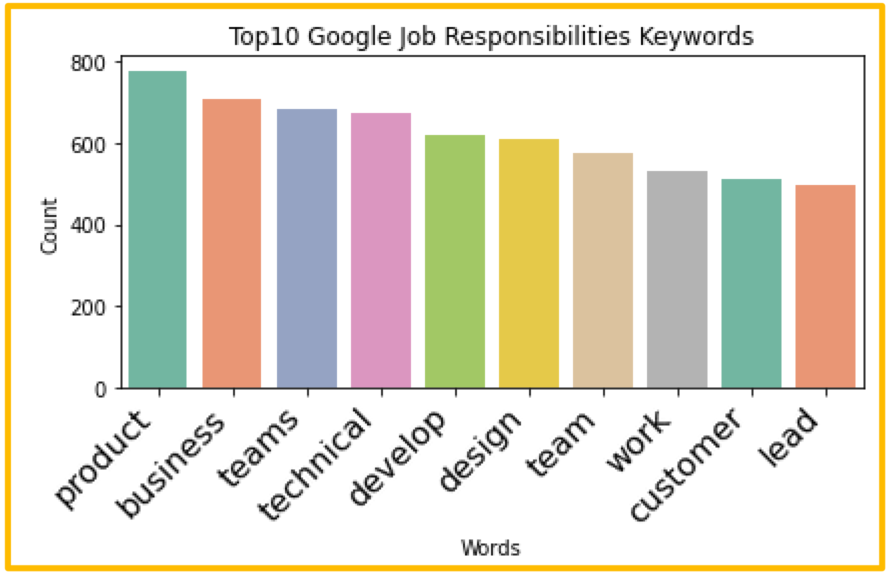




Insight 3 – Interest Fact

An interest finding, despite most of the top 10 Google job opening title keywords are related to technical field, the top 10 responsibilities keywords are mostly related to leadship and teamwork. This shows **equiping technical skills alone is not enough to excel the job at Google**. Soft skills such as **communication, teamwork and business awareness are also required.**





Conclusion

Answer for Questions/Tasks:

□ What Programming languages does Google request the most?

✓ **Python** , **Java** and **R** are three popular programming languages for Google Jobs

□ What about the requirement for degrees?

✓ You need at least **bachelor degree** to get in Google. **Master and MBA** make you more competitive than other candidates.

□ Does work experience important? If so, how many years work experience is generally required?

✓ Most of the jobs did not mentioned work experience. Other than this, most of the works require **5 years work experience**

□ What is the most popular job type in Google now?

✓ By searching title keyword, Google have the highest talent demand in **Cloud related field**.

Recommendation

- If you are planning to learn a programming language before deciding on a career direction, **learning Python** will increase your chances of meeting the requirements for Google job openings.

- If you are looking for the country/location with the most job openings, you can refer **to the United States and Asia** as they are the places where Google have the **highest talent demand**.

- Although demonstrating technical skills is important in a resume, **Google also values teamwork and communication skills**. Therefore, do not forget to show these skills as well.

Google

Thank You!

Michael Tsai

Michael Tsai

Michael Tsai

Michael Tsai

h94xup6