IBM Data Analyst Capstone Project

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OUTLINE

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- Methodology
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- Discussion
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- Conclusion
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EXECUTIVE SUMMARY

- Survey data of Software Professionals consisting of 11398 rows and 85 columns
- Data consists ~93% of Men
- Dominate Age Group Range: 20-35 years
- Top 5 programming Languages:
  - JavaScript, HTML/CSS, SQL, Bash/Powershell, and Python
- Most in demand programming Language: JavaScript
- Top 5 Databases:
  - MySQL, PostgreSQL, MS SQL Server, SQ Lite, and Mango DB
- Most Database Skill in demand: PostgresSQL

INTRODUCTION

- Data Analytics is a process of analyzing row data in order to make conclusions about that information.
- Methods involved:
  - Qualitative Data Analysis
  - Quantitative Data Analysis
- There are typically 5 steps involved showed in the image on the right:
- **Aim:**
  - Analyze Several datasets to help identify trends for emerging technologies
  - **Objectives:**
    - Identify top programming languages in demand
    - Database skills in demand
    - Most popular IDE's
    - Demographic data for developers

METHODOLOGY

Data Collection

- API's and Web scrapping
- Data Used
  - Survey Data – Software Professionals
    - Rows: 11398
    - Columns: 85
  - Number of Jobs Opening:
    - Rows: 27005
    - Columns: 9

Data Cleaning

- Data Shape
  - # Columns
  - # Rows
- Data types
  - Objects
  - Integers
  - Floats
  - Datetime
- Duplicates
  - Drop duplicates
- Missing Values
  - Impute Missing Values
- Normalizing Data

Data Analysis

- Descriptive Statistics
  - Mean
  - Mode
  - Median
  - IQR
  - Outliers
- Data Visualization
  - Univariate Analysis
    - Distributions
    - Box Plots
  - Bi-Variate Analysis
    - Scatter Plots
    - Bubble Plots
    - Pie Charts, lines, and Bar Plots

Tools Used

RESULTS

- Survey Data
  - Shape (11398, 85)
  - Three Datatypes:
  - 79 Objects, 5 Float64, 1 int64

- Jobs Opening Data
  - Shape (27005, 9)
  - Two Datatypes:
    - 8 Object, I int64

```
In [86]:
# data shape
df.shape

Out[86]: (11398, 85)

In [90]:
# datatypes
df.dtypes.value_counts()

Out[90]: object     79
float64     5
int64       1
dtype: int64

In [87]:
# view first 3 rows
df.head(3)
```

Out[87]:

	Respondent	MainBranch	Hobbyist	OpenSourcer	OpenSource	Employment	Country	Student	EdLevel	UndergradMajor	...	WelcomeChange	SOI
0	4	I am a developer by profession	No	Never	The quality of OSS and closed source software ...	Employed full-time	United States	No	Bachelor's degree (BA, BS, B.Eng., etc.)	Computer science, computer engineering, or sof...	...	Just as welcome now as I felt last year	wri devel
1	9	I am a developer by profession	Yes	Once a month or more often	The quality of OSS and closed source software ...	Employed full-time	New Zealand	No	Some college/university study without earning ...	Computer science, computer engineering, or sof...	...	Just as welcome now as I felt last year	
2	13	I am a developer by profession	Yes	Less than once a month but more than once per ...	OSS is, on average, of HIGHER quality than pro...	Employed full-time	United States	No	Master's degree (MA, MS, M.Eng., MBA, etc.)	Computer science, computer engineering, or sof...	...	Somewhat more welcome now than last year	wri devel

3 rows × 85 columns

```
In [35]:
# jobs shape
Jobs_df.shape

Out[35]: (27005, 9)

In [37]:
Jobs_df.dtypes.value_counts()

Out[37]: object    8
int64     1
dtype: int64

In [38]:
Jobs_df.head(3)
```

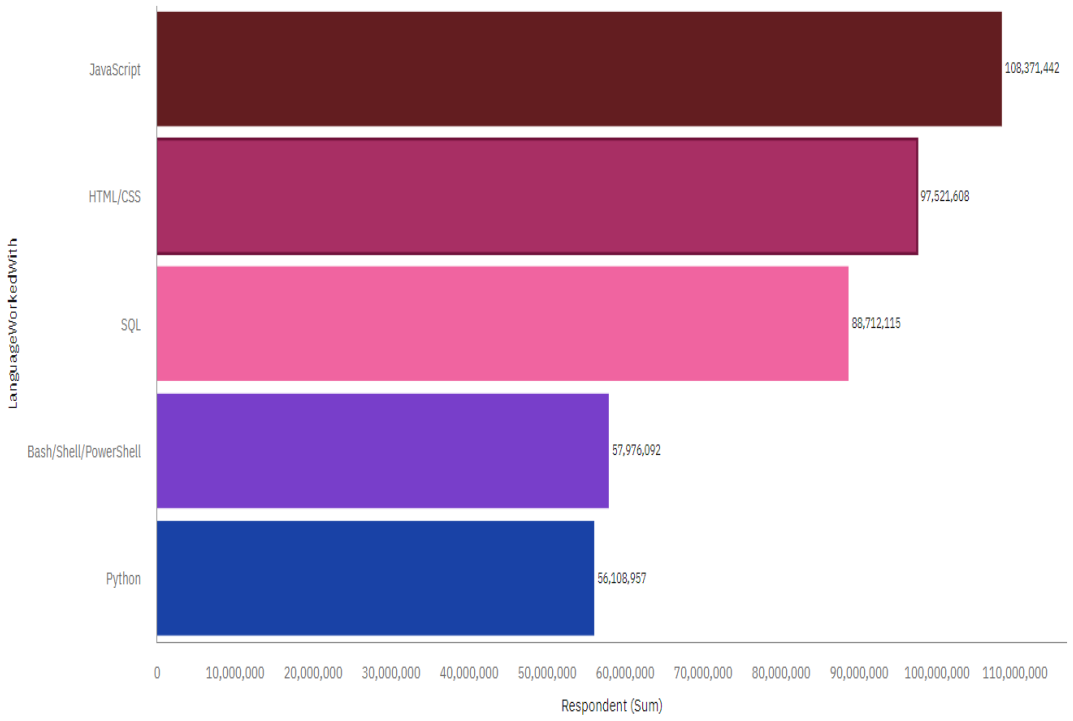
Out[38]:

	Id	Job Title	Job Experience Required	Key Skills	Role Category	Location	Functional Area	Industry	Role
0	0	Digital Media Planner	5 - 10 yrs	Media Planning| Digital Media	Advertising	Los Angeles	Marketing , Advertising , MR , PR , Media Plan...	Advertising, PR, MR, Event Management	Media Planning Executive/Manager
1	1	Online Bidding Executive	2 - 5 yrs	pre sales| closing| software knowledge| client...	Retail Sales	New York	Sales , Retail , Business Development	IT-Software, Software Services	Sales Executive/Officer
2	2	Trainee Research/ Research Executive- Hi- Tech...	0 - 1 yrs	Computer science| Fabrication| Quality check| ...	R&D	San Francisco	Engineering Design , R&D	Recruitment, Staffing	R&D Executive

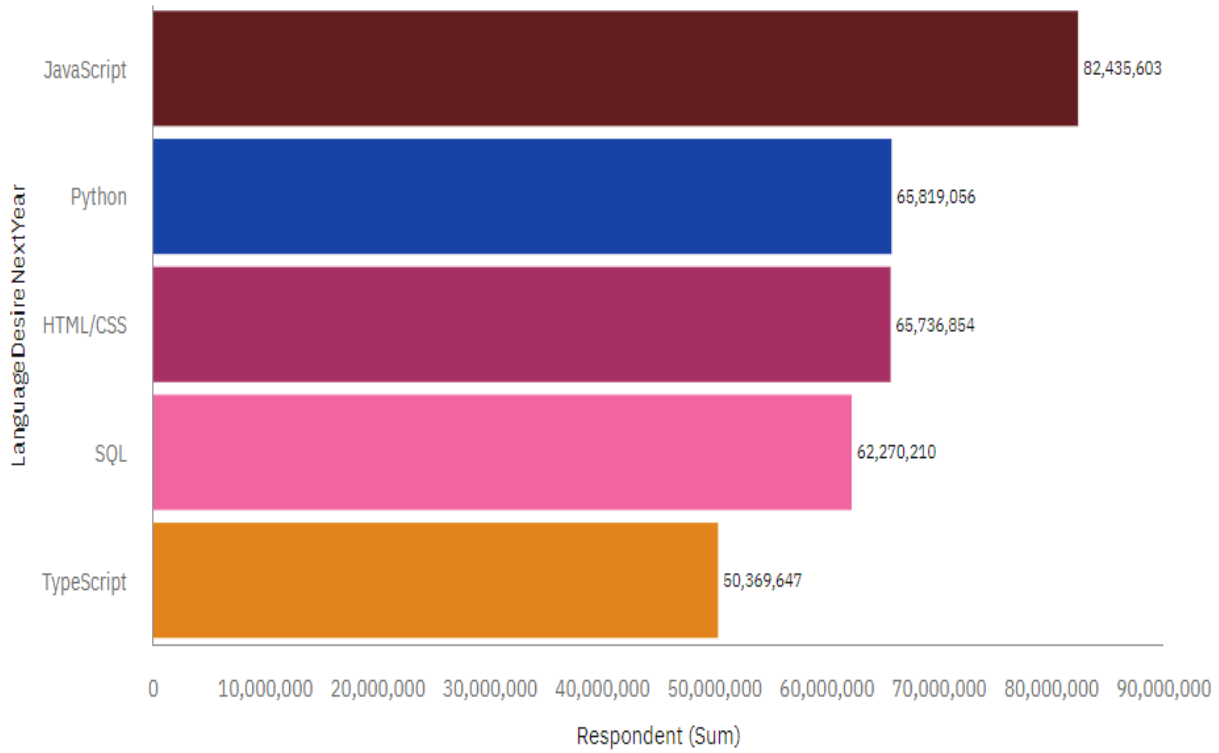
```
In [12]:
api_url = "http://127.0.0.1:5000/data"
def get_number_of_jobs_T(technology):
    #your code goes here
```

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



IBM Developer

SKILLS NETWORK

PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

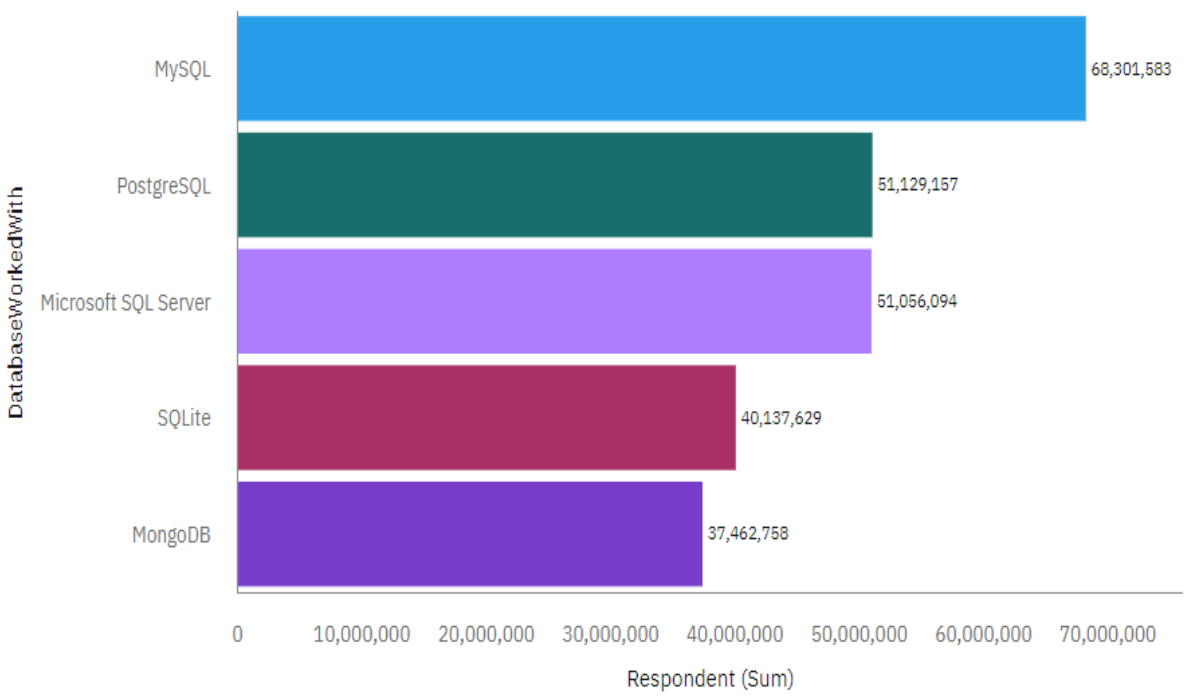
- Current Year Top 5 most popular Languages are:
  - JavaScript, HTML/CSS, SQL, Bash/Powershell, and Python
- JavaScript is the most popular Language, reported at about 108Million Jobs.
- JavaScript is expected to still lead in the following year

Implications

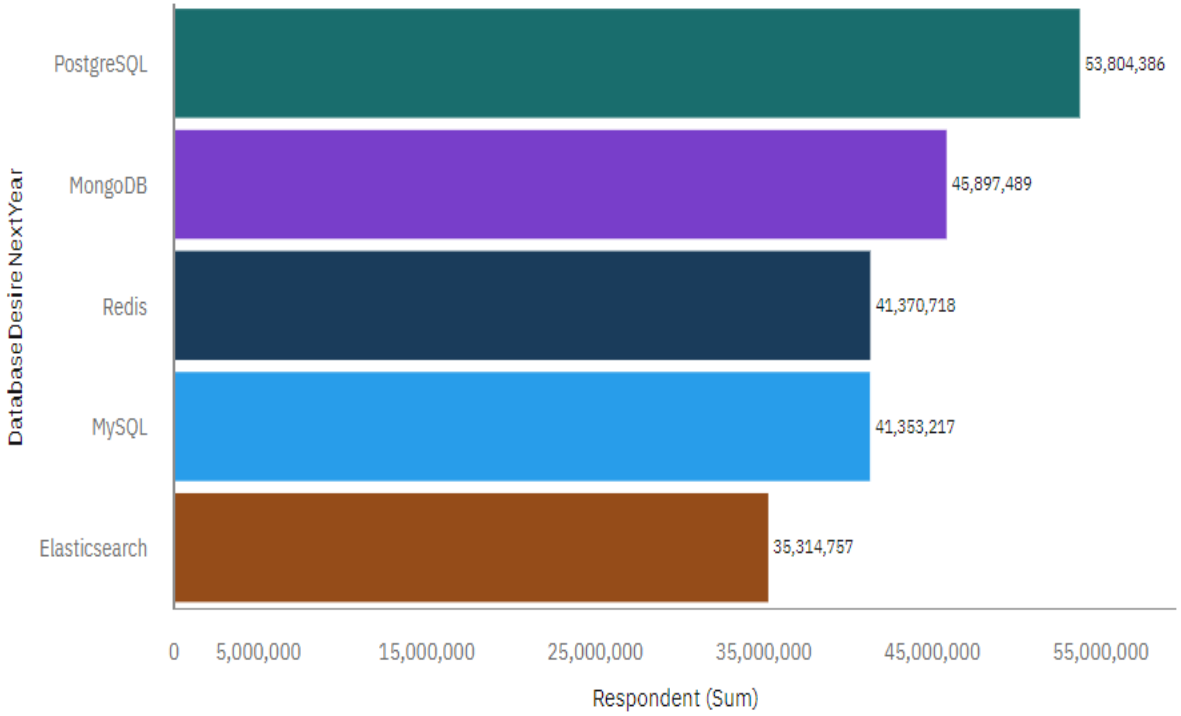
- Expected JavaScript popularity to drop by ~24% in the following year
- Python to Rank 2nd, a growth popularity by 17%
- TypeScript Popularity to rise and rank 5th,while Bash/Powershell popularity will drop out of the Top 5.

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- Current Year Top 5 most popular Databases are:
  - MySQL, PostgreSQL, MS SQL Server, SQ Lite, and Mango DB
- MySQL is the most popular Database.
- PostgreSQL is expected to become the most popular Database in the following year

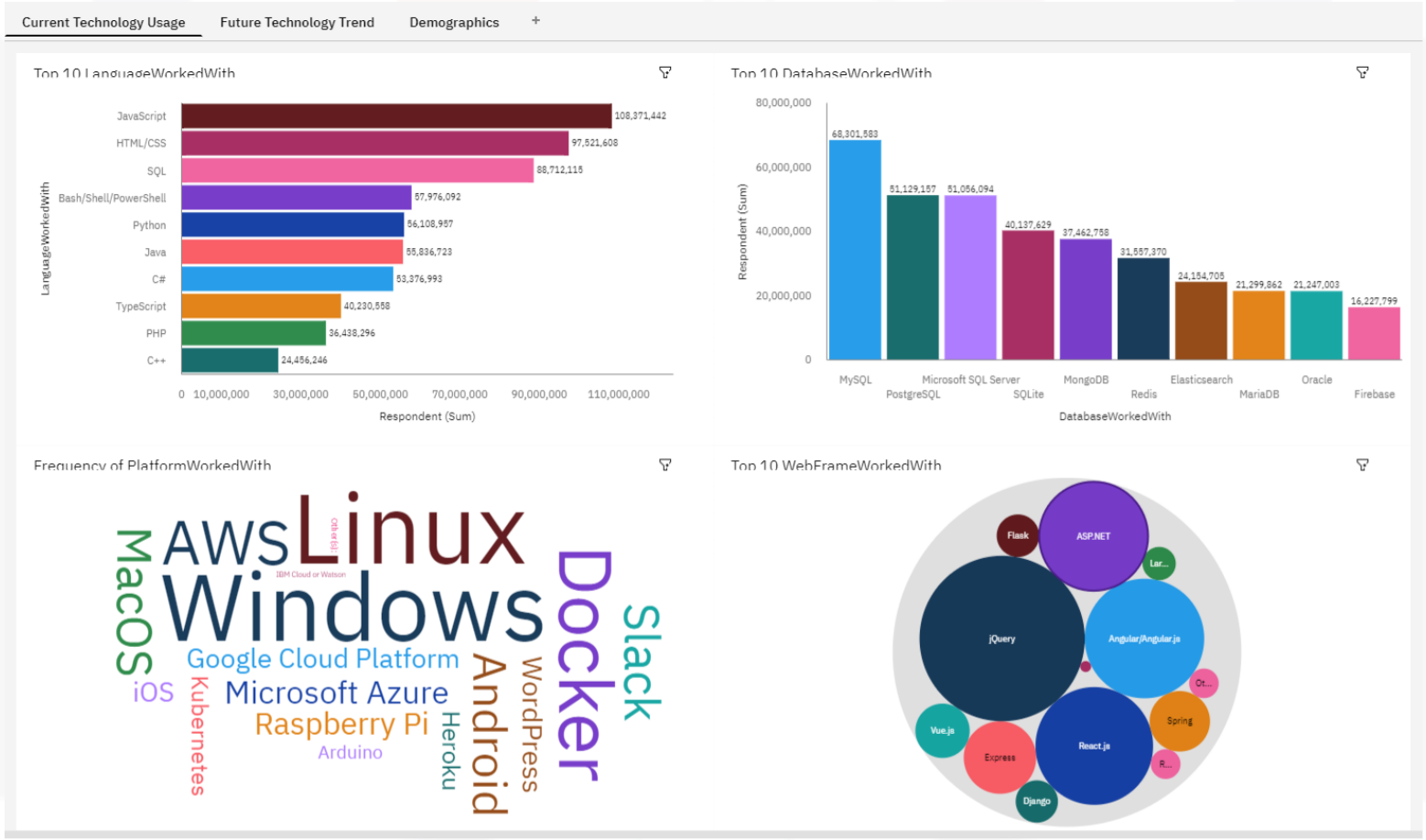
Implications

- Expected MySQL popularity to drop by ~40% in the following year
- **Elasticsearch** will be the **fastest growing Database**, with a growth rate of **~46%** !
- Redis will be the 2nd fastest growing Databases, with a growth rate of 31%.

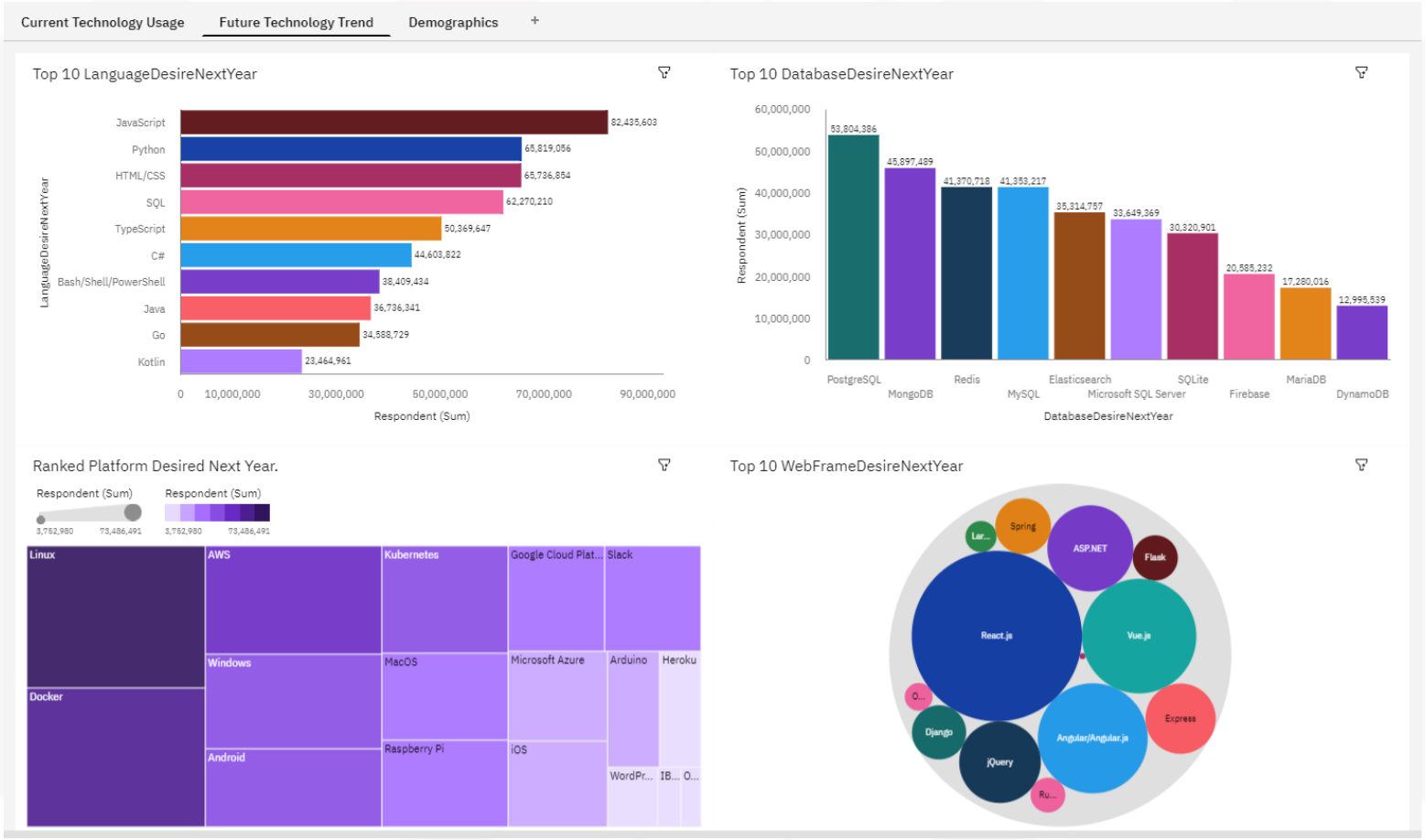
DASHBOARD

https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FBuilding%2Ba%2Bdashboard%2Bwith%2BCognos%2BDashboard%2BEmbedded%2B%2528CDE%2529&action=view&mode=dashboard&subView=model00000182bb1cd26d_00000000

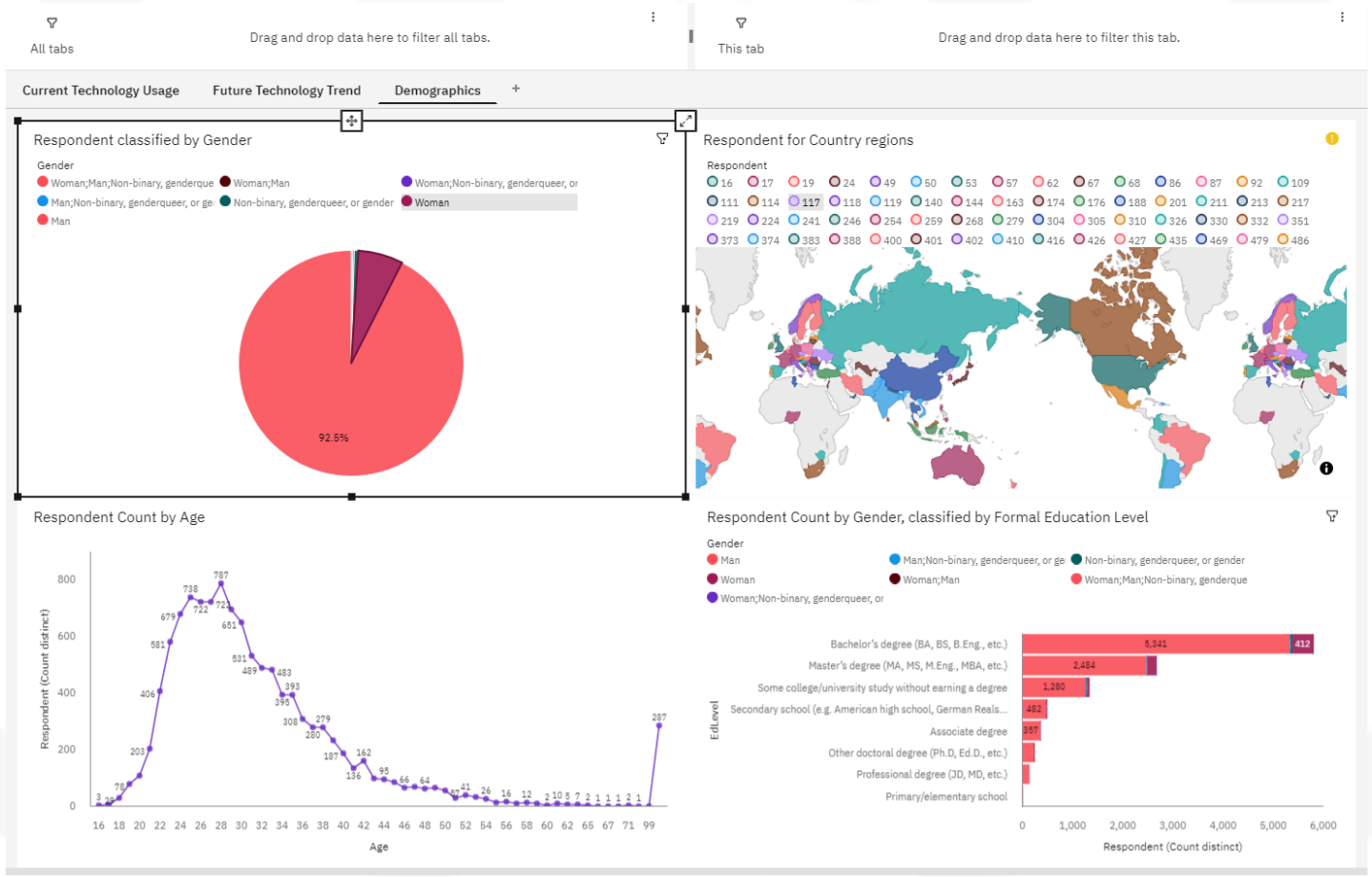
DASHBOARD TAB 1



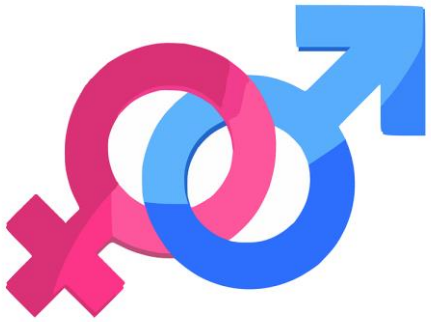
DASHBOARD TAB 2



DASHBOARD TAB 3

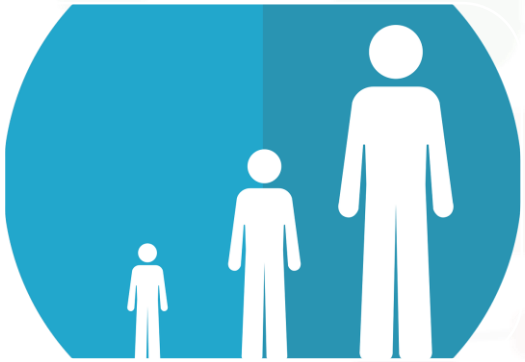


DISCUSSION



92.5% Men

6.5% Women



Most Age Group

20-35

- Most Used Platform: Linux
- Most Used Webframe: jQuery
- Next most Desired Platforms:
  - Linux
  - Docker
- Next most desired Webframe: React.js

OVERALL FINDINGS & IMPLICATIONS

Most Popular Language

Fastest Growing Language

Most Popular Database

Fastest Growing Database

CONCLUSION

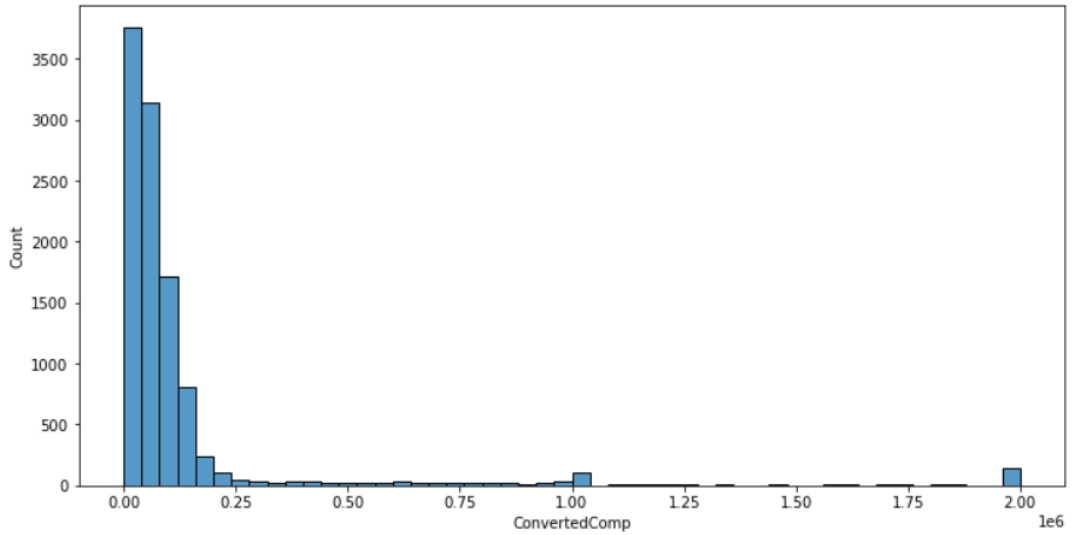
- JavaScript is the currently leading language, and it will at least remain so for the next following year.
- Python is the fastest growing language, and it has a potential to surpass JavaScript in the future.
- MySQl database is currently leading, however, its usage is expected to decline significantly by the following year
- Elasticsearch is expected to gain momentum to up its rank in the Database Market. Nevertheless, Postgres SQL will become the leading Database in the following year.

APPENDIX

GitHub Link:https://github.com/mzwaMoj/IBM_python_project_for_data_science

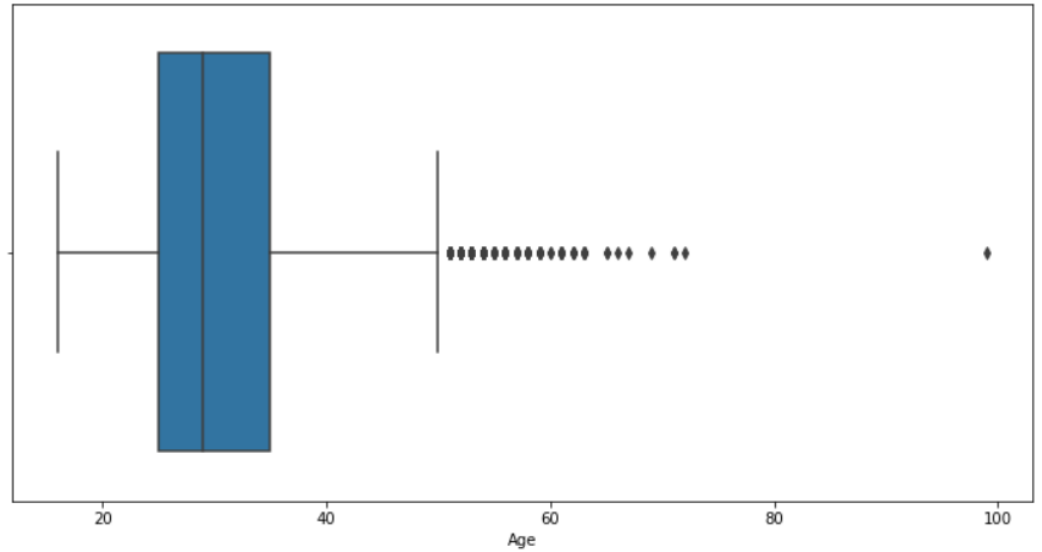
```
plt.figure(figsize=(12,6))
sns.histplot(data = df, x = 'ConvertedComp', bins=50)
```

```
<AxesSubplot:xlabel='ConvertedComp', ylabel='Count'>
```




```
plt.figure(figsize=(12,6))
sns.boxplot(data = df, x = 'Age')
```

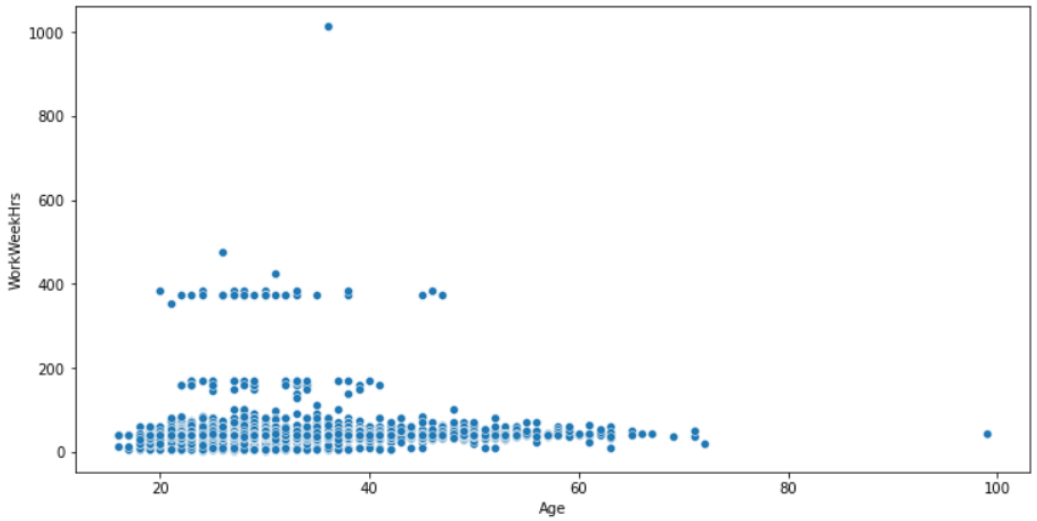
```
<AxesSubplot:xlabel='Age'>
```



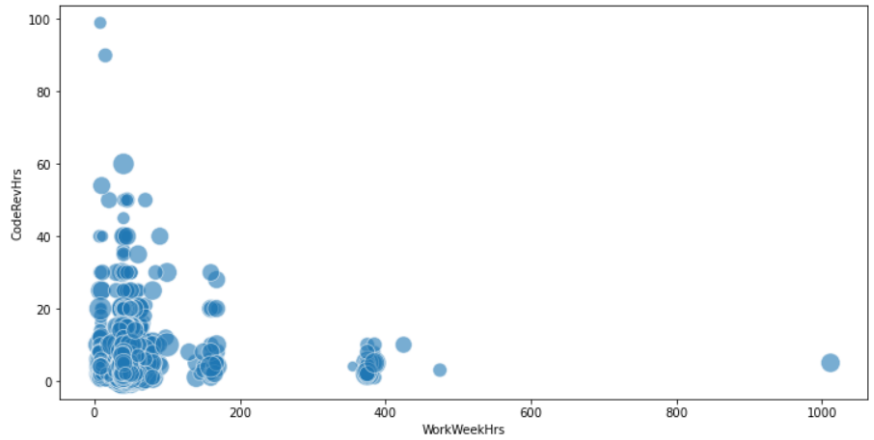
APPENDIX cont1

```
plt.figure(figsize=(12,6))
sns.scatterplot(data=df, x ='Age', y = 'WorkWeekHrs')
```

```
<AxesSubplot:xlabel='Age', ylabel='WorkWeekHrs'>
```

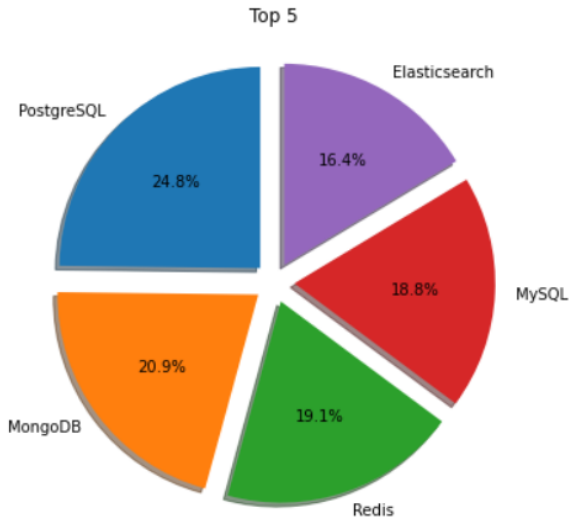



```
plt.figure(figsize=(12,6))
sns.scatterplot(data = df, x= 'WorkWeekHrs', y = 'CodeRevHrs', size = 'Age', alpha = 0.6, legend = False, sizes = (20,1000))
plt.show()
```



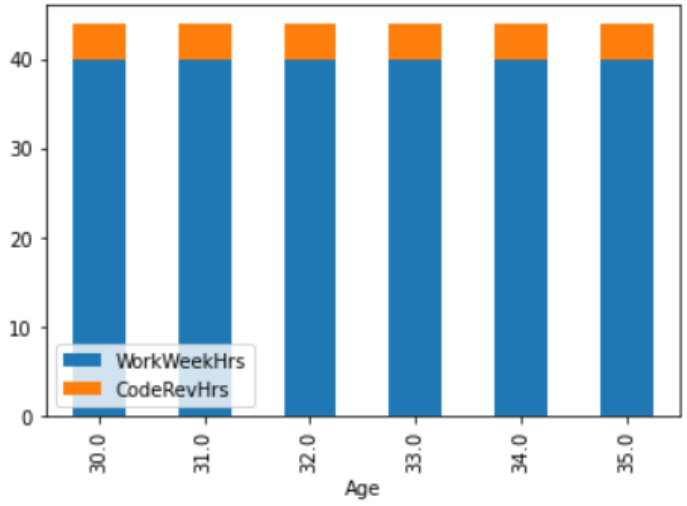
APPENDIX cont2

```
plt.figure(figsize=(12,6))
df.set_index('DatabaseDesireNextYear', inplace=True)
lab = df.index
explode_list = [0.1, 0.1, 0.1, 0.1, 0.1]
sizes = df.iloc[:,0]
plt.pie(sizes, labels = lab , startangle=90,shadow=True,autopct='%1.1f%%', explode=explode_list)
plt.title('Top 5')
plt.show()
```




```
plt.figure(figsize=(12,6))
df.plot(kind = 'bar', stacked = True )
```

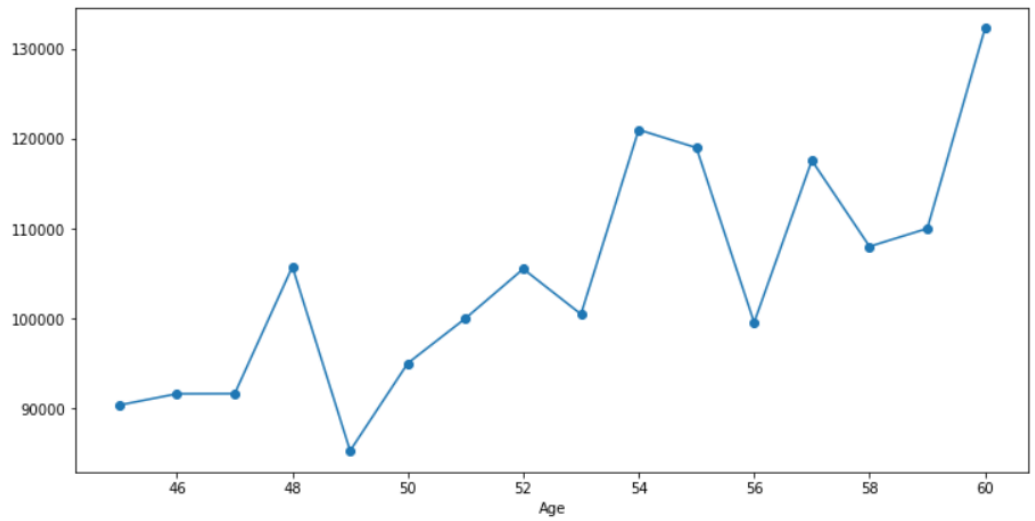
```
<AxesSubplot:xlabel='Age'>
<Figure size 864x432 with 0 Axes>
```



APPENDIX cont3

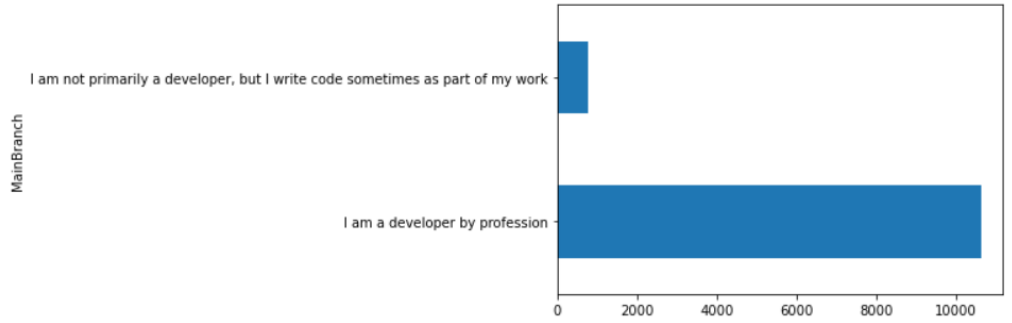
```
plt.figure(figsize=(12,6))
df.plot(linestyle = '-', marker = 'o')
```

```
<AxesSubplot:xlabel='Age'>
```

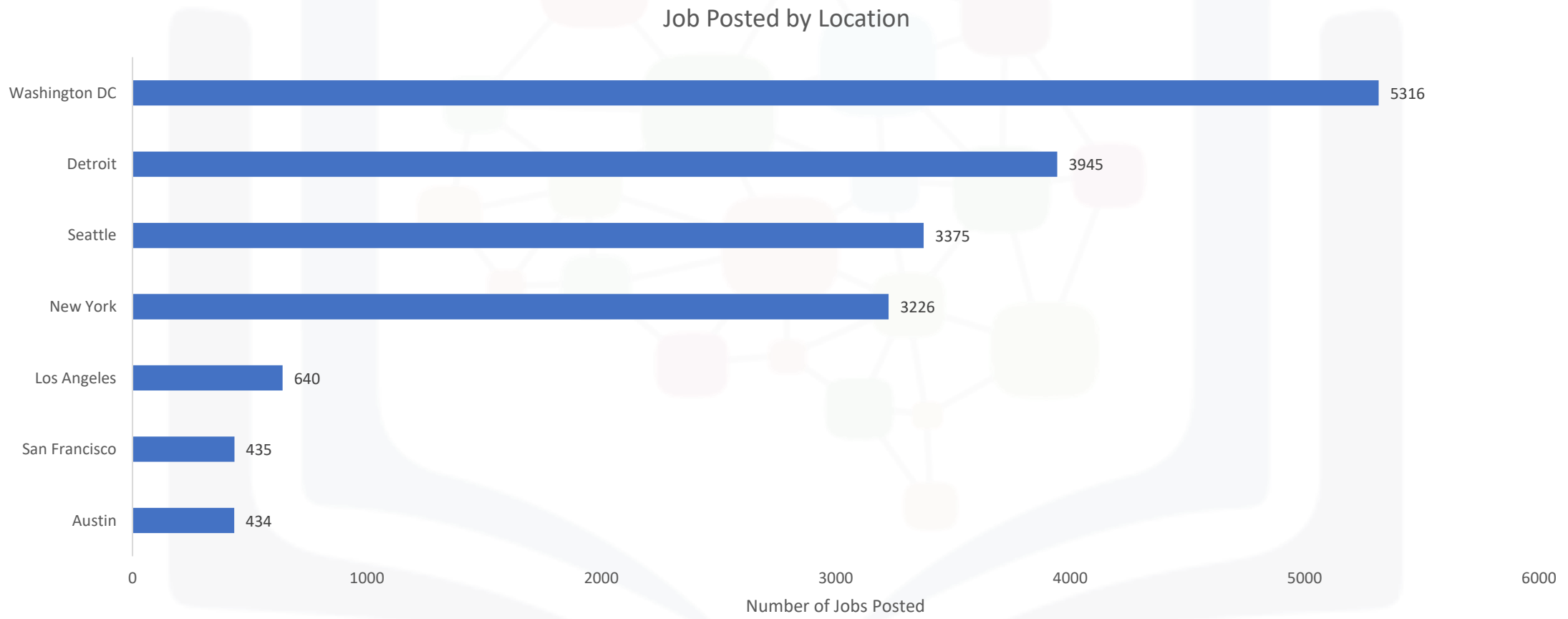



```
df.plot.barh()
```

```
<AxesSubplot:ylabel='MainBranch'>
```



JOB POSTINGS



POPULAR LANGUAGES