IBM Data Analyst Capstone Project: Analysis on Emerging Technology Skills and Trends

- Name: Hung Nguyen

- Date: 07/05/2025

OUTLINE

- Executive Summary
- Introduction
- Methodology
- Results
  - Visualization – Charts
  - Dashboard
- Discussion
  - Findings & Implications
- Conclusion
- Appendix

EXECUTIVE SUMMARY

- **Introduction**: In this project report, we aim to provide a detail analysis of the current state of technology adoption, future technology trends, and demographic insights within the programming industry. Our investigation covers a wide range of topics, including the most popular programming languages, databases use today. We also explore the emerging technologies that professionals are eager to learn. By examining these we have come with some interesting findings.
- **Current Technology usage report**

a. Top 10 Programming Languages : 1. JavaScript, 2. HTML/CSS, 3. SQL and 7 more

b. Top 10 Databases worked with : 1. MySQL, 2. Microsoft SQL Server, 3. PostgreSQL and 7 more

c. Top 10 Platforms used: 1. Linux, 2. Windows, 3. Docker and 7 more

d. Top 10 web frameworks among developers: 1. jQuery, 2. React.js 3.Angular/Angular.js and 7 more

EXECUTIVE SUMMARY

- **Future Technology trend Report**

  a. Top Programming languages desired next year: 1. HTML/CSS, 2. JavaScript, 3. C# and 7 more

  b. Top 10 Databases desire for next year: 1. PostgreSQL, 2. MongoDB, 3. Redis and 7 more

  c. Next years most desired platforms: 1. Linux, 2. Docker, 3. AWS and 7 more

- **Demographics Report:**

  a. Gender distribution on genders: 1. Men 2. Women

  b. Respondent count by country: 1. USA, 2. India, 3. UK and so on

  c. Respondent count by age: Most of them were young 28 to 38 with highest responses

INTRODUCTION

Current Technology usage report (Intro)

- This report gives a detailed analysis of current technology usage among developers, including the most popular programming languages, databases, platforms, and web frameworks.
- I have analyzed data based on a wide range of respondents to identify the top technologies that are shaping the industry of programming today.

Future Technology trend Report

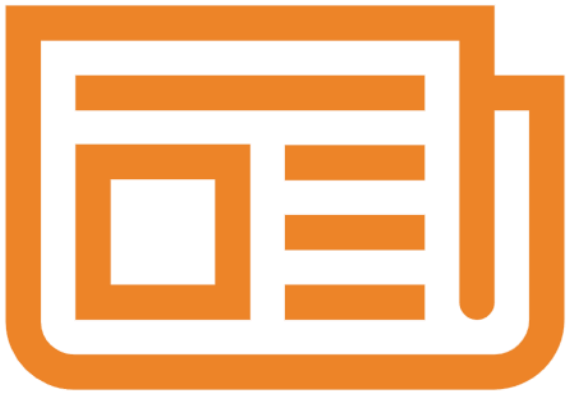
- This report covers the future technology trends which developers expect to see and the programming languages, databases, and platforms they want to use in the coming year.
- Based on the analysis of the survey, I have provided the top technologies for which developers would want to learn and add to their work process, hence giving an outline of what is to come for the tech industry.

INTRODUCTION

Demographics Report:

- The following report details complete demographic analysis within the tech industry on gender distribution, country-wise respondent count, and age distribution of survey respondents.
- It is through the examination of these demographics that we get key insights into the diversity and characteristics of the individuals contributing to technological advancement in our world

METHODOLOGY



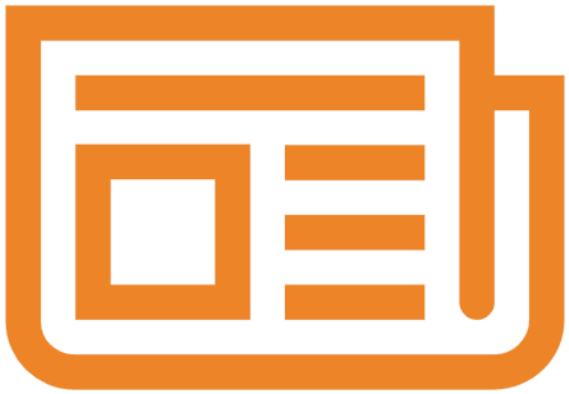
Current Technology Usage Report:

- Analysis Method: Cluster analysis was used to identify clusters or segments of developers, according to their current technology usage.
- Data Analyzed: For the analysis, data related to the top 10 most used Point2 programming languages, top 10 databases worked with, top 10 platforms used, and top 10 web frameworks have been considered.

Future Technology Trend Report:

- Analysis Method: Cluster analysis was not utilized. Instead, regression analysis was employed to understand the relationship between different variables and future technology trends.
- Data Analyzed: The analysis focused on predicting future technology trends by examining the top programming languages desired next year, top 10 databases desired for next year, and next year's most desired platforms

METHODOLOGY



Demographics Report:

- **Analysis Method:** Regression analysis was employed to explore the relationship between demographic variables (such as gender, country, and age) and the technology preferences or behaviours of respondents.
- **Data Analyzed:** The analysis focused on examining gender distribution among respondents, respondent count by country, and respondent count by age to understand the demographic makeup of the surveyed population.

RESULTS

Current Technology Usage Report:

- In this section, we dive into the analysis of the latest technology used by developers.
- The dataset used in the extraction of informationis“ m5_survey_data_technologies_normalised.csv." This data has been arranged for the most important technologies that developers are working with in terms of programming languages, databases, platforms, and web frameworks. Each dataset segment was prepared very carefully to ensure correct and meaningful visual representations.
- The analysis used cluster analysis techniques to understand the patterns and groupings of the data. This helped us discover which technologies are most used and their diffusion among the developers.
- Taken together, the visualizations give a broad-brush overview of the current technology landscape in the developer community. By detecting the most used programming languages, databases, platforms, and web frameworks, we shall better understand which skills and preferences are to be found among developers.

RESULTS

Future Technology Trend Report:

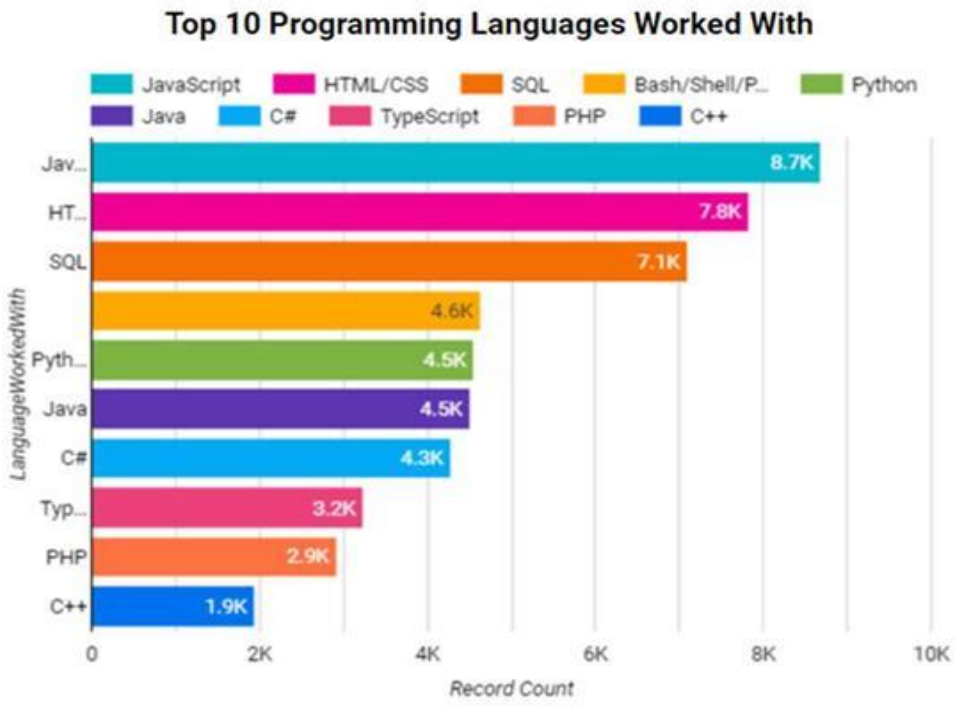
- This section analyzes the technologies that developers aim to use in the coming year, according to the results of the 2019 Stack Overflow Developer Survey.
- The data from "m5_survey_data_technologies_normalised.csv" was analyzed to get the top desired technologies

for the future.

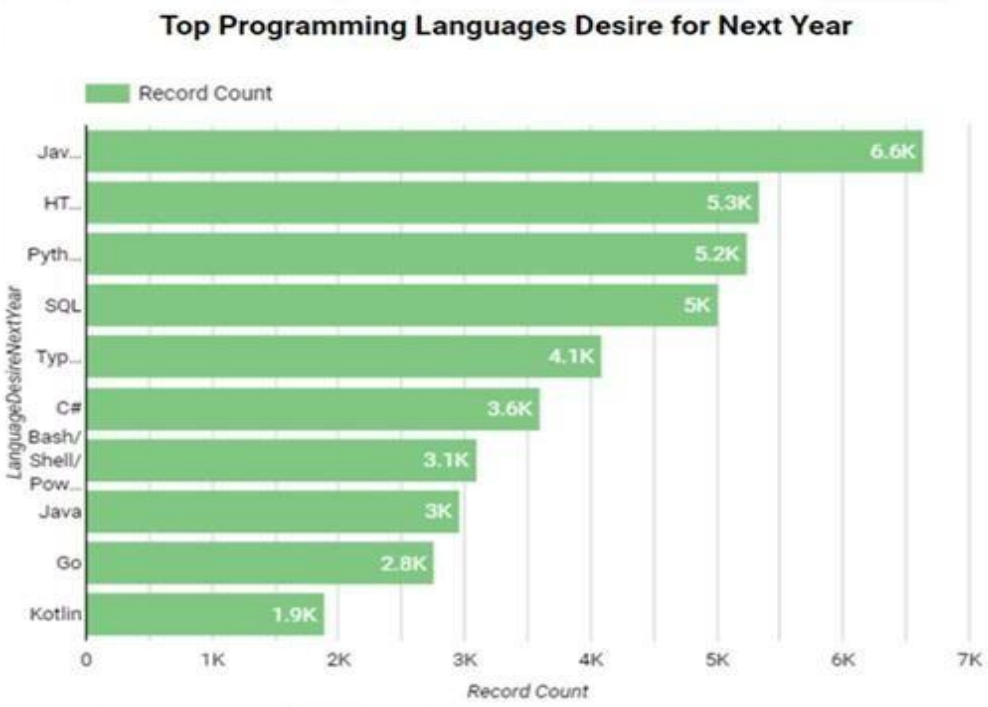
- The dataset was organized to capture the developers' desired technologies for next year use in areas like programming languages, databases, platforms, and web frameworks. The data were prepared meticulously for its accurate visual representation and meaningful analysis.
- Cluster analysis has helped to identify the patterns and trends in the data, while visualizations have been created to show clear, insights-giving representations of the future technology preferences of developers.

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

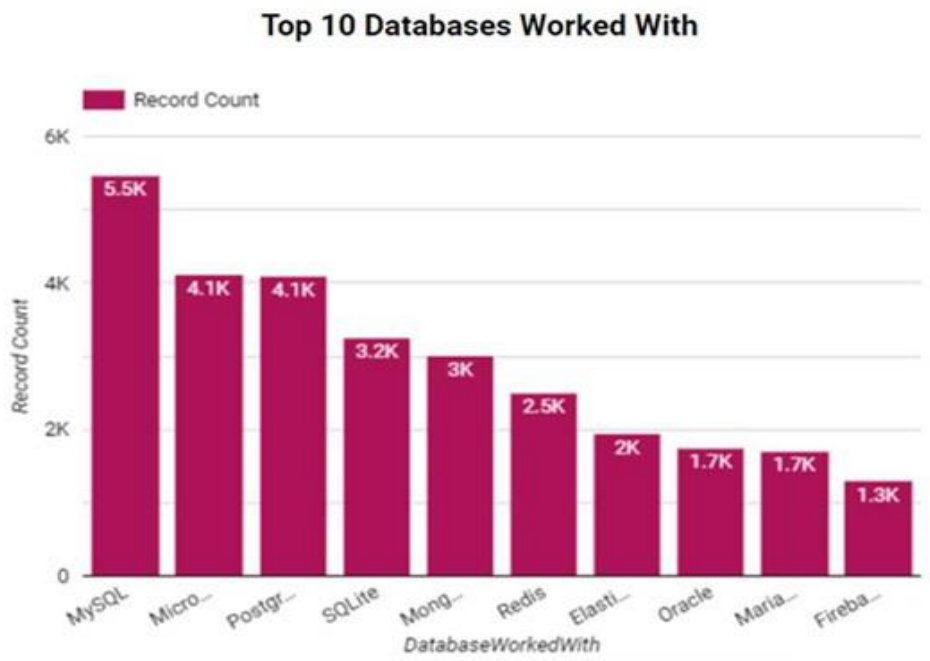
- JavaScript is the most in-demand and desired language. Across both graphs, JavaScript holds the top spot.
- Web development languages are still desired. Both graphs show HTML/CSS, SQL as in-demand languages..
- SQL is the third most popular programming language.
- Developer preferences are shifting. Java goes from third in the 1st graph to sixth in the 2nd graph.
- Conversely, Python goes from seventh in the 1 graph to third (tied) in the 2nd graph

Implications

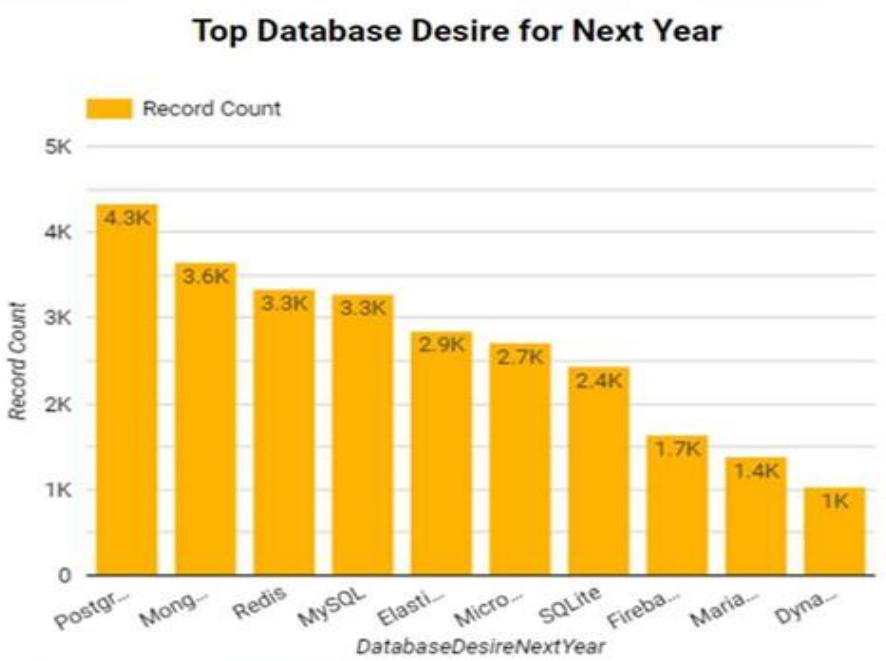
- JavaScript skills are a safe bet for software development careers. JavaScript reigns supreme in both proficiency and desire in-use
- Full-stack developer skills are becoming increasingly important. The continued high demand for HTML/CSS, SQL alongside JavaScript suggests a growing need for developers who can handle both front-end and back-end development.
- The rise of Python reflects a growing data science field. Python's movement up the list suggests an increase in demand for data science skills. As data continues to be a driving force in many industries, this trend is likely to continue.

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- There is a shift in preference from traditional relational databases (MySQL, PostgreSQL) to NoSQL databases (Firebase, MongoDB, Redis).
- While MySQL is currently the most used database, it is not the most desired for next year.
- Firebase, which is not currently being used much, is the most desired database for next year.
- There is a decrease in desire to use currently popular databases like PostgreSQL, MySQL, and SQLite next year.

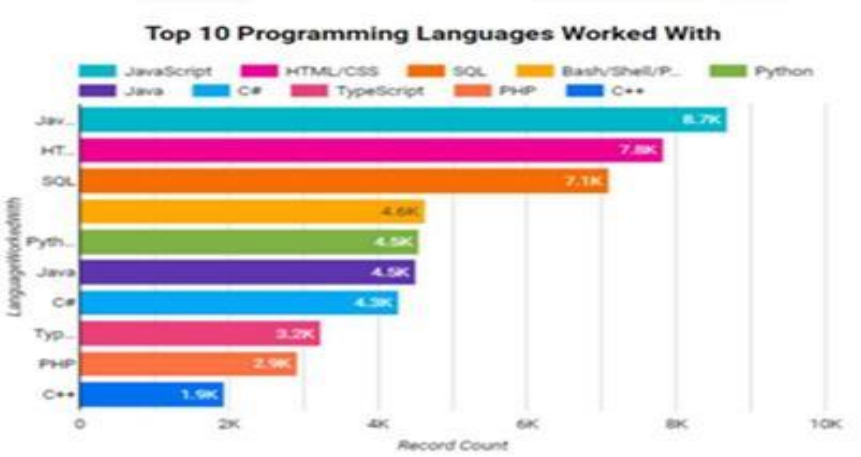
Implications

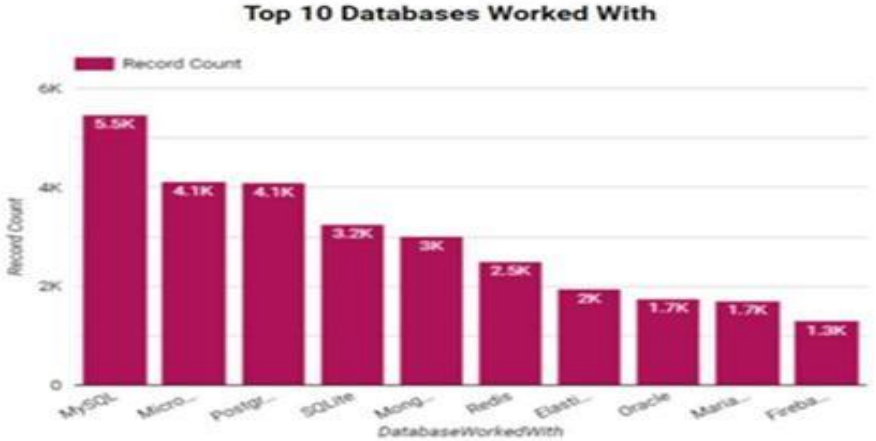
- This trend suggests a need for greater scalability and flexibility in data storage
- NoSQL databases may be better suited for handling the increasing complexity of data.
- Organizations may need to invest in training and resources to adopt NoSQL technologies.
- The decision of which type of database to use will depend on the specific needs of the project.

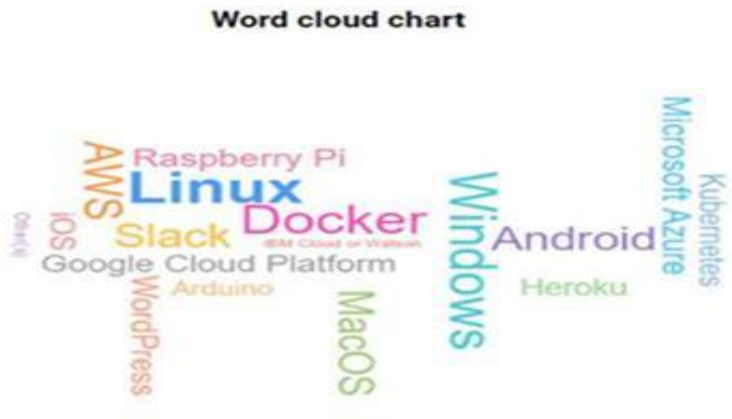
DASHBOARD

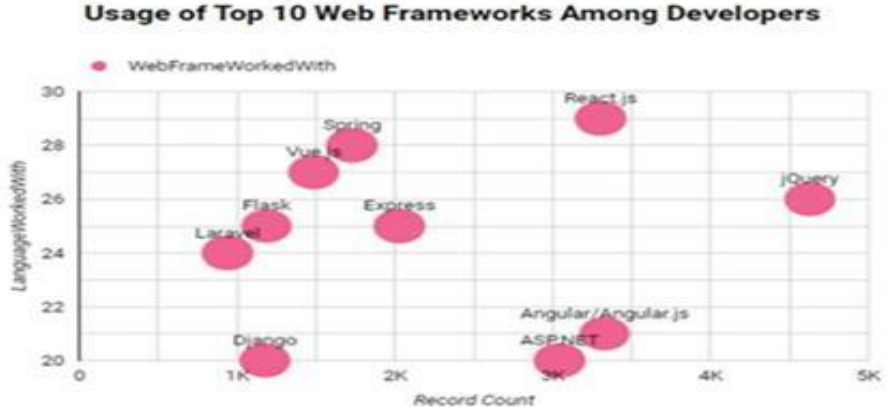
<The GitHub link of the Cognos/Looker Studio dashboard goes here.>

DASHBOARD TAB 1

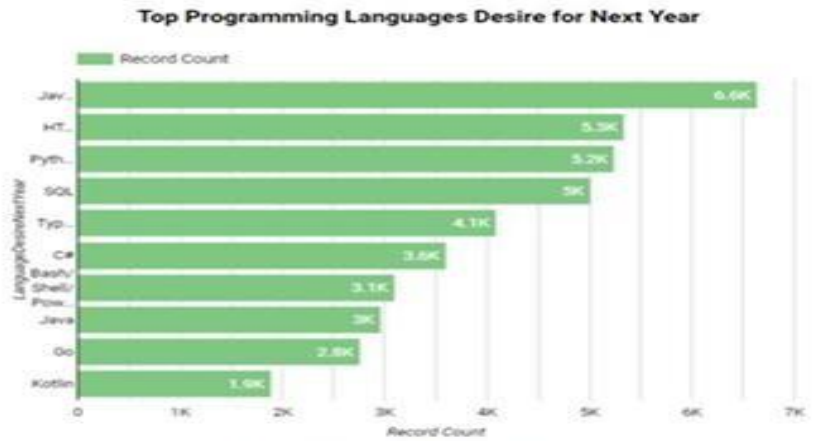


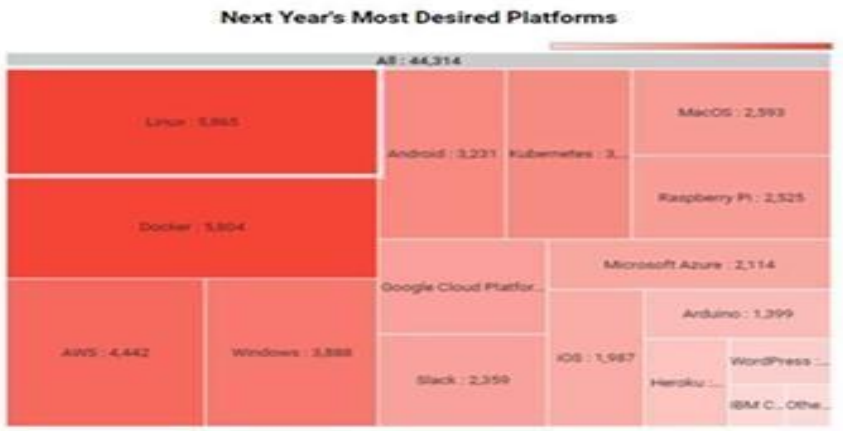


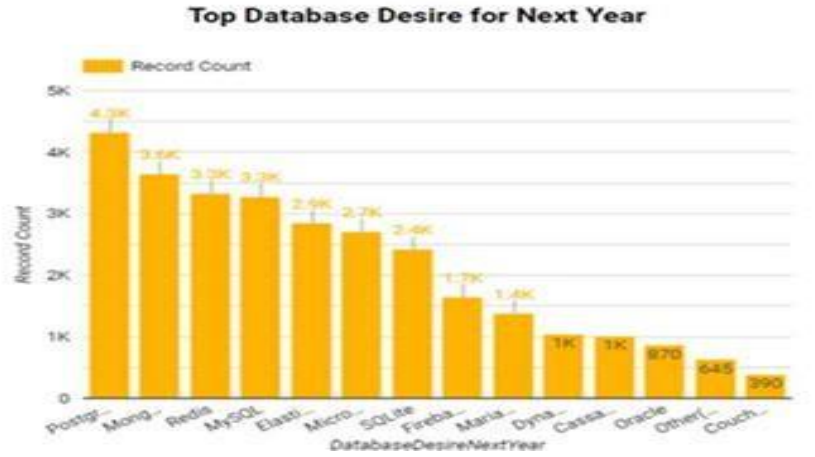


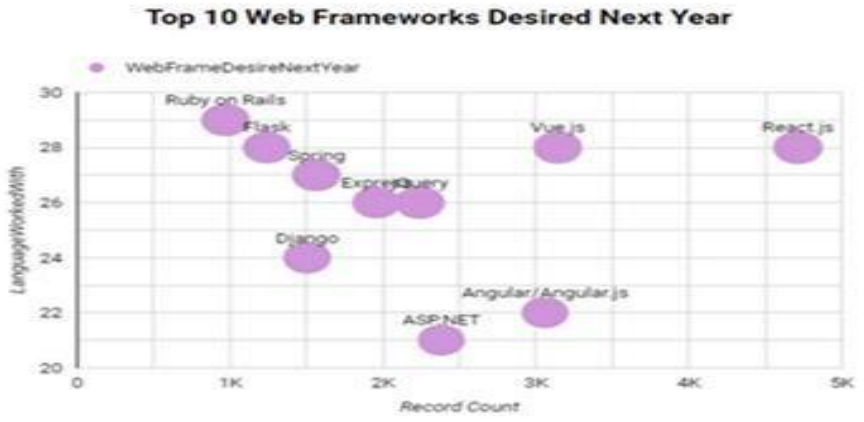


DASHBOARD TAB 2

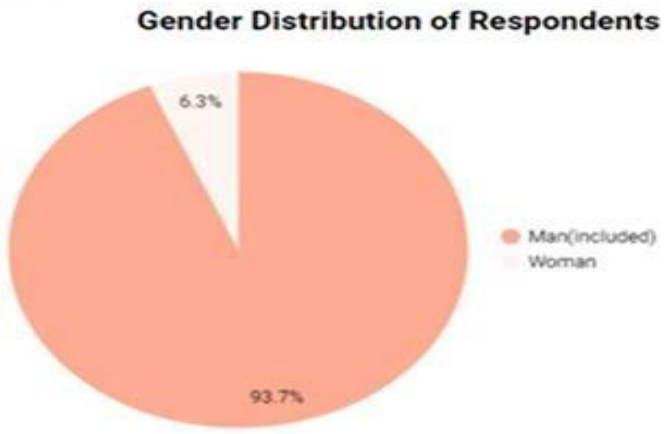


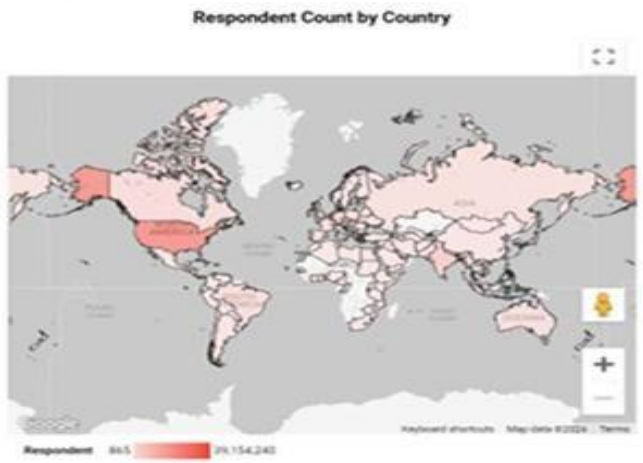


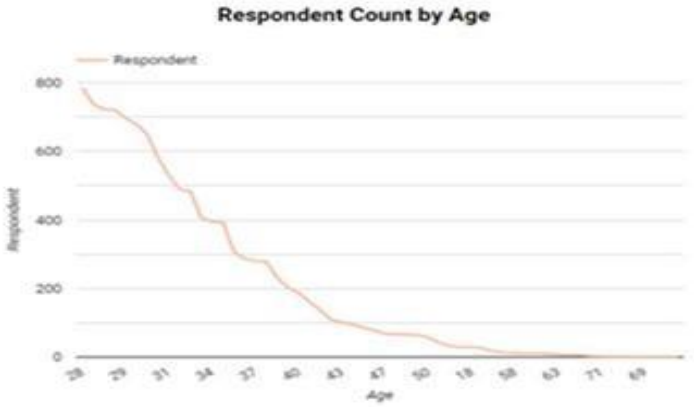


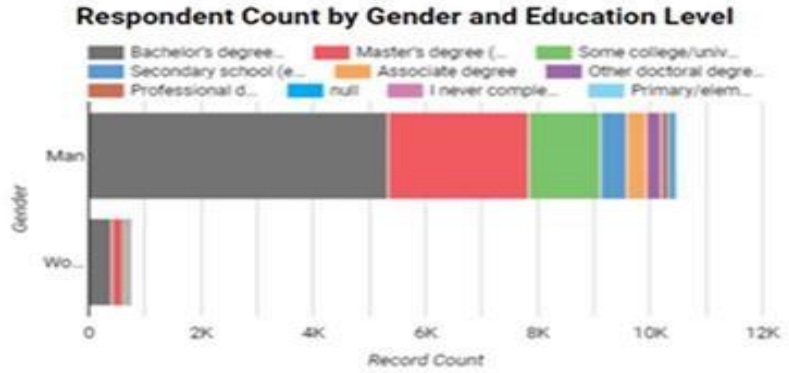


DASHBOARD TAB 3









DISCUSSION

- Upskilling in the Technology sector.
- How do we close the wide gender gap in the Technology sector?
- Is completing a masters or doctorate degree really a requirement?
- The increasing demand for mobile development as Kotlin is getting popular.
- More tech education, access and development in less developed regions in South east Asia, South America, Africa and some parts of Europe.
- How relevant will Oracle SQL still be in the future?

OVERALL FINDINGS & IMPLICATIONS

Findings

- JavaScript reigns supreme in both charts: the most demanded and desired language for software development.
- Web Development Strong: HTML/CSS and SQL continue to be extremely important for web development consistently ranking in the top few for both current use and desired languages.
- Shifting Preferences: Developer preference is shifting. Traditional languages such as Java and C are still widely used, yet their share is declining. The rise of Python shows interest in the area of data science.

Implications

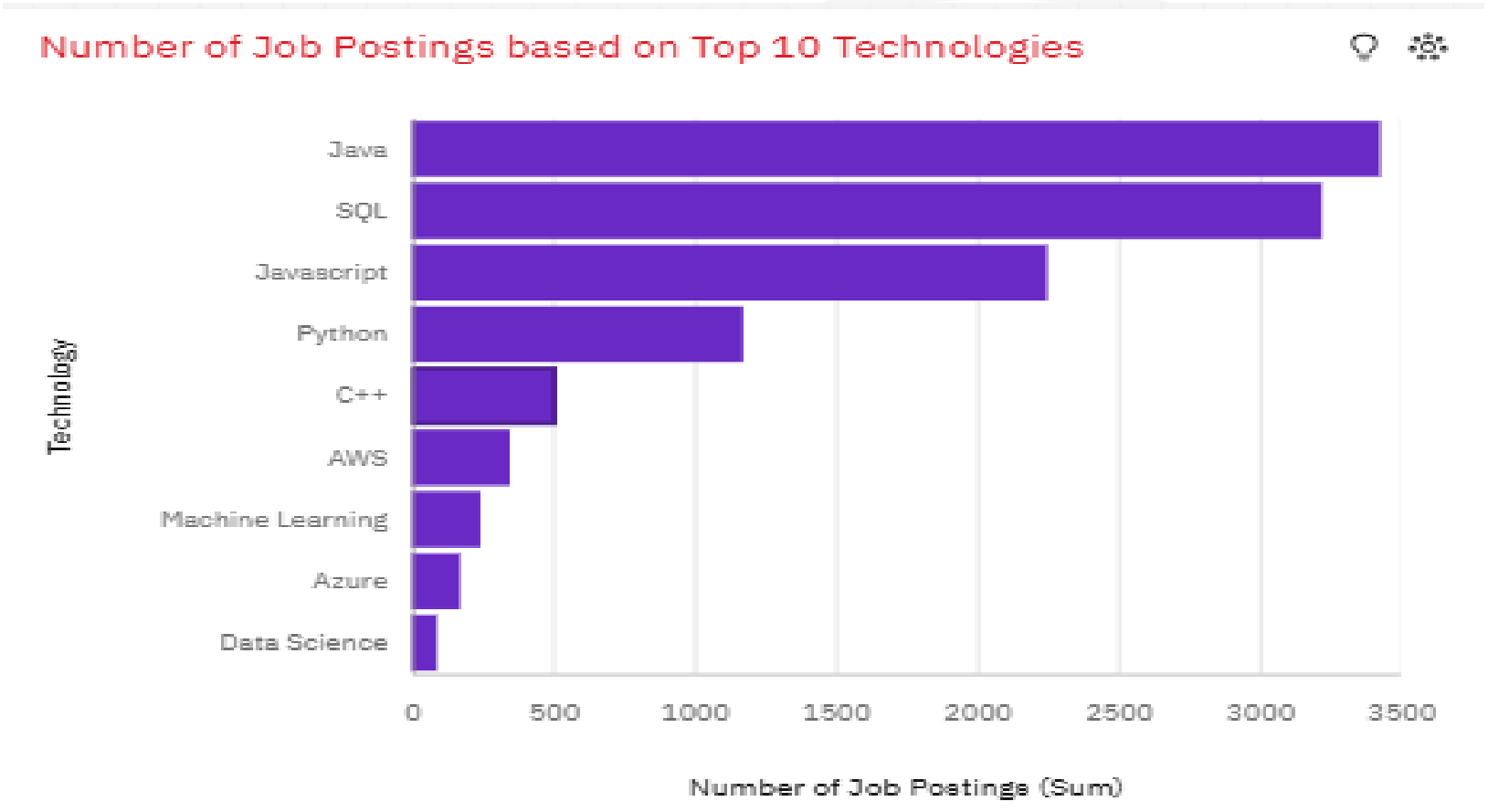
- Invest in JavaScript skills: Being proficient in JavaScript could be an asset, considering it is the most used and most desired language in the industry right now.
- Focus on Full-Stack Development: The high demand for HTML/CSS, SQL coupled with JavaScript reflects the increased need for developers capable of full-stack development.
- Demand for Data Science Skills: With the growing popularity of Python, more and more people need data science skills that are valuable in today's data-driven world.

CONCLUSION

- Developer preferences keep changing. While JavaScript stands atop the table, the uprising of Python and the movements of traditionally prominent languages like Java and C indicate the need to keep flexible and learn new technologies constantly.
- There's a growing demand for developers to bridge front-end and back-end development, coupled with data analysis.
- Popularity with Python reflects the ever-increasing importance of data science. Nowadays, more data is collected and used by businesses than ever, creating a strong demand for developers who can build applications and draw insights from the data.

APPENDIX

JOB POSTINGS



POPULAR LANGUAGES