Technology Trends: Present and Future

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SKILLS NETWORK

OUTLINE

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EXECUTIVE SUMMARY

- In order to remain competitive and continue to maintain and attract new talent, we conducted a detailed analysis to determine the most popular current and upcoming technology trends.
- Data was collected from a variety of sources including job postings, blog posts and surveys across multiple demographics.
- We present our findings through a collection of visual graphics and an interactive dashboard for real-time analysis.

INTRODUCTION

- **Goals:**
  - to identify current and future technology trends
  - to better understand employee skill and salary requirements
- **Purpose:**
  - to remain a leader in employee retention, training and new hire recruitment
  - to maintain our competitive edge in the technology industry
- **We seek to answer questions such as:**
  - “What are the most popular technologies used today?”
  - “Which technologies are poised to become the most sought after in the near future?”
  - "How do salary, age, gender, experience level, and location influence our findings?”

METHODOLOGY

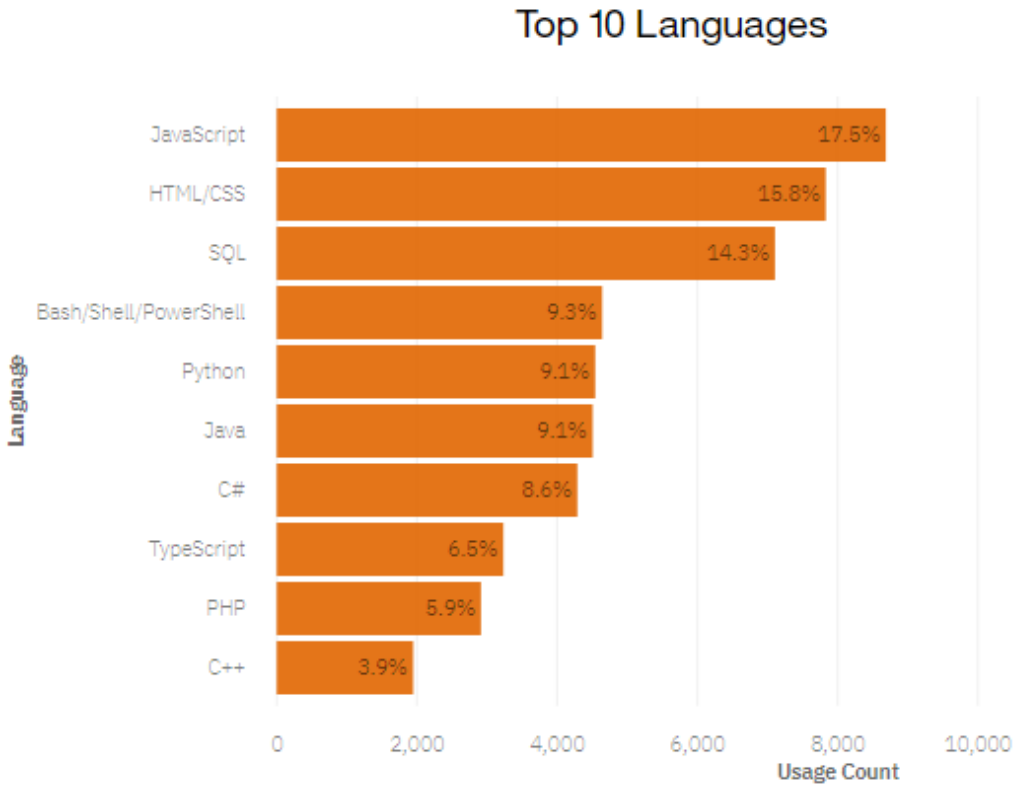
- Step 1 : Data Collection
  - Sources include: job postings, blog posts, surveys
  - Technologies used include: HTTP Get Requests using the Python ‘Requests’ package; Beautiful Soup for web scraping; sqllite to access the open source data from Stack Overflow.
- Step 2 : Data Wrangling
  - To prepare the data for analysis
  - To identify outliers and correlations between features in the dataset
  - Proper handling of missing and duplicate values, data validation and normalization
- Step 3 : Statistical/Exploratory Analysis
  - To identify insights and trends in technology while accounting for factors such as age, gender, salary, and location

RESULTS

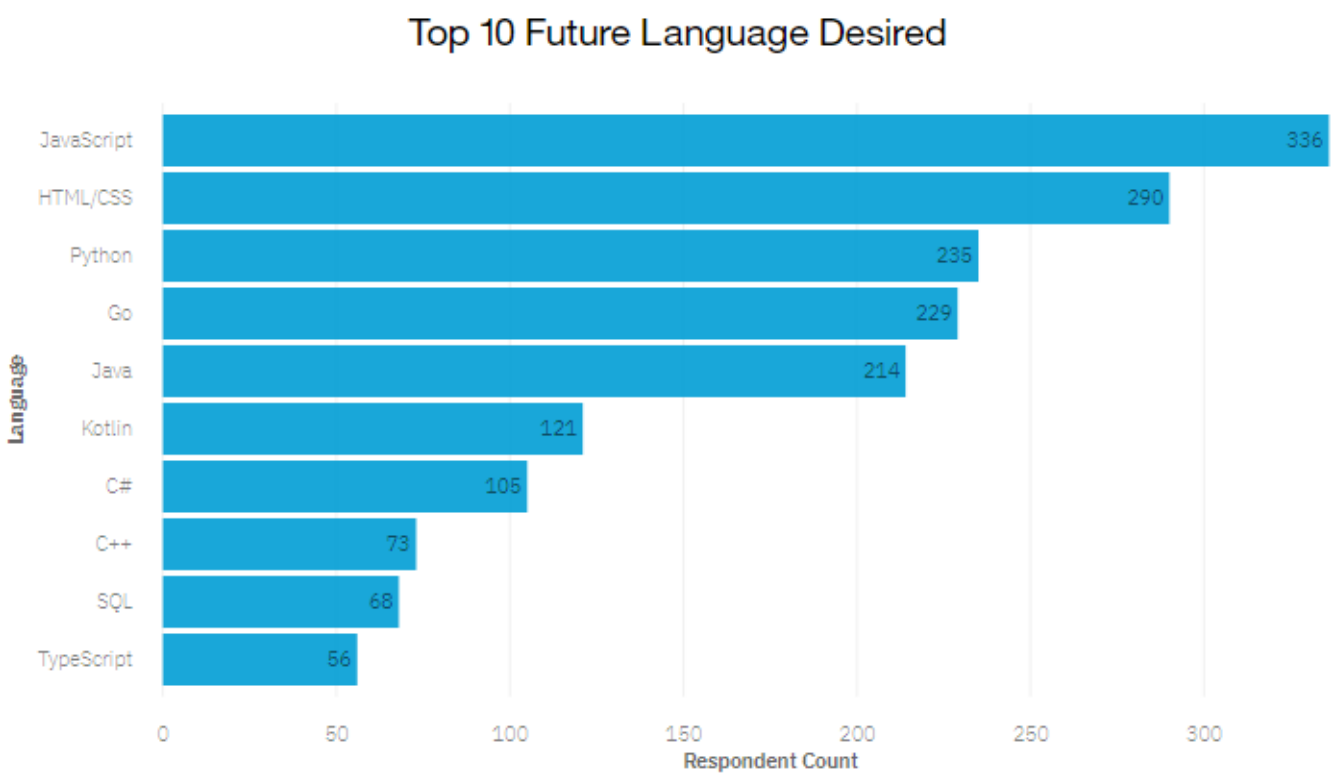
- An Interactive Dashboard was created using IBM Cognos for real-time analysis and exploration
- Screen shots of this dashboard, as well as additional visualizations such as charts, plots and graphs are included to highlight some of our key findings.
- A link to the live Cognos Dashboard is also provided for further end-user data exploration and analysis.

PROGRAMMING LANGUAGE TRENDS

Current Year



Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

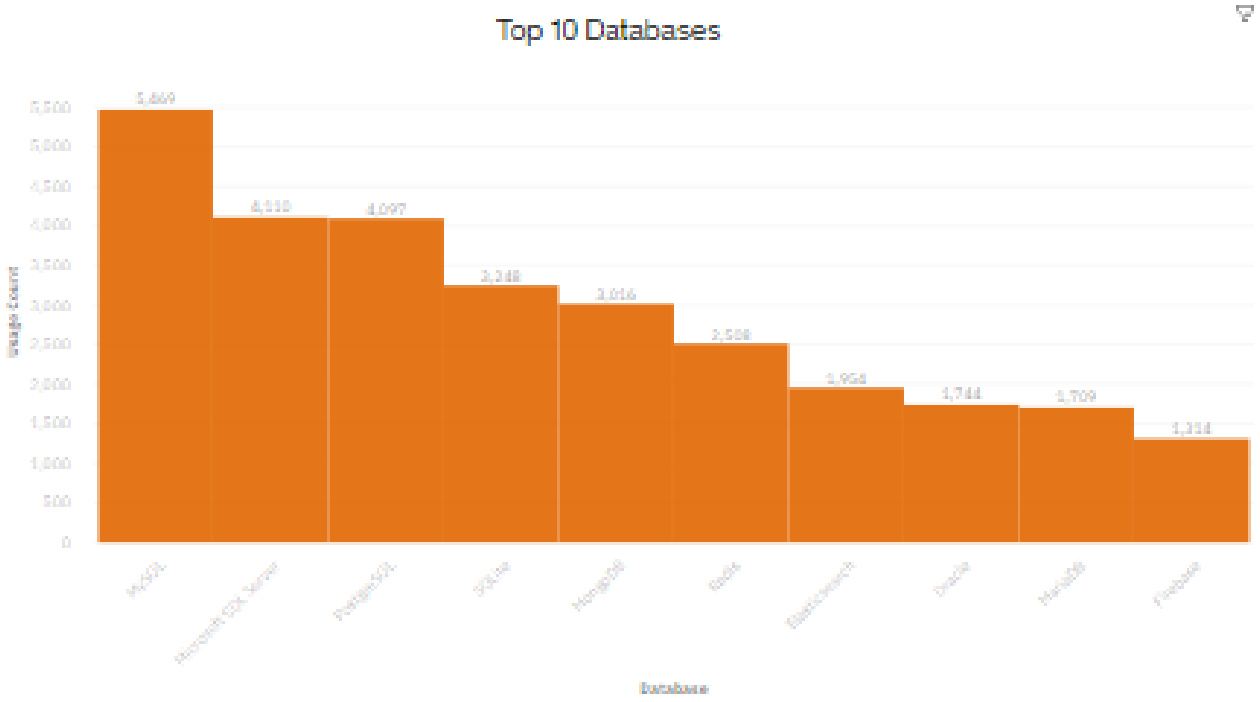
- JavaScript and HTML/CSS rank as the top 2 languages on both lists
  - 35% of respondents are currently using at least one of these languages
  - an additional 40% express interest in learning either JavaScript or HTML/CSS next year
- SQL ranks #3 and Python ranks #5 on the current year’s top ten list
- Go and Kotlin replace Shell programming and PHP on the top 10 lists, respectively
- Java maintains its prominence as popular language choice, securing the 6th and 5th spots

Implications

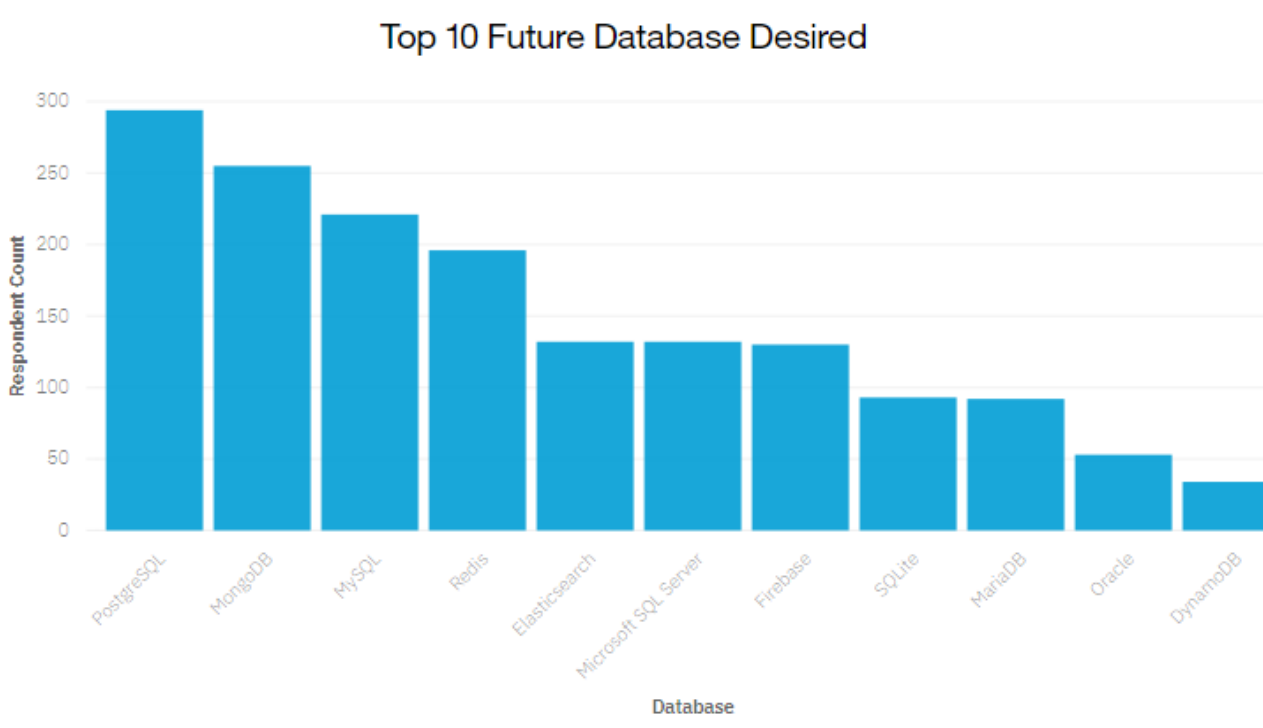
- JavaScript and HTML/CSS are poised to sustain their widespread popularity.
- Python's popularity is expected to persist, with 10% of respondents expressing intent to learn it in the upcoming year.
- Despite its stronghold in development, SQL's appeal to new learners lags behind, as evolving data storage and retrieval preferences emerge.
- A shift towards newer languages is evident, reflecting traits like cross-platform adaptability, synergy with existing languages, streamlined syntax, enhanced error handling, and more efficient coding methodologies.

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

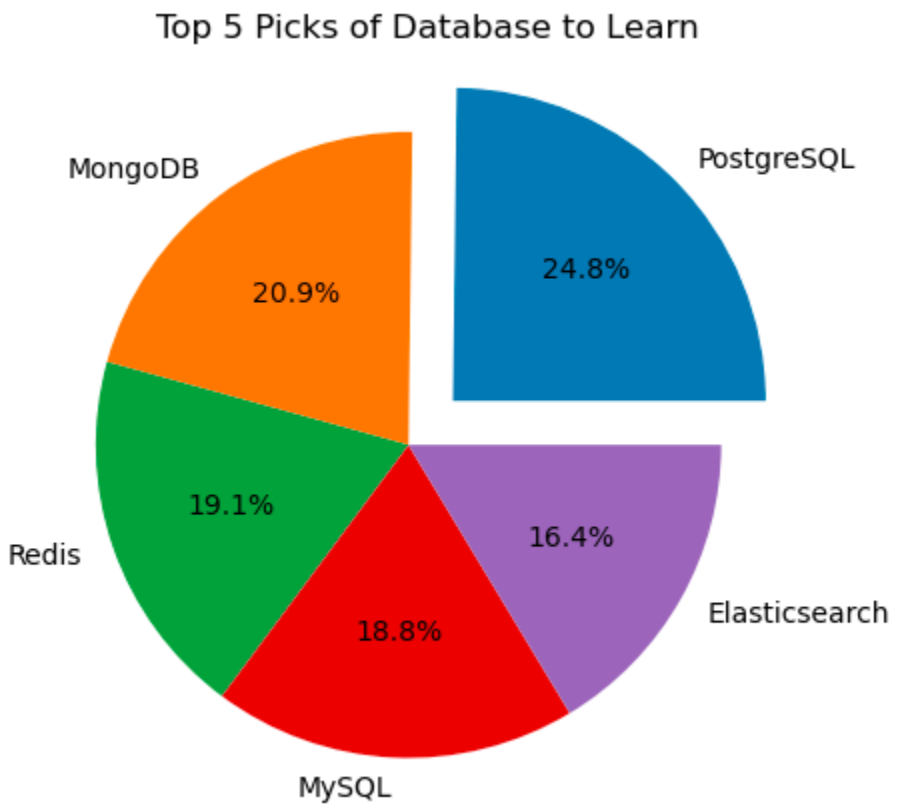
Findings

- MySQL and PostgreSQL stayed in the top 3 on both lists
- MySQL Server dropped from #3 to #6 in the lists
- MongoDB rises from 5th to 2nd in the list ranking
- A new entry to the list, DynamicDB, as well as Redis, ElasticSearch and Firebas ranked high in the desired to learn category

Implications

- MYSQL and PostgreSQL remain strong languages now and in the future
- MySQL remains a dominant language of choice
- The popularity of NoSQL databases is rising.

DATABASE TRENDS



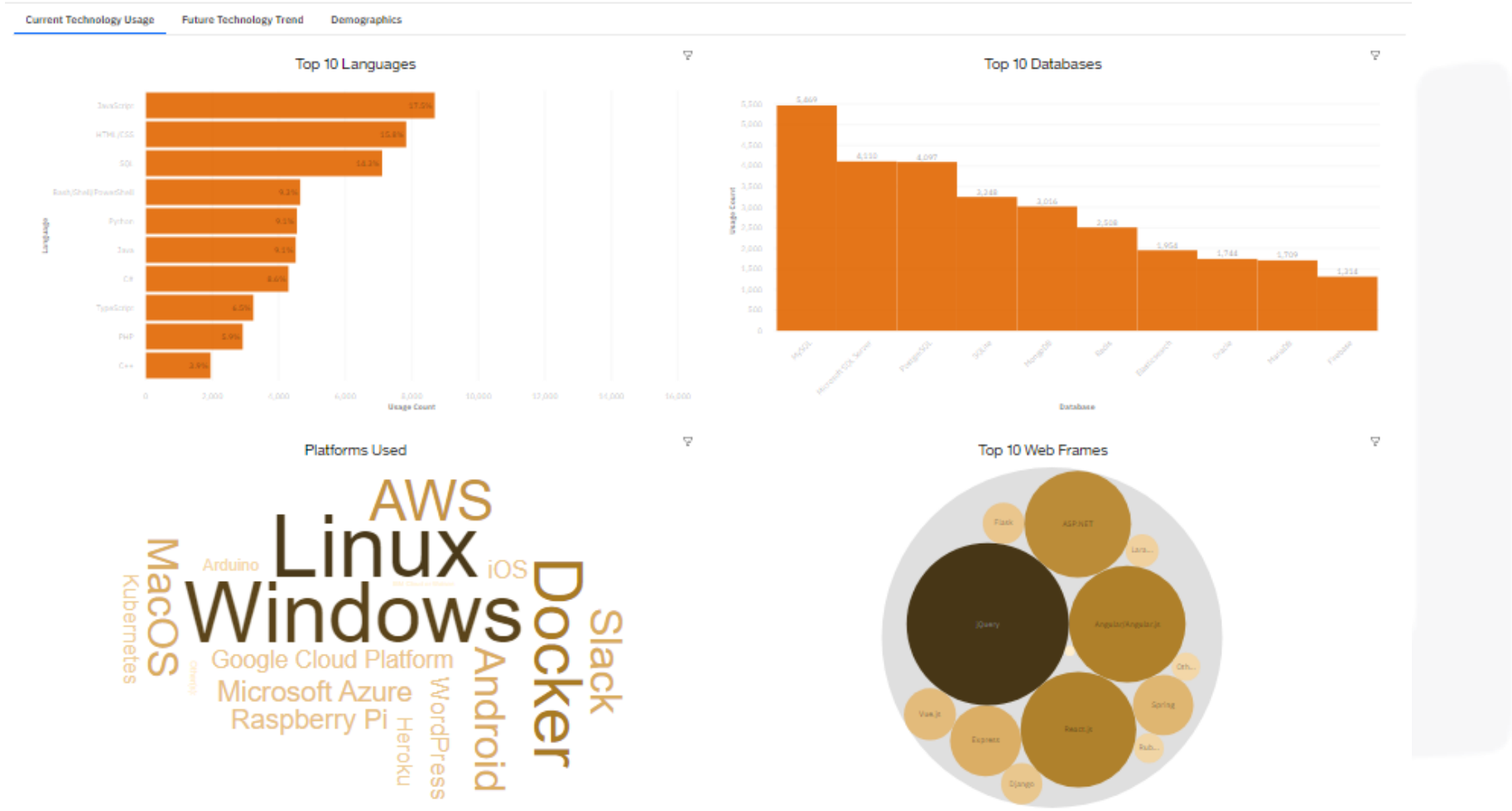
While RDMS are the backbone of many modern applications, the popularity of NoSQL databases are rising as the importance of handling diverse data types, scalability, and performance demands continues to increase.

DASHBOARD

LINK TO DASHBOARD:

https://dataplatform.cloud.ibm.com/dashboards/dee4a256-4e81-4102-8758-6fc5e62d88b7/view/7116d92804a2208949c7b5e4079c2b542866210be3bb830085d37b495b322497a93c1592c87e1d5c88455630f7ec135f9f

DASHBOARD TAB 1



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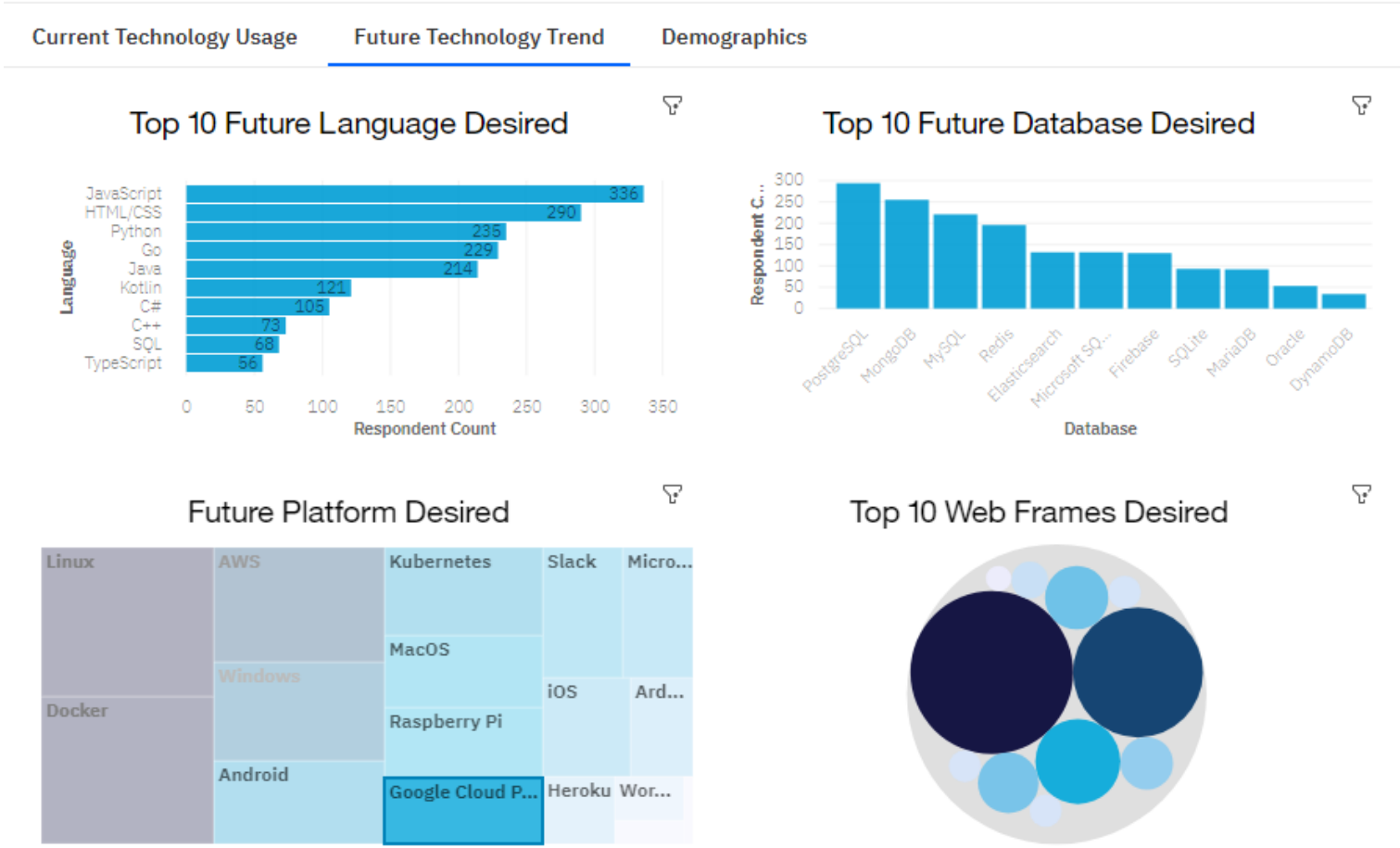

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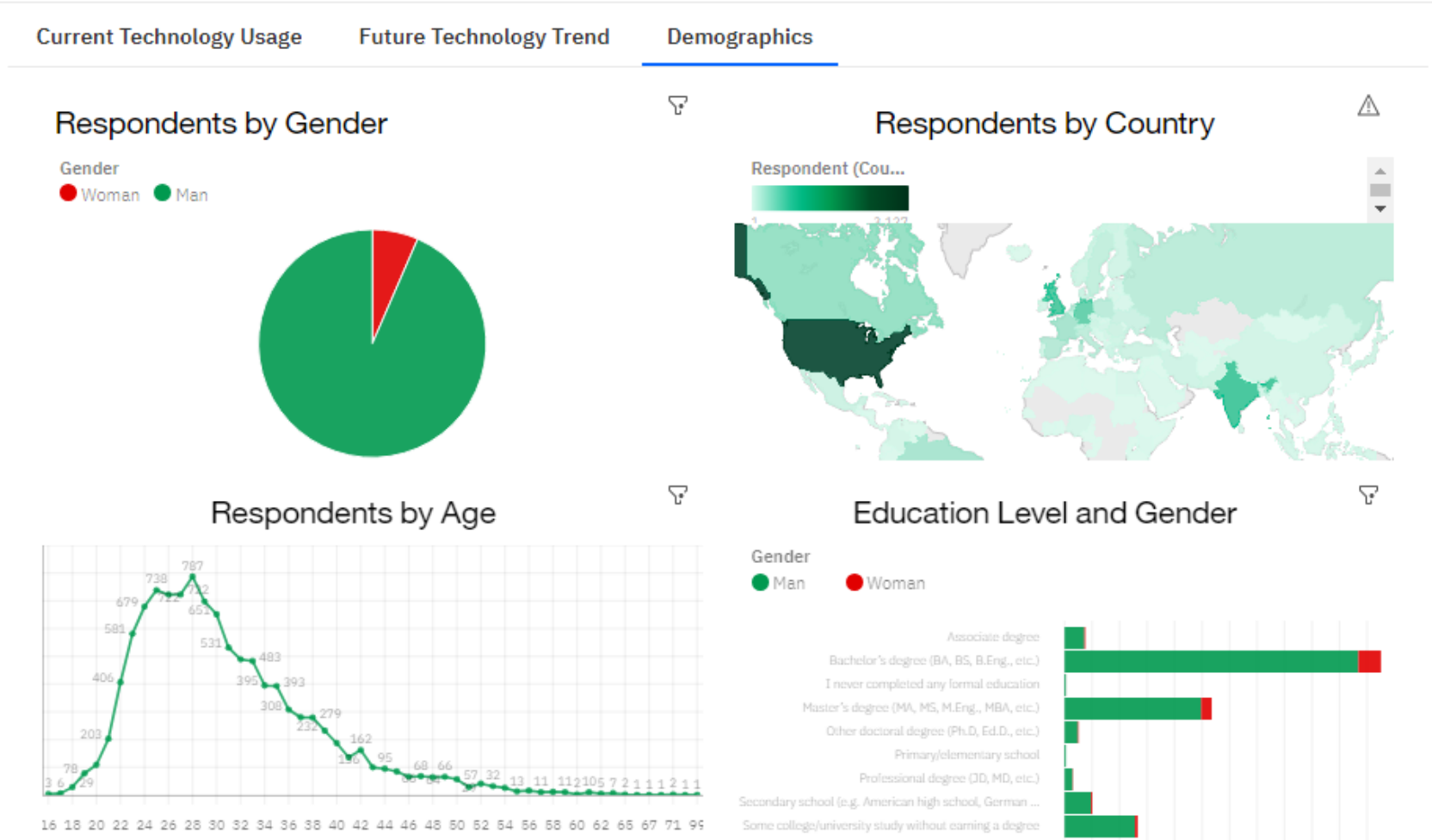


DISCUSSION - Next Steps

- While the survey respondents are represented by 135 unique countries, the majority are in the US.
- In addition, the majority of respondents are males in their mid 20s to early-30s.
- Further analysis is needed to determine if this is an adequate representation of the global technology population.

OVERALL FINDINGS & IMPLICATIONS

Findings

- The demand for established programming languages like JavaScript and Java, as well as proficiency in traditional RDMS data storage systems continues to increase although at a slower pace.

Implications

- In order to remain competitive and continue to maintain and attract new talent, a balance between hiring and training employees on traditional languages and tools and establishing expertise in emerging languages and tools is necessary.

CONCLUSION

- **We set out to answer the following questions:**
  - “What are the most popular technologies used today?”
  - “Which technologies are poised to become the most sought after in the near future?”
  - "How do salary, age, gender, experience level, and location influence our findings?”
- **To summarize our findings:**
  - Many of the popular languages today will remain a dominant force into the future, including:
    - JavaScript, HTML/CSS, Java and Python.
  - A noticeable transition from conventional relational data management to adaptable NoSQL storage solution has been observed
  - Concerns regarding the diversity in the survey respondents warrant further investigation.

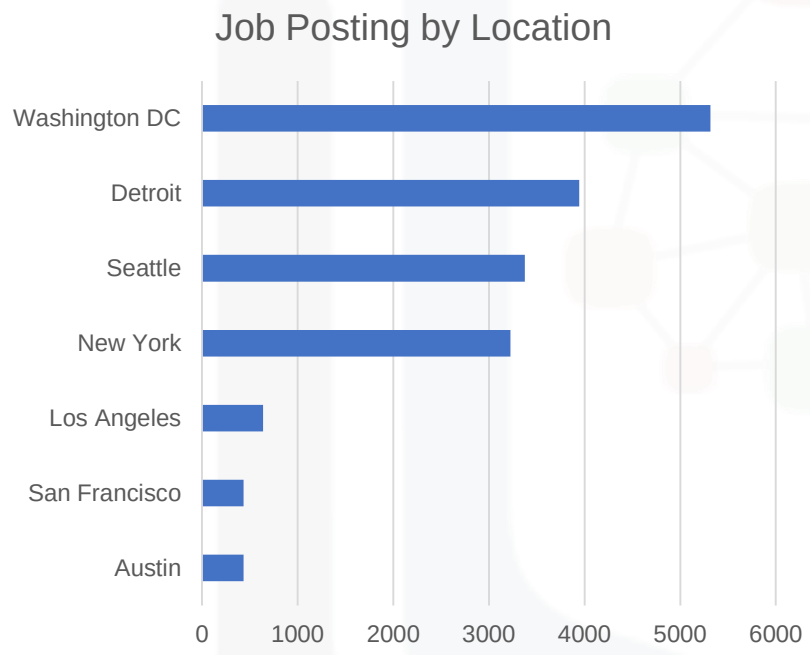
APPENDIX A – Survey Data

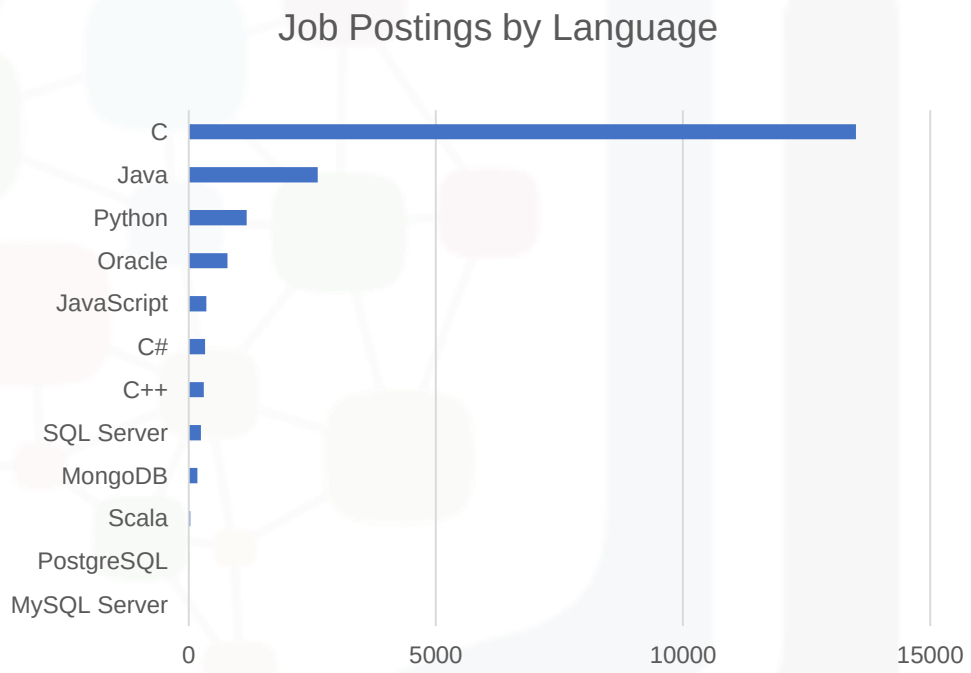
- Survey Data obtained from Stack Overflow, a popular website for developers.
- Conducted an online survey of software professionals across the world.
- The survey data was later open sourced by Stack Overflow.
- The actual data set has around 90,000 responses.
- Mean age of respondents:31
- 135 Unique countries represented
- See notes section for data fields

APPENDIX B – Outliers Removed

- Results of our initial exploratory data analysis, showed almost 10% of the salary data to be inaccurate (i.e. extreme outliers)
- Normalization of the salary resulted in extreme outliers of salaries in the millions of dollars which is not typical of a software developer role.
  - One possible hypothesis is that respondents answered the question on how often they were paid (i.e. monthly, bi-weekly) correctly, but input their salary as an annual salary instead of per pay period. For example, a $130K annual salary multiplied by 12 months is 1.5M and $90K multiplied by 26 weeks is $250M$
- These outliers skewed the average salaries, and the distributions and correlation analysis results.
- These values were removed from consideration.
- As our analysis focused more on technology trends and less on salary, additional effort was not made to determine the reason for these outliers and subsequently a suitable replacement (e.g. mean, median, etc)

JOB POSTINGS





POPULAR LANGUAGES