CURRENT AND EMERGING TRENDS IN TECHNOLOGY, TOOLS AND SKILLS

IBM DATA ANALYST CAPSTONE PROJECT

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OUTLINE

EXECUTIVE SUMMARY

- Audience: Management of IT Companies looking to plan HW, SW and personnel requirements in the light of future trends.
- Data Analysis of Current Technology Usage and Future Direction.
- Overview of Methodology:
  - Data Collection Process
  - Data Examination, using exploratory data analysis, data wrangling and data visualization to present results.
  - Key Takeaways to be shown in Visual Representation via Dashboard.
- Presentation of Results with Supporting Graphs and Trends.
- Interpretation of Findings and Implications.
- Final Data Analysis Conclusions.

INTRODUCTION

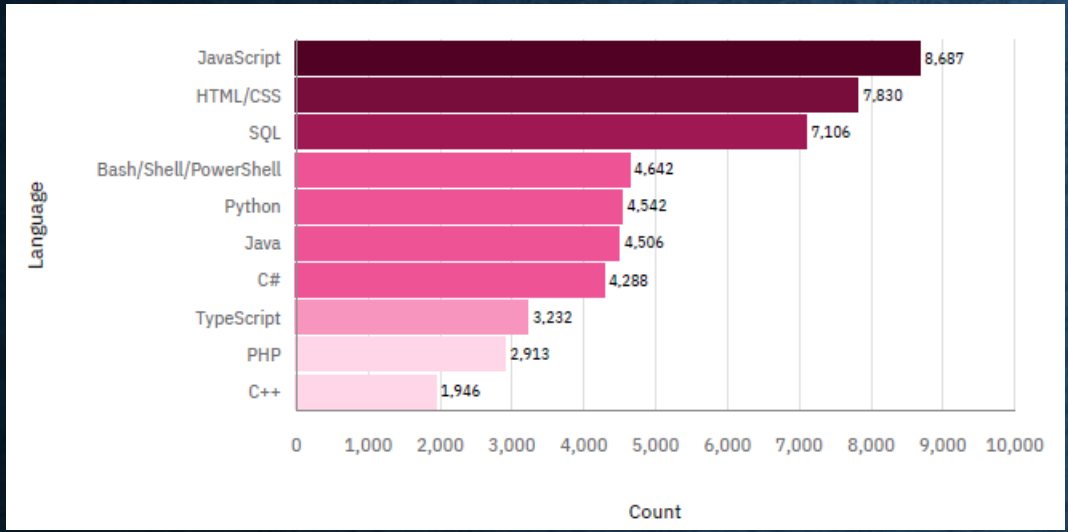
- Staying competitive in the fast-evolving global IT landscape requires keeping pace with emerging technologies. This report leverages data analytics to identify both current and future trends in demand for skills related to programming languages, databases, and other key technologies. Additionally, it provides insights into the demographics of professionals working within the technology sector, offering a comprehensive view of the industry's evolving workforce.
- Data was obtained using the ‘Stack Overflow Developer Survey’ which is the most extensive and far-reaching study of the global developer community so far produced offering a vast data pool.
- The survey also provides a detailed profile of developers across various regions, showcasing their diverse backgrounds and practices.
- Key findings included that though JavaScript is still the most popular programming language, Python is catching up. PostgreSQL is the most popular database amongst the majority of respondents who tended to be US based males in the 24-32 year age bracket.

METHODOLOGY

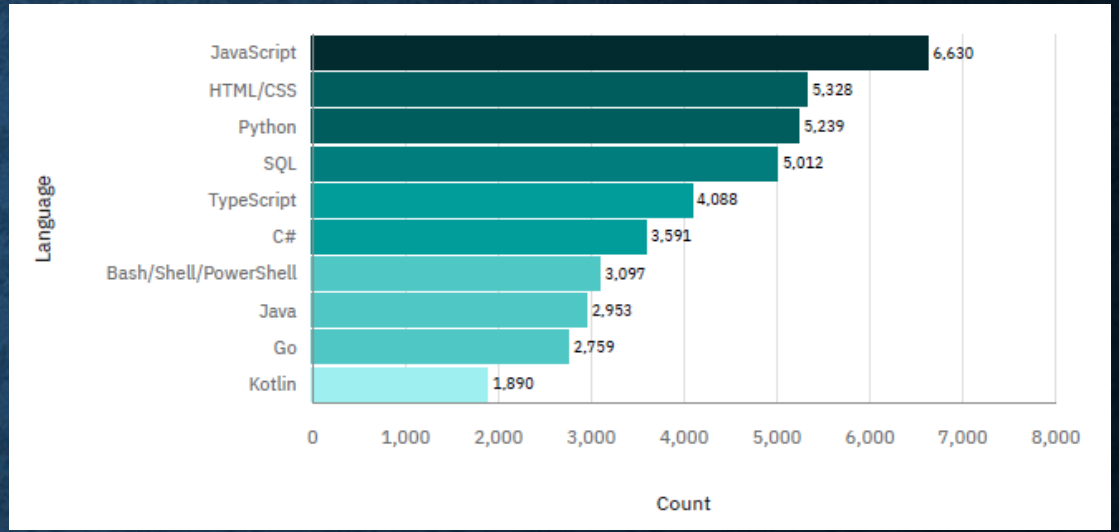
- Explore the Pre-Prepared Survey Data Set Using the Following Methodologies:
  - Familiarization with the dataset was achieved through Data Analysis including:
  - Dataset Exploration
  - Webscraping
  - Data Wrangling
  - Exploratory Data Analysis
  - Data Visualization
  - Building a Dashboard using IBM Cognos Analytics to extract meaningful patterns and trends
- The survey provided valuable insights into global trends and practices pertinent to the topic under review.

PROGRAMMING LANGUAGE TRENDS – FINDINGS & IMPLICATIONS

Top Ten Languages Worked with This Year



Anticipated Language Trends Next Year



Findings:

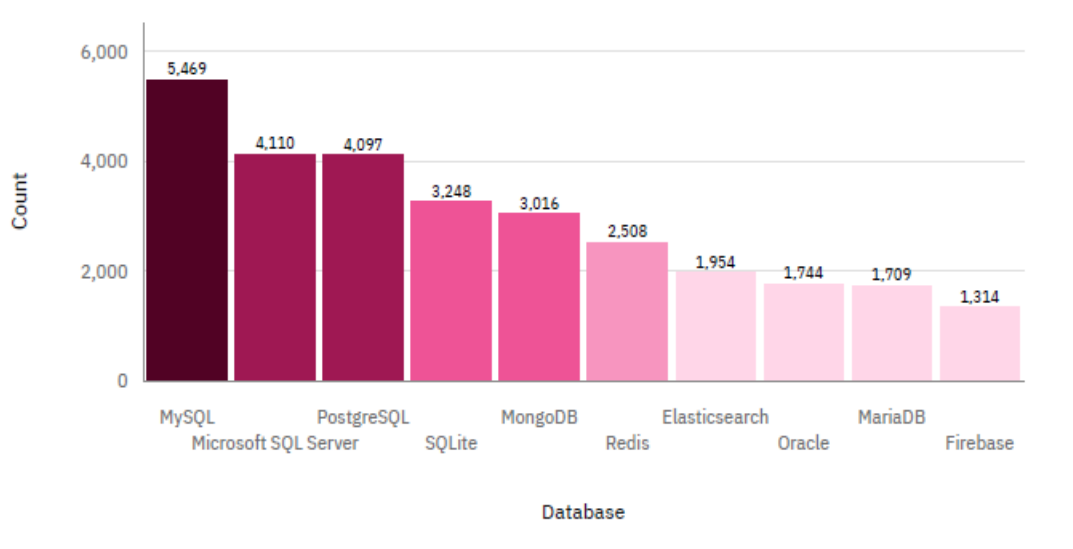
- JavaScript, HTML/CSS, SQL, Shell languages, and Python are the most used languages today.
- Python is expected to see higher demand year-on-year.

Implications:

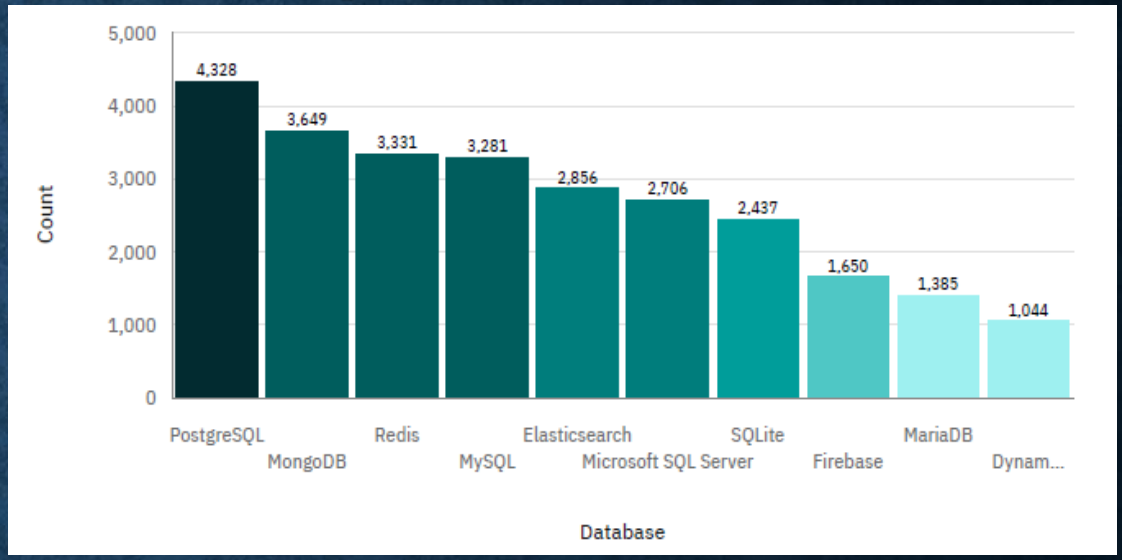
- Though Java Script is still anticipated to be the preeminent working programming language, Python is becoming more popular.
- Data shows that the rise of Python is likely at the expense of aging languages like PowerShell and C++.

DATABASE TRENDS – FINDINGS & IMPLICATIONS

Top Ten Databases Worked with This Year



Anticipated Future Database Demand



Findings:

- PostgreSQL seems well favoured to take a more dominant role going forward.
- In the future, PostgreSQL, MongoDB, Redis, MySQL, and Elasticsearch will grow in popularity.
- Redis and Elasticsearch are newer tools and are anticipated to gain significant traction in the IT industry.

Implications:

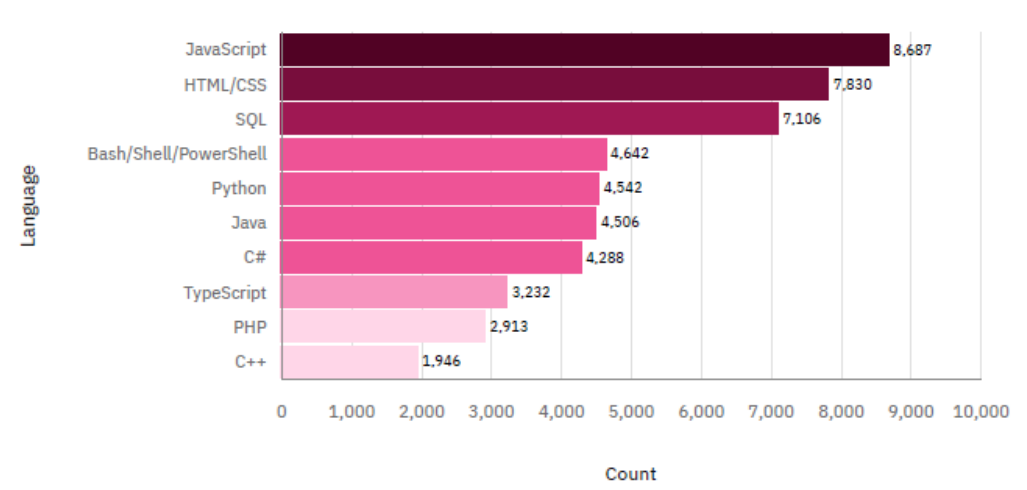
- Oracle SQL did not make the top 5 list and is gradually losing popularity over time.

SUMMARY OF DB & LANGUAGE RESULTS/FINDINGS

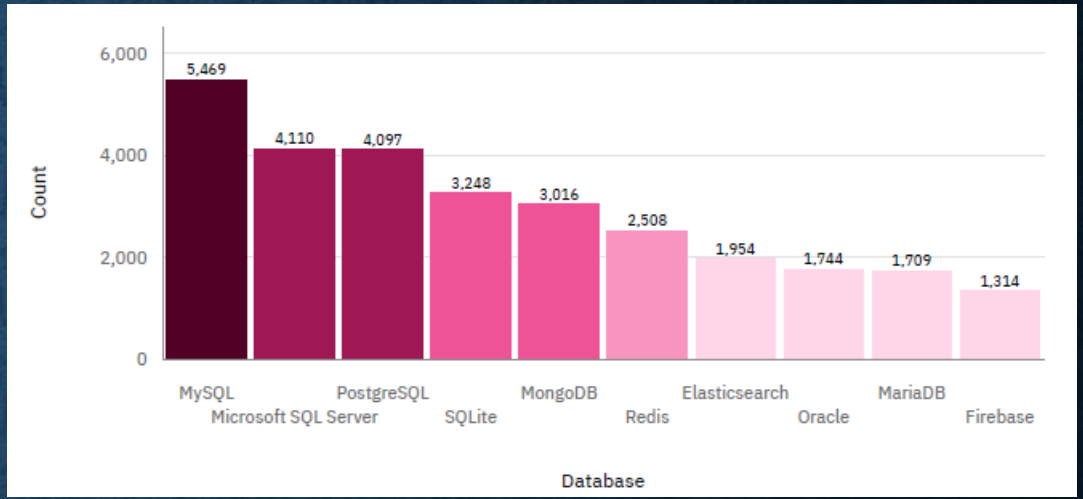
- Approximately 90% of survey respondents are male, with higher female representation among students than in professional roles, particularly in regions like the US, India, and the UK.
- JavaScript continues to be the most widely used programming language globally.
- Python has surpassed Java to become the 5th most preferred programming language, showing significant growth as the fastest-growing major language.
- jQuery remains the most popular web framework, while React.js has overtaken Angular in developer usage this year.
- Around 75% of professional developers worldwide hold at least a bachelor's degree, consistent with previous trends, and 75% of respondents in professional developer roles are under 35 years of age.

DASHBOARD 1: CURRENT TECHNOLOGY USAGE

Top Ten Languages Worked with This Year

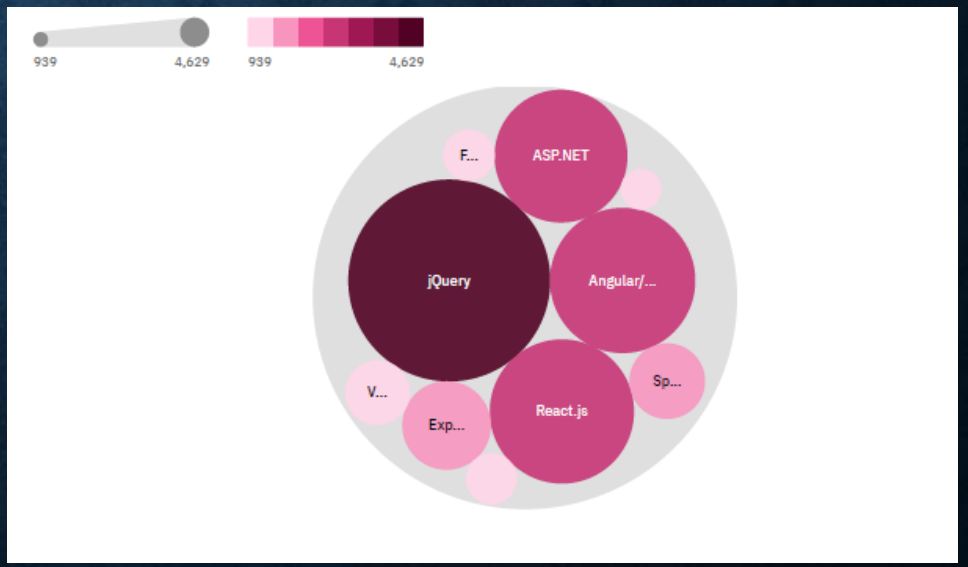


Top Ten Databases Worked With



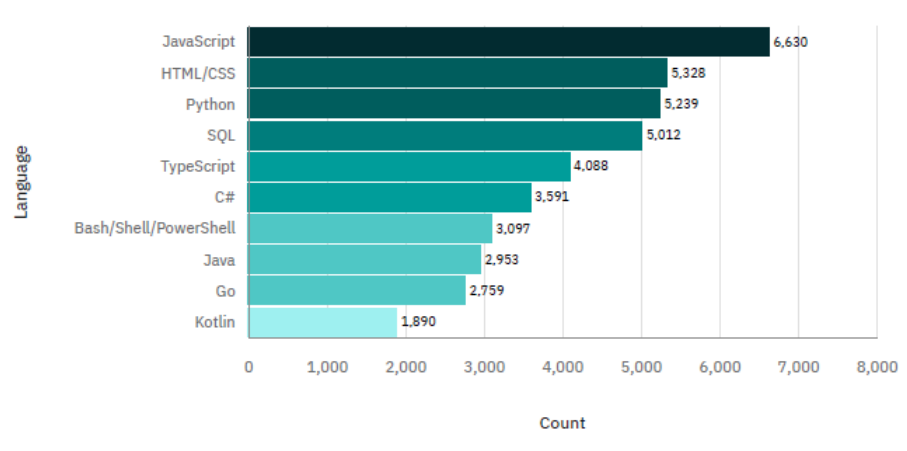
Top Platforms Worked With

Top Ten Web Frameworks Worked With

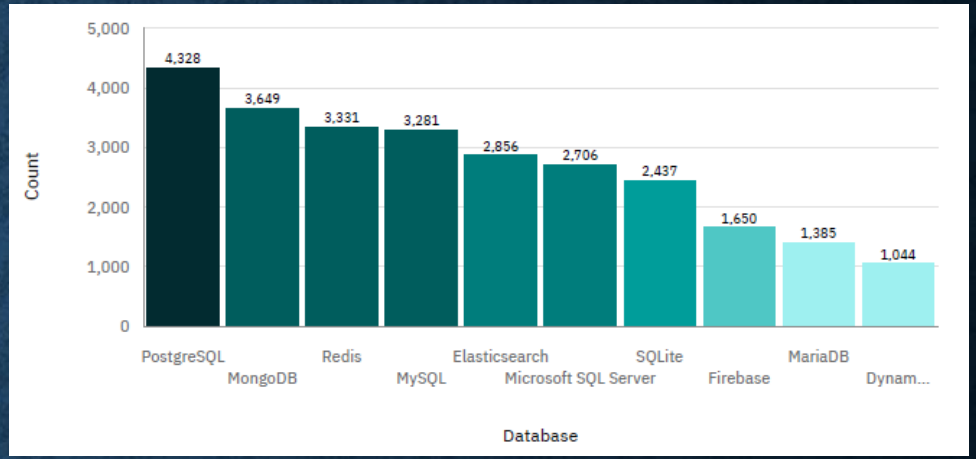


DASHBOARD 2: FUTURE TECHNOLOGY TRENDS

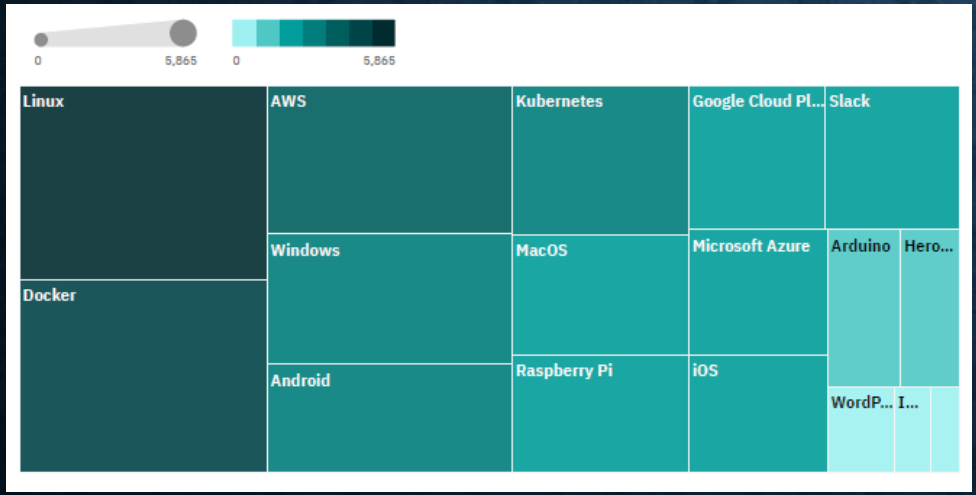
Top Ten Languages Desired In the Future



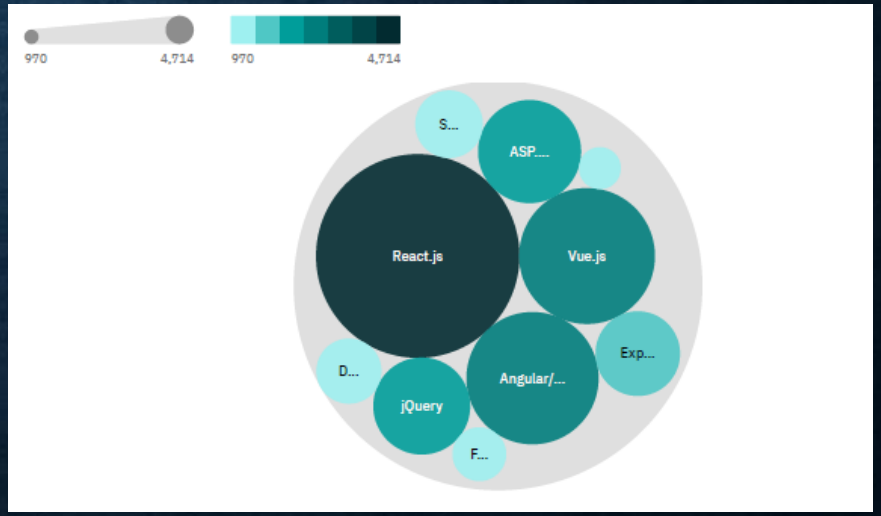
Top Ten Databases Desired in the Future



Top Platforms Desired Next Year

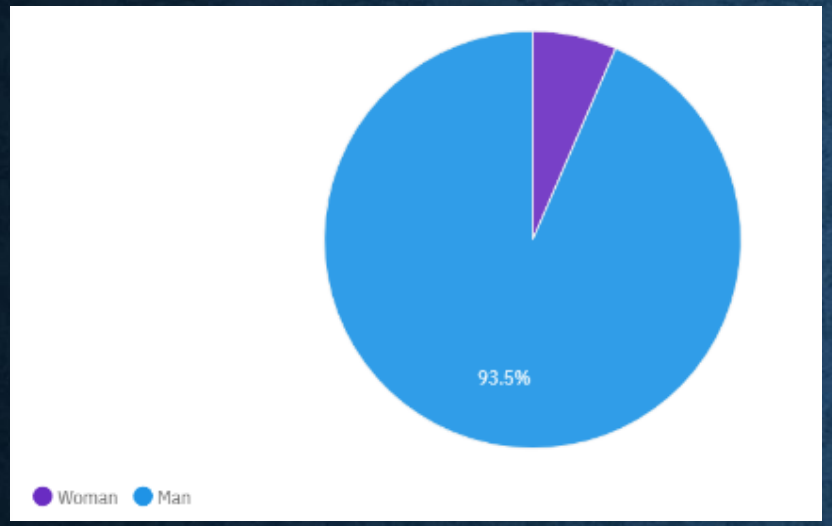


Top Ten Web frames Desired Next Year

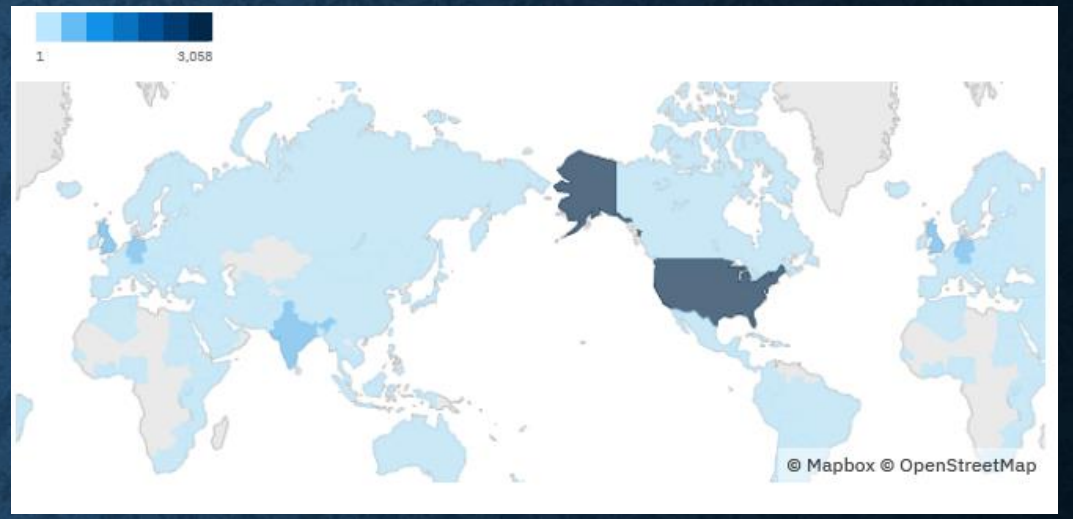


DASHBOARD 3: DEMOGRAPHICS

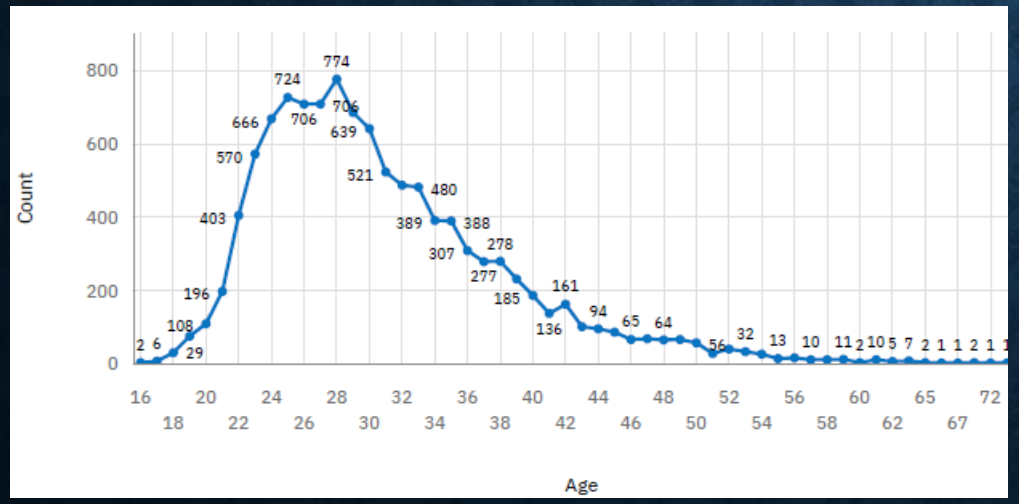
Respondent Count by Gender



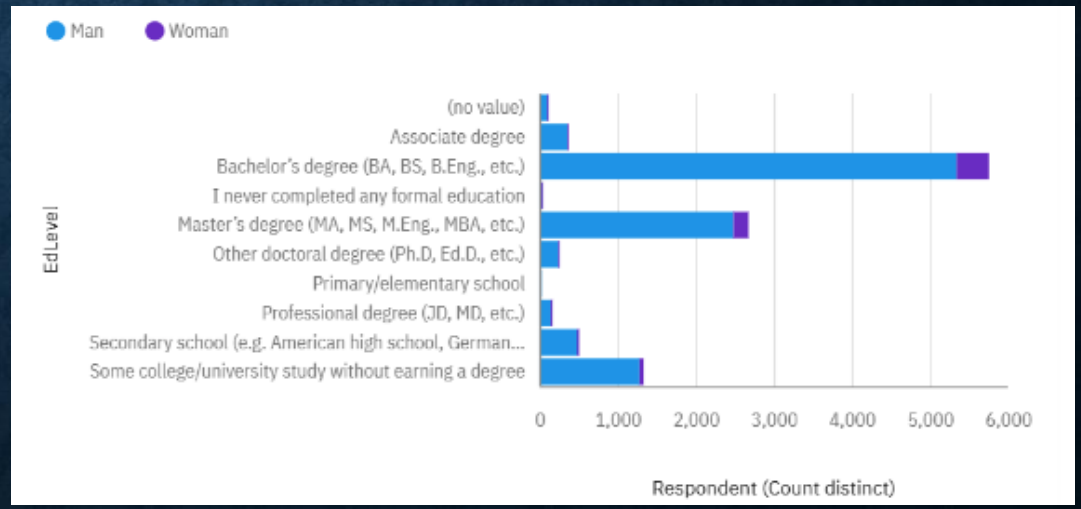
Respondent Count by Count



Respondent Count by Age



Respondent Education Level by Gender



OVERALL FINDINGS AND BROADER IMPLICATIONS

- Technology Usage:
  - JavaScript will continue to be a popular programming language.
  - Python is growing rapidly in popularity and some say has already overtaken JavaScript as the leading language (1).
  - Data professionals should gain expertise in both NoSQL and SQL databases.
- Database Preference:
  - MySQL is the leading Database.
  - Microsoft SQL and SQLite are losing market share.
  - Others such as MongoDB are becoming more popular.
- Demographics
  - The majority of professionals in the IT field hold at least a Bachelor's degree.
  - The tech sector is primarily populated by individuals under the age of 40.
  - Predominantly a male-oriented industry, the data seems to show that Women are facing challenges when trying to break into tech and data analytics-related roles(2).
  - There is a growing need for increased access to tech training and education in less developed countries.

CONCLUSION & TOPICS FOR FURTHER DISCUSSION

Overall:

- This report has shown the benefits of staying up-to-date in the tech sector is crucial, as trends evolve rapidly and continuously shape the industry's landscape.

Further Discussion Topics Might Include:

- Strategies for upskilling in the technology sector.
- Is obtaining a Bachelor’s degree truly necessary in the tech industry?
- Expanding access to tech education and development in regions such as South Asia, South America, Africa, and certain parts of Europe.
- How can we bridge the significant gender gap in tech?

Limitations:

- The findings, however, cannot fully capture the entire spectrum of the developer population and so some groups will inevitably be underrepresented.

QUESTIONS

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APPENDICES

1. https://dataleum.com/why-python-overtook-javascript-as-the-most-popular-language-on-github/

2. https://www.linkedin.com/pulse/from-glass-ceiling-cliffs-decade-long-progress-women-data-cisneros-ylz5c

3. https://github.com/Mattph1963/GitHub-Repository-IBM-Data-Analyst-Capstone-Project