Exploring Stack Overflow Developer Survey Data

Drew Lesh 11/19/25

OUTLINE

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

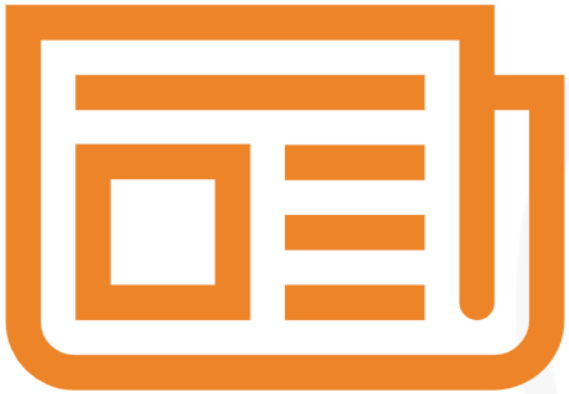
EXECUTIVE SUMMARY

- The Top 10 Programming Languages
  - Current / Future
- Top 10 Databases
  - Current / Future
  - By Age
- Top 10 Platforms
  - Current / Future
- Top 10 Web Frameworks
  - Current / Future
- Respondents Demographics
  - Age
  - Education Levels
  - Region

INTRODUCTION

- Purpose: Analyze Stack Overflow Survey Data
- Target Audience:
  - Future Tech Users / Business Integration
- Identify Trends and relationships:
  - Tools, Languages, Developer Experience, etc.
- The goal is to translate complex data into clear insights that inform decisions and highlight where the developer landscape is headed.

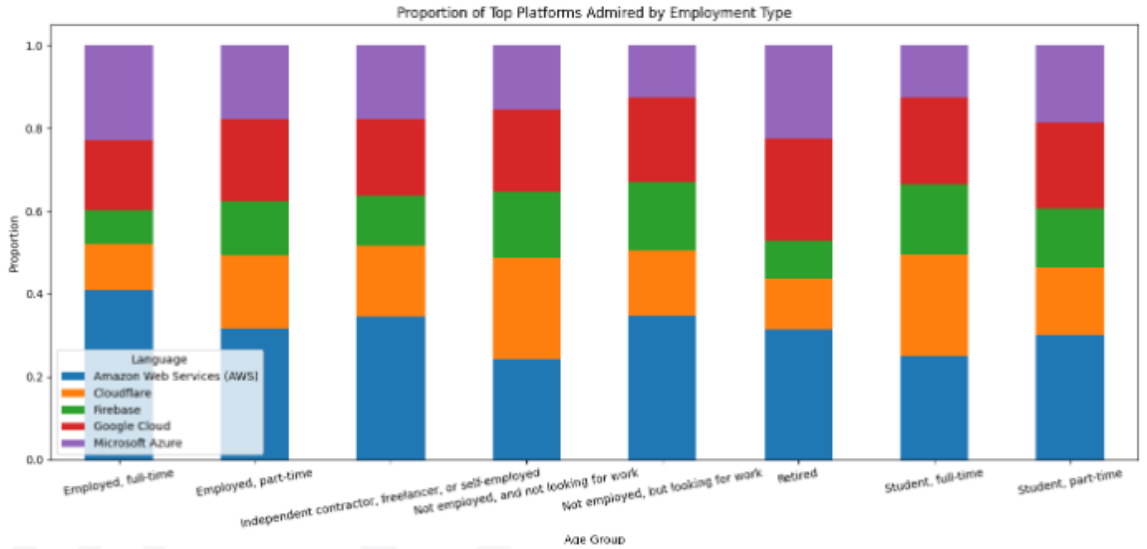
METHODOLOGY

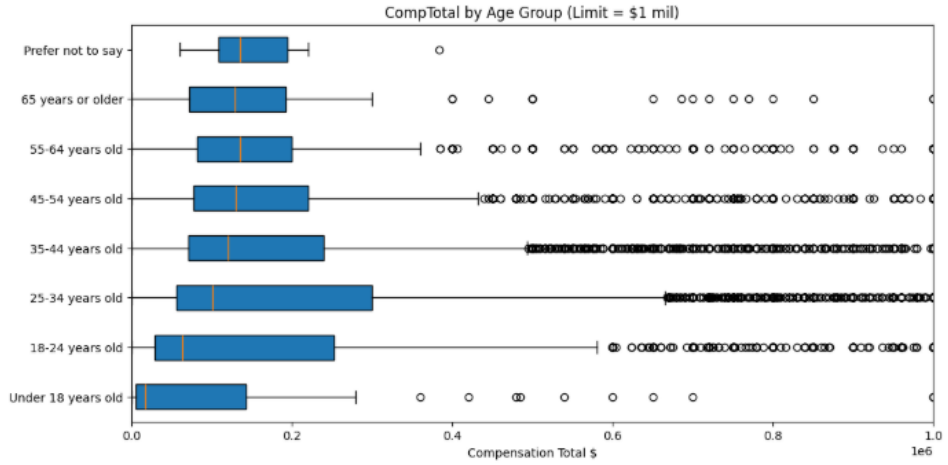


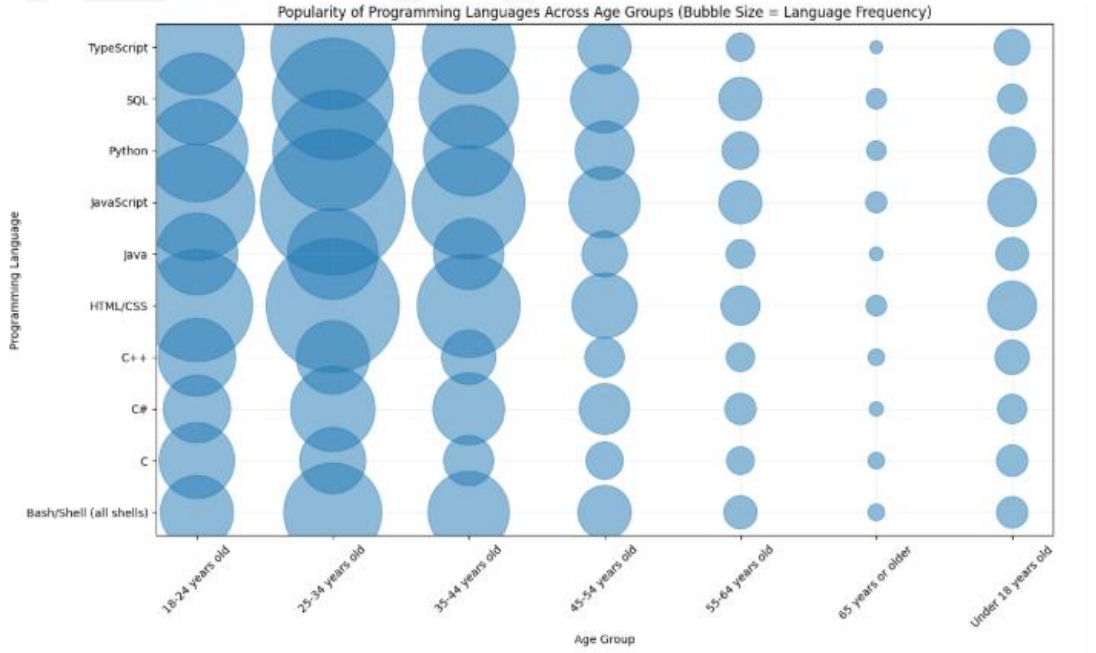
- Data Source: Stack Overflow Survey Data
- Data Cleaning + Key Steps:
  - Cleaned Duplicates
  - Removed missing values / filled missing values
  - Skewness / outlier / correlation
  - Exploded mutli-select columns
  - Converted categorical to numerical values
- Analysis
  - Calculated top technologies, medians salaries, satisfaction scores, etc.
  - Explored relationship between experience, tools used, job satisfaction, pay, age, employment, job roles, etc.
- Visualizations:
  - Python(pandas, matplotlib, seaborn, numpy), IBM Cognos Analytics
  - Bar charts, stacked charts, histograms, line charts, pie charts, tree maps, heat maps, maps, box plots, scatter/bubble plots

RESULTS

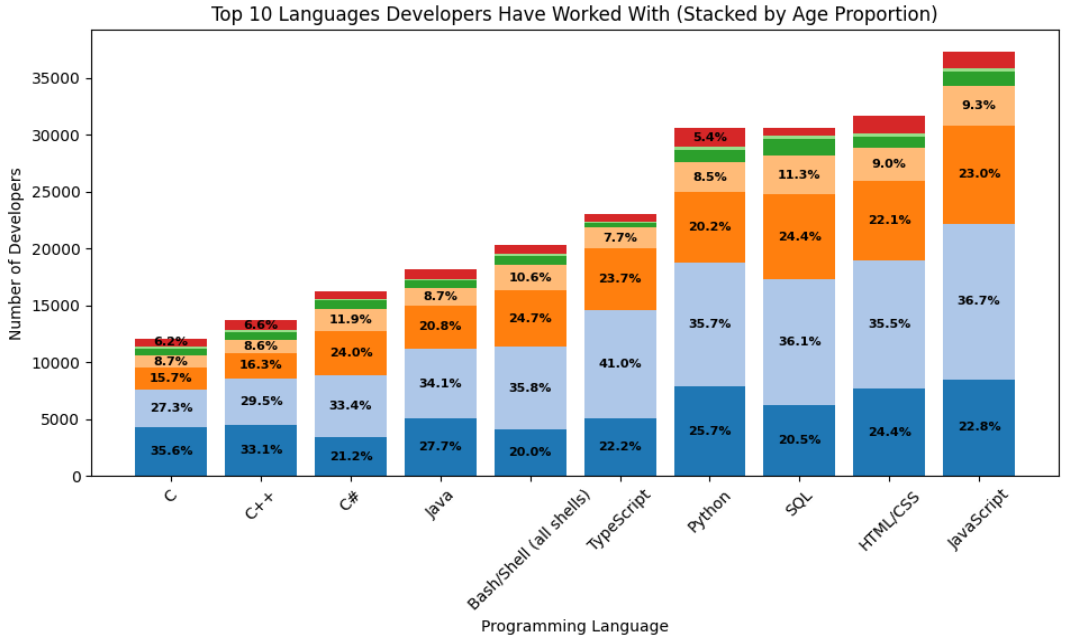
In the next slides I will share some graphs, findings, dashboards and extras!





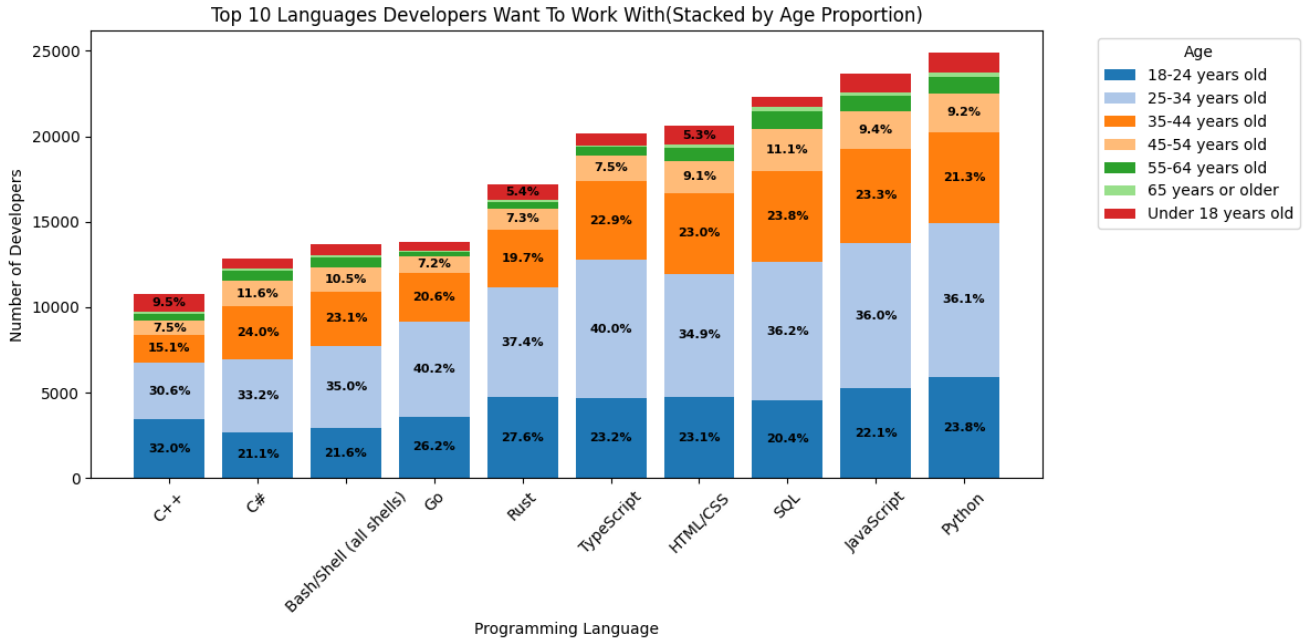


PROGRAMMING LANGUAGE TRENDS



Current Year

Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

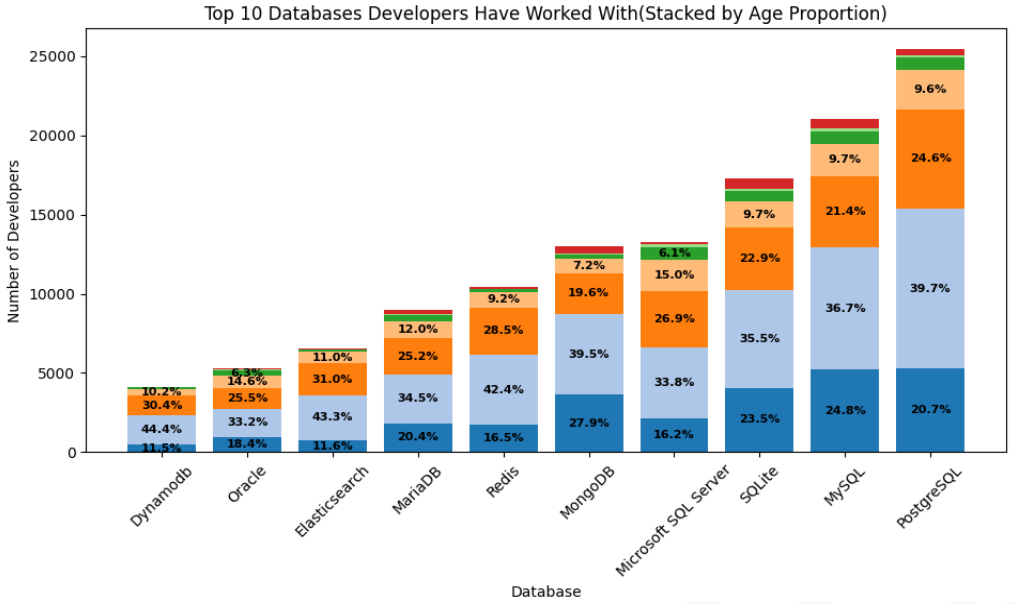
Findings

- JavaScript, HTML/CSS, SQL are the most common languages
- Python is gaining popularity / want to work with
- Most of the Data are ages 18-44 years old

Implications

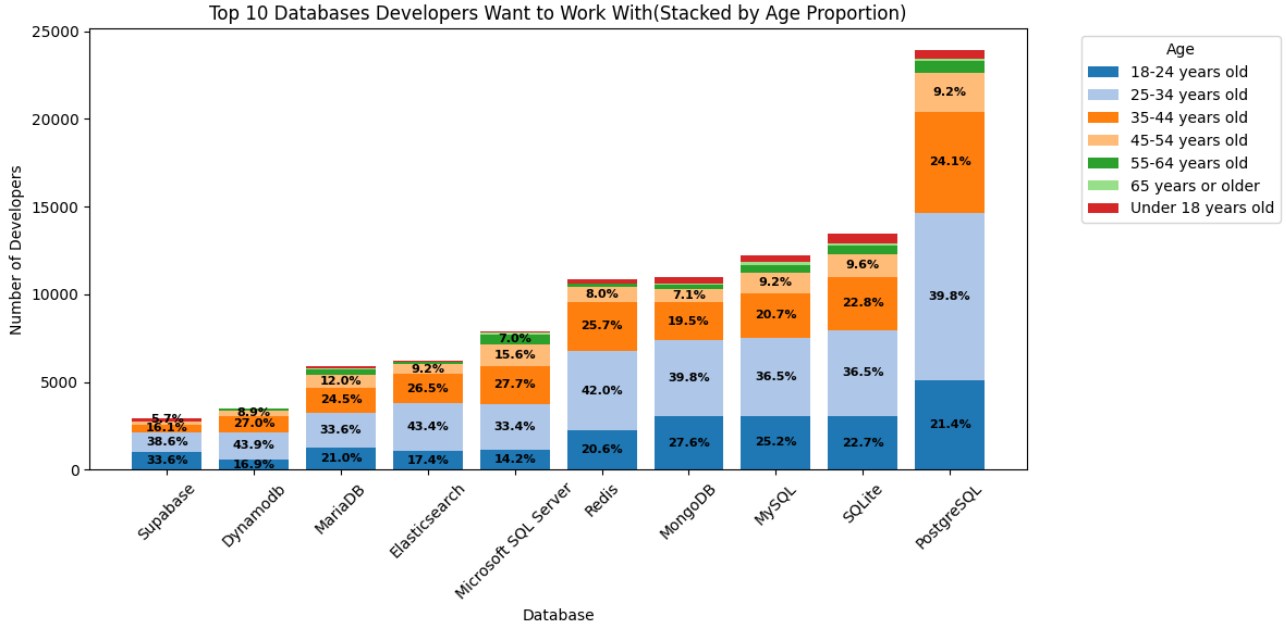
- Developers and teams should prioritize proficiency in these languages to remain competitive and maintain current projects efficiently.
- Organizations should consider investing in Python training and projects to align with current developer interests and industry trends.
- The survey sample underrepresents older developers, so future surveys should aim to include more participants above 44 to get a complete picture of industry trends.

DATABASE TRENDS



Current Year

Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- PostgreSQL is the most common database now and most popular in the future.
- MySQL and SQLite are either 2nd or 3rd currently and in the future.
- Distribution of the top 10 databases is heavily skewed toward the most popular, showing clear dominance.

Implications

- Organizations should consider prioritizing PostgreSQL for new development, training, and migrations, since its growth suggests long-term stability and community support.
- MySQL and SQLite will continue to be important for a wide range of applications, so teams should maintain support and expertise in these systems, especially for lightweight or legacy environments.
- Developers and businesses may benefit from focusing resources on a small set of widely-used databases, as niche systems show low adoption and may offer less community support, tooling, or long-term viability.

Drew Lesh's Repository -> Data Analyst Capstone Project

GitHub Repo Link:
https://github.com/drewlesh/Stack-Overflow-Developer-Survey-Dashboard/tree/main

DASHBOARD - Current Technology Usage

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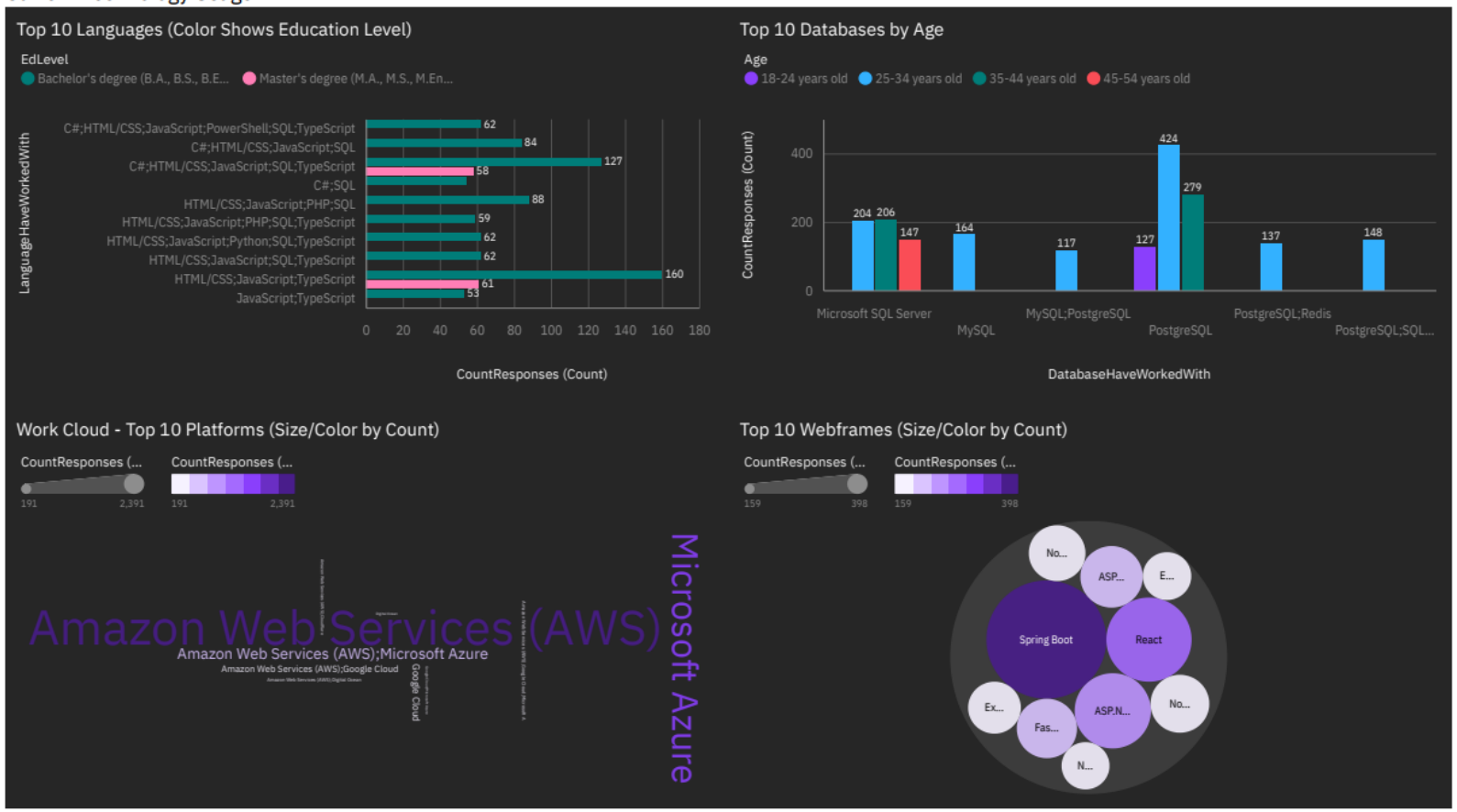
IBM Capstone

Current Technology Usage



DASHBOARD - Future Technology Use

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DASHBOARD - Demographics

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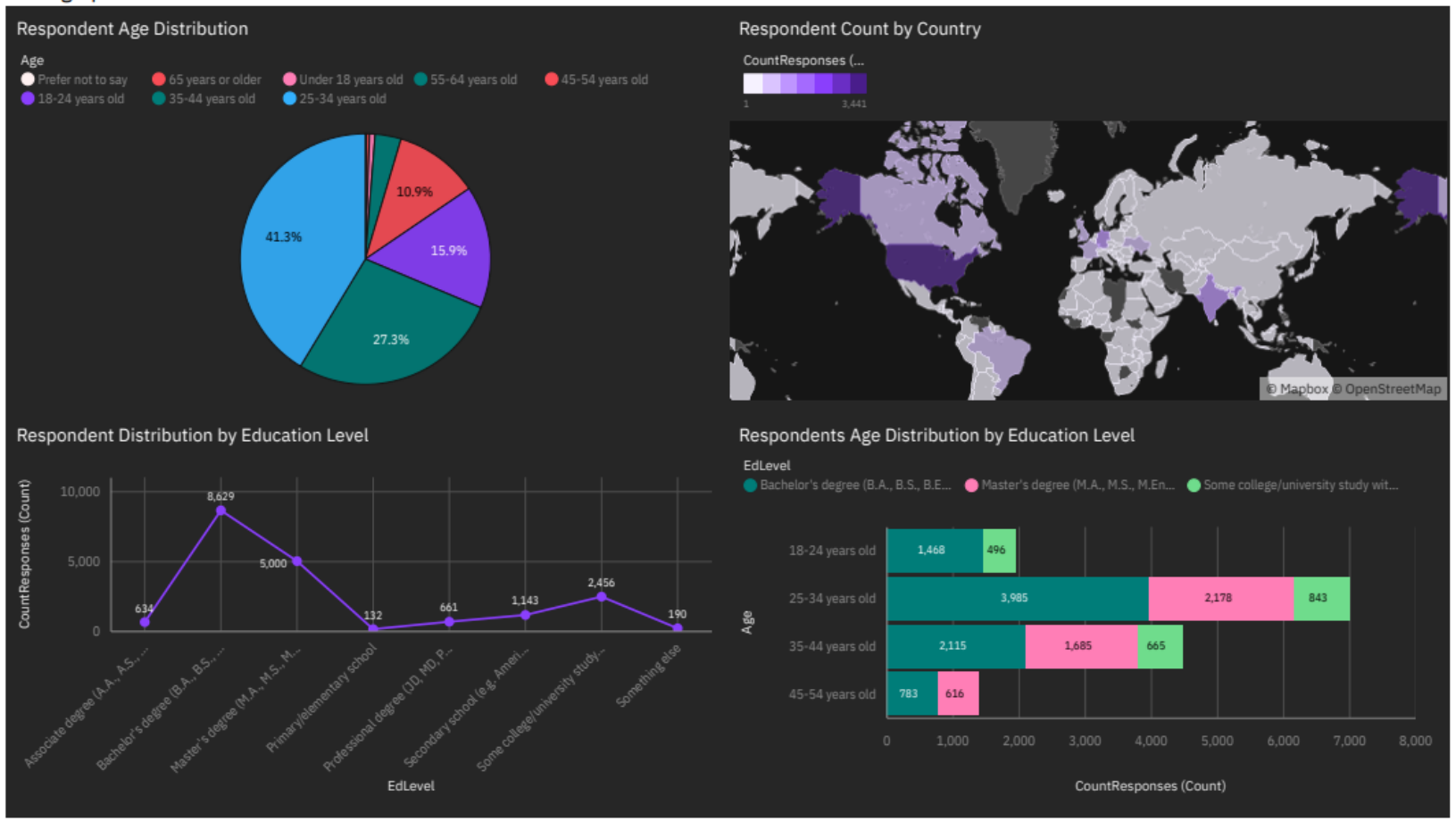
Demographics



DISCUSSION

- The dashboard was created on IBM Cognos Analytics
- Current vs Future Graph Comparisons
- Demographics impact and meaning towards the data
  - Age and experience level / education can help filter data

OVERALL FINDINGS & IMPLICATIONS

Findings

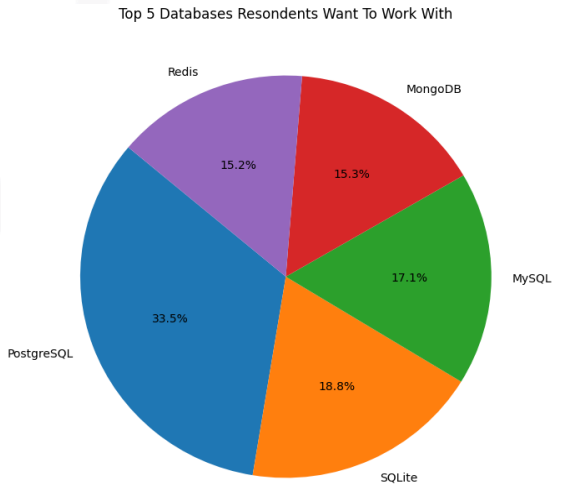
- Developer Demographics are shifted towards younger less experienced developers.
- Popular Technologies show clear winners, while communities form around niche tools in a small user base.
- Age and Experience Influences Technology Preferences.

Implications

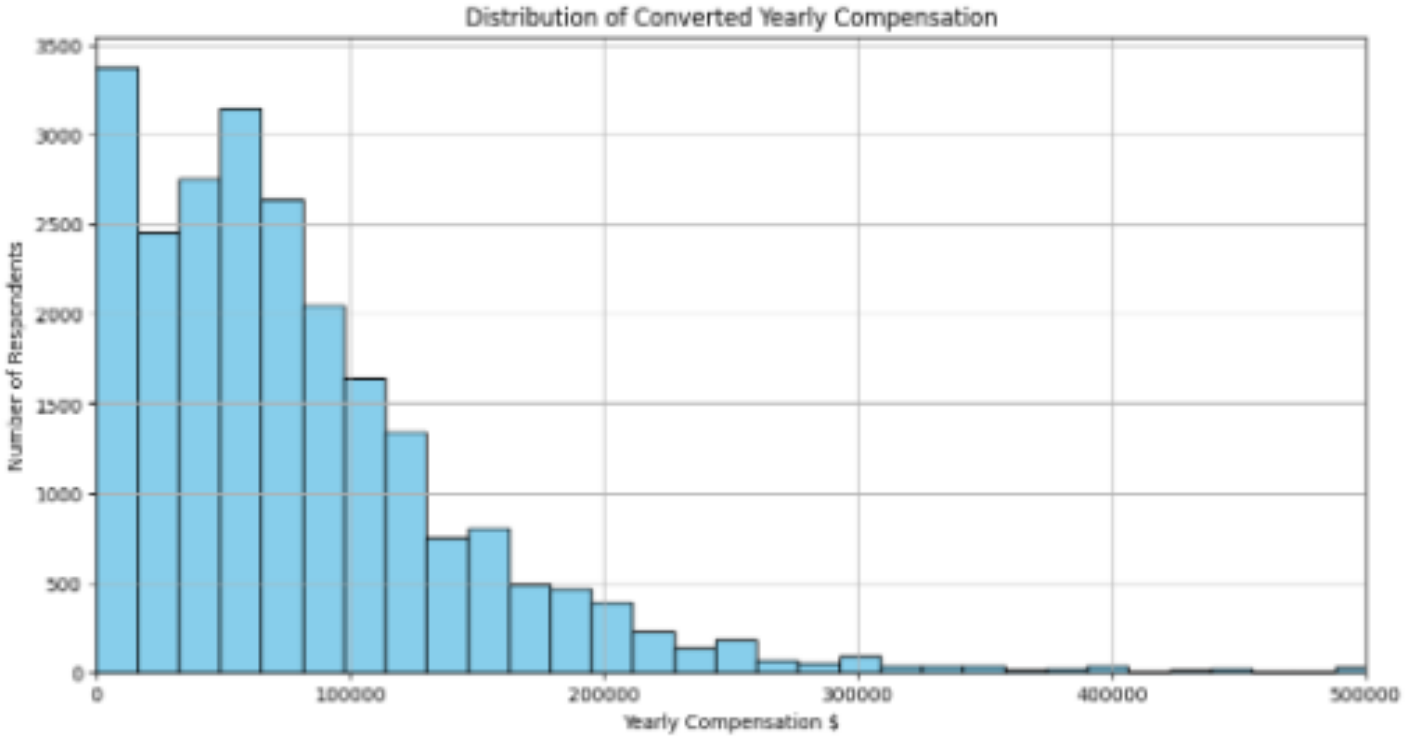
- Organizations should emphasize early-career opportunities the growing young talent.
- Companies should standardize popular technologies for efficiency.
- Training strategies should be tailored to different groups to leverage expertise in different tech

CONCLUSION

- This survey suggests the developer workforce is increasingly younger.
- Technology adoption has clear leaders and niche groups.
- Experience and age influence technology preferences.
- Data-driven insights guide strategic decisions
  - This survey data provides useful insights about the developers community. Trends in languages, databases, compensation, age groups, experience, etc. to better suggest the evolving tech world.



APPENDIX



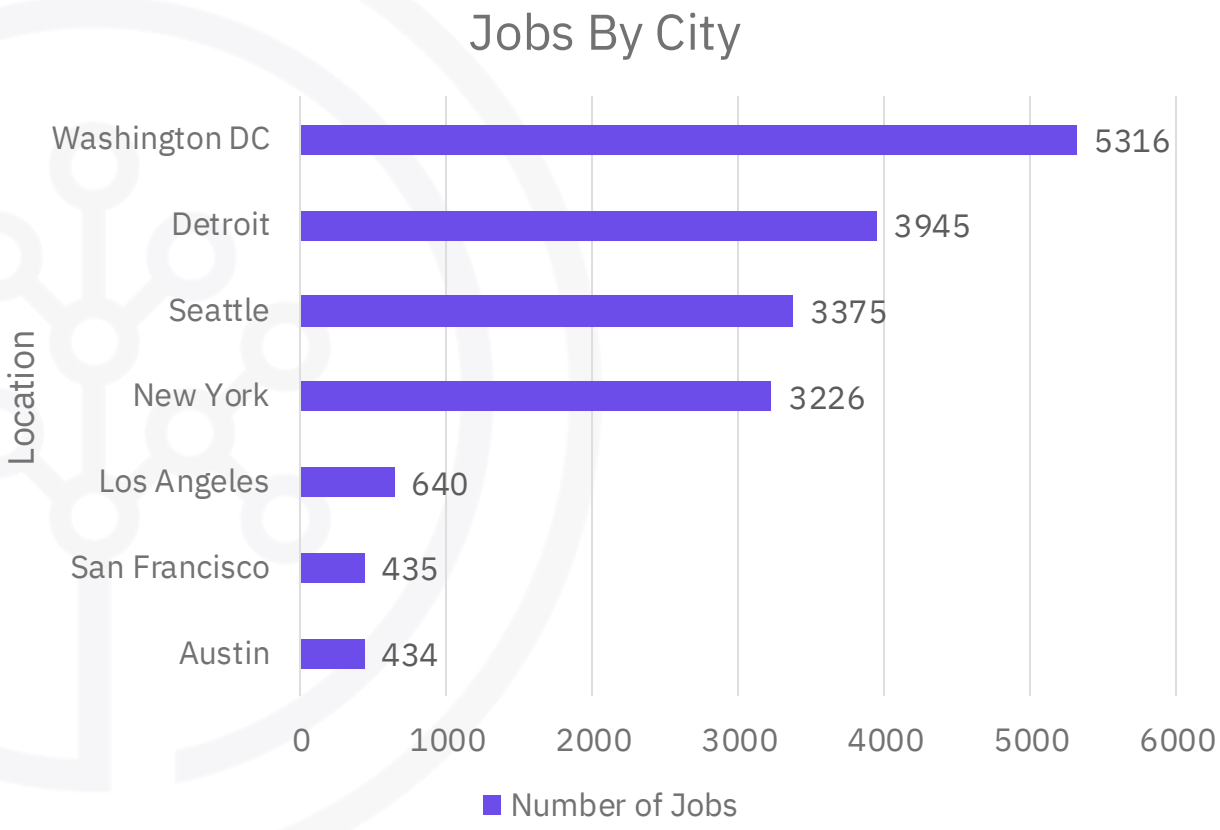
Additional zoomed in look at a graph representing the distribution of Yearly Compensation in the Stack Overflow Survey Data.

JOB POSTINGS

Module 1 Data Collection
Lab 2 Collecting Data Using APIs

- Part of this lab was to extract json data using an API, format it and save it to an excel file
- This bar charts shows the number of jobs in each city
- Data Source:

http://api.open-notify.org/astros.json



POPULAR LANGUAGES

Module 1 Data Collection
Lab 4 Collecting Data Using Web Scraping

- The task of this lab:
  - Scrape data from a website(using BeautifulSoup, requests and pandas)
  - Format Data
  - Save to a csv

- The bar chart shows the annual salary of jobs using certain programming languages

- Data Source:

https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DA0321EN-SkillsNetwork/labs/datasets/Programming_Languages.html