Behind the Code: Analyzing Global Developer Preferences and Trends

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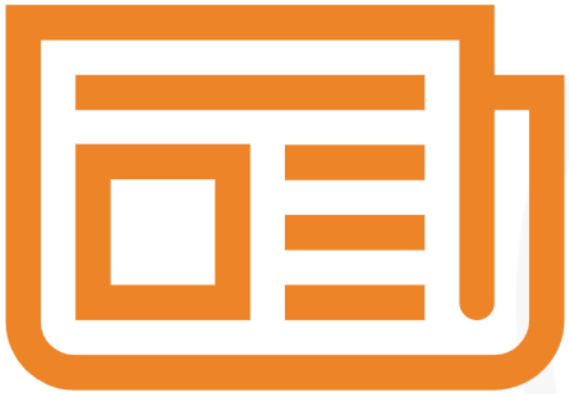
EXECUTIVE SUMMARY

- Collected and analyzed global developer survey data to uncover patterns in **technology preferences**, **career satisfaction**, and **compensation**.
- Identified the **most commonly used** and **most admired** programming languages, frameworks, and databases across regions and experience levels.
- Dominant across both usage and future interest categories:
  - Python
  - JavaScript
  - SQL
- Discovered significant variation in **job satisfaction and compensation** based on **age, experience level, and employment type**.
- Created multiple **visualizations (histograms, stacked charts, scatter plots)** to explore compensation, job satisfaction, and technology adoption trends.
- Highlighted a strong correlation between **professional coding experience** and **median yearly compensation**.

INTRODUCTION

- This project analyzes global developer survey data to understand key trends in **technology usage**, **preferences**, and **career satisfaction**.
- The goal is to explore how factors like **experience level, employment type** and **age** influence developer choices and outcomes.
- Target audience: Tech or Data Hiring Managers, Curriculum Designers, Product or Engineering Team Leads, Stakeholders in Tech Education or Policy.
- The project combines data visualization, statistical analysis, and storytelling to derive actionable insights from real-world data.
- The analysis covers areas such as:
  - Programming languages and web frameworks
  - Databases and AI tools
  - Compensation patterns
  - Job satisfaction

METHODOLOGY



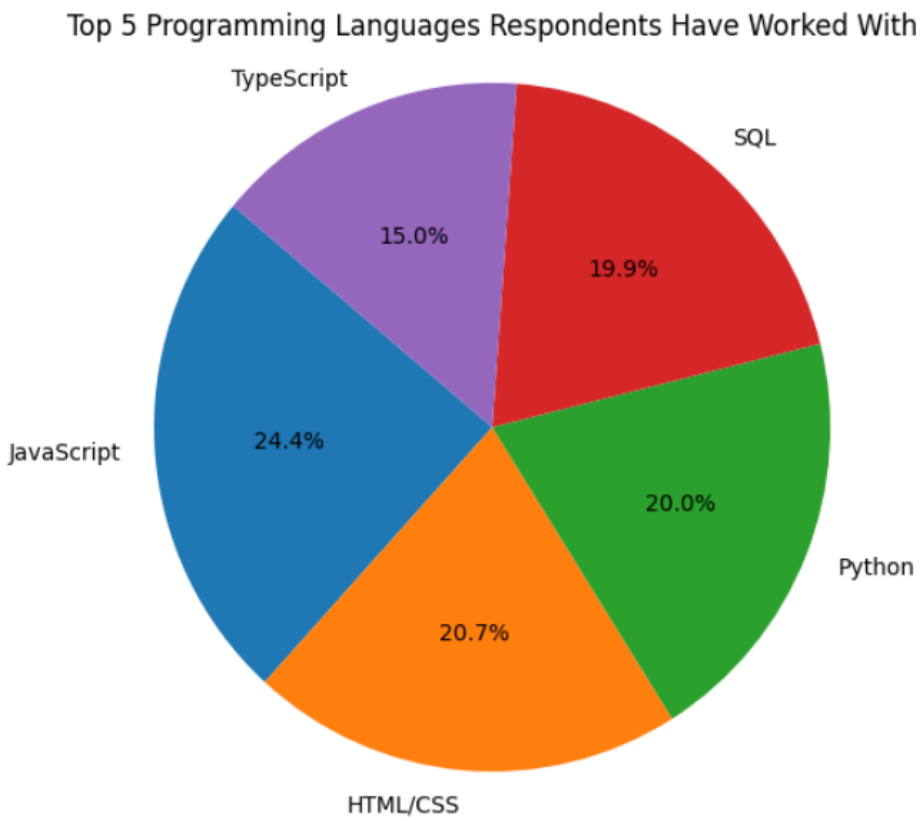
- **Data Source**: Used given developer survey data in CSV and SQLite formats provided via URLs.
- **Data Cleaning**: Removed duplicate records and handled missing values across key columns. Normalized columns with multiple values using split and explode techniques (appendix).
- Mapped age ranges and experience levels to numeric values for quantitative analysis (appendix).
- **Visualization Techniques**: Used Python libraries like **Pandas**, **Matplotlib**, and **Seaborn.**
- Synthesized results into interactive dashboards using Looker Studio for storytelling and insight presentation.

RESULTS

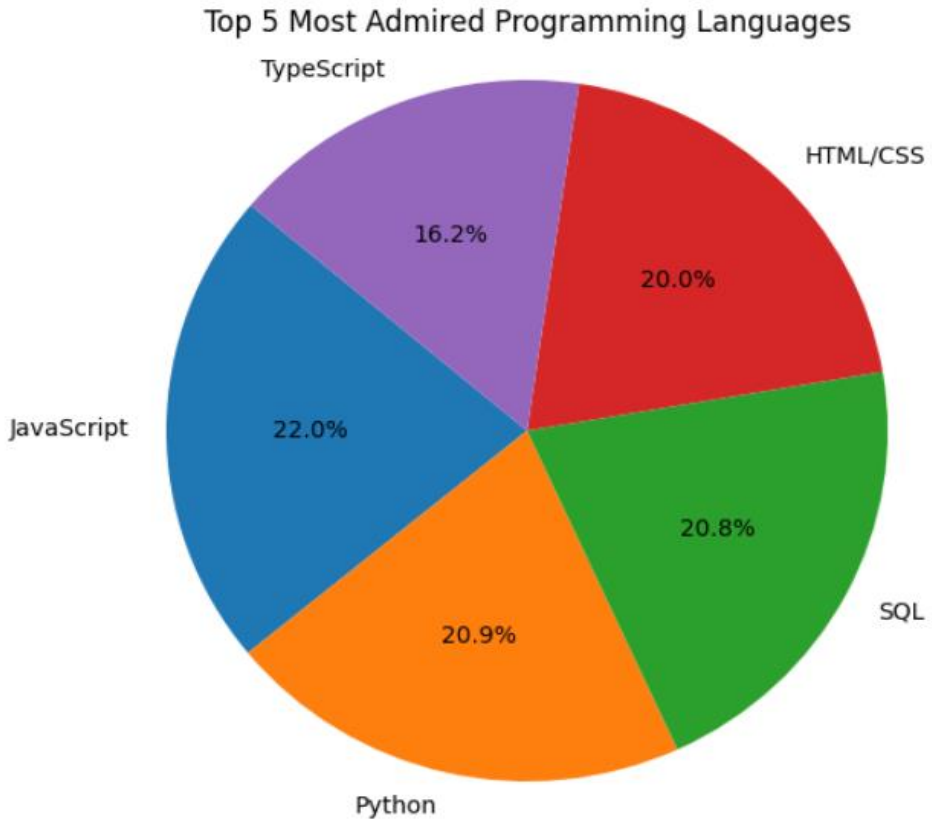
- **Programming Languages**: **Python** , **JavaScript**, and **SQL** emerged as the most-used and most-desired languages across all demographics (Dashboard tab 1&2).
- **Database Trends**: **MySQL**, **PostgreSQL**, and **SQLite** were the most commonly used databases. **PostgreSQL** and **MongoDB** were among the top databases respondents want to work with next year (Dashboard tab 1&2).
- **Job Satisfaction**: Median satisfaction scores were **highest among respondents with 5–15 years** of experience. Freelancers and full-time workers reported comparable satisfaction levels, but part-time and temporary roles scored lower.
- **Compensation Trends**: Compensation **increased steadily with experience** up to around 20 years.
- **Employment**: Most respondents were **employed full-time** and preferred **remote or hybrid work** setups.
- **Regional Insights**: The **United States**, **India**, and **Germany** had the highest respondent counts (Dashboard 3).

PROGRAMMING LANGUAGE TRENDS

2024



2025



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

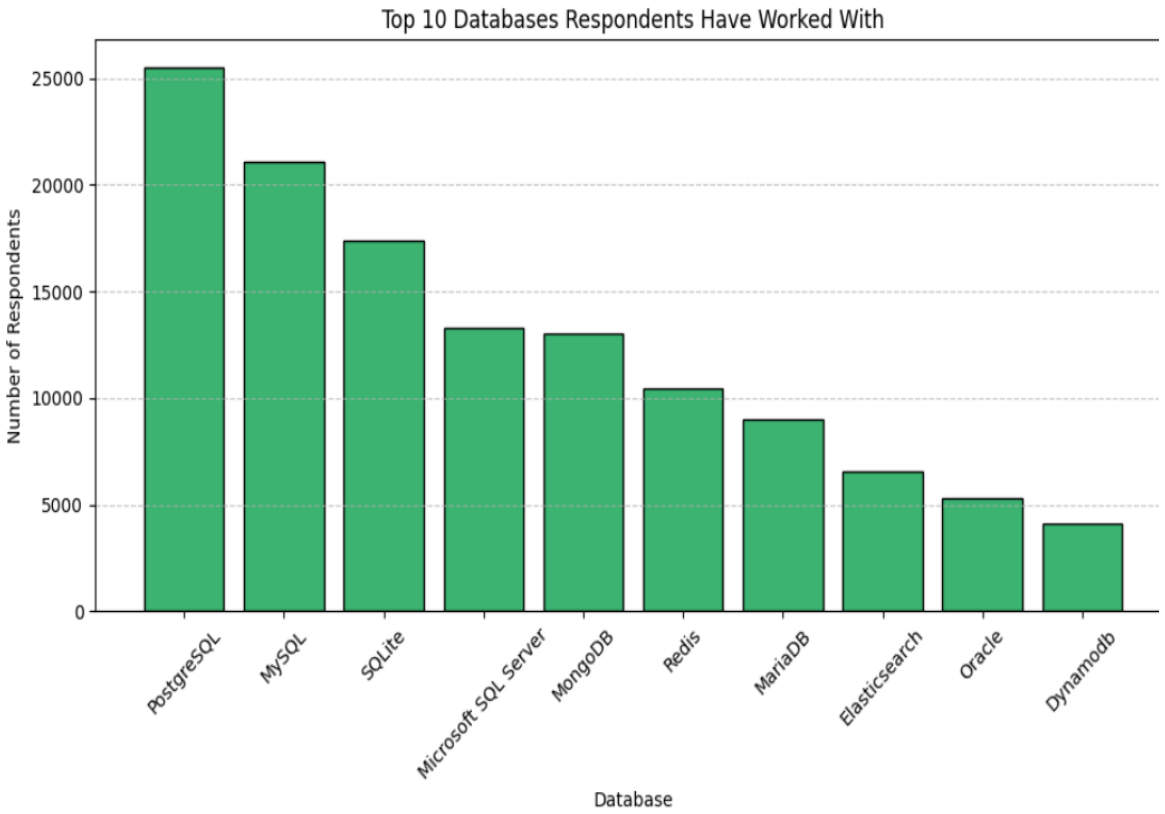
- **Python**, **JavaScript**, and **SQL** are consistently the top three languages used by respondents globally.
- Experienced developers (10+ years) continue to rely on traditional languages like **Java** and **C++**, though usage is gradually declining among new entrants.
- There's a significant overlap between **languages developers currently use** and **languages they want to work with.**

Implications

- Developers should consider learning **Python** and **TypeScript** to align with both current demand and future interest.
- Companies should invest in **JavaScript/TypeScript** expertise for frontend roles and **Python** for backend, automation, and AI-driven roles.
- Educational institutions should prioritize **Python**, **JavaScript**, and **SQL** in their curricula.

DATABASE TRENDS

2024



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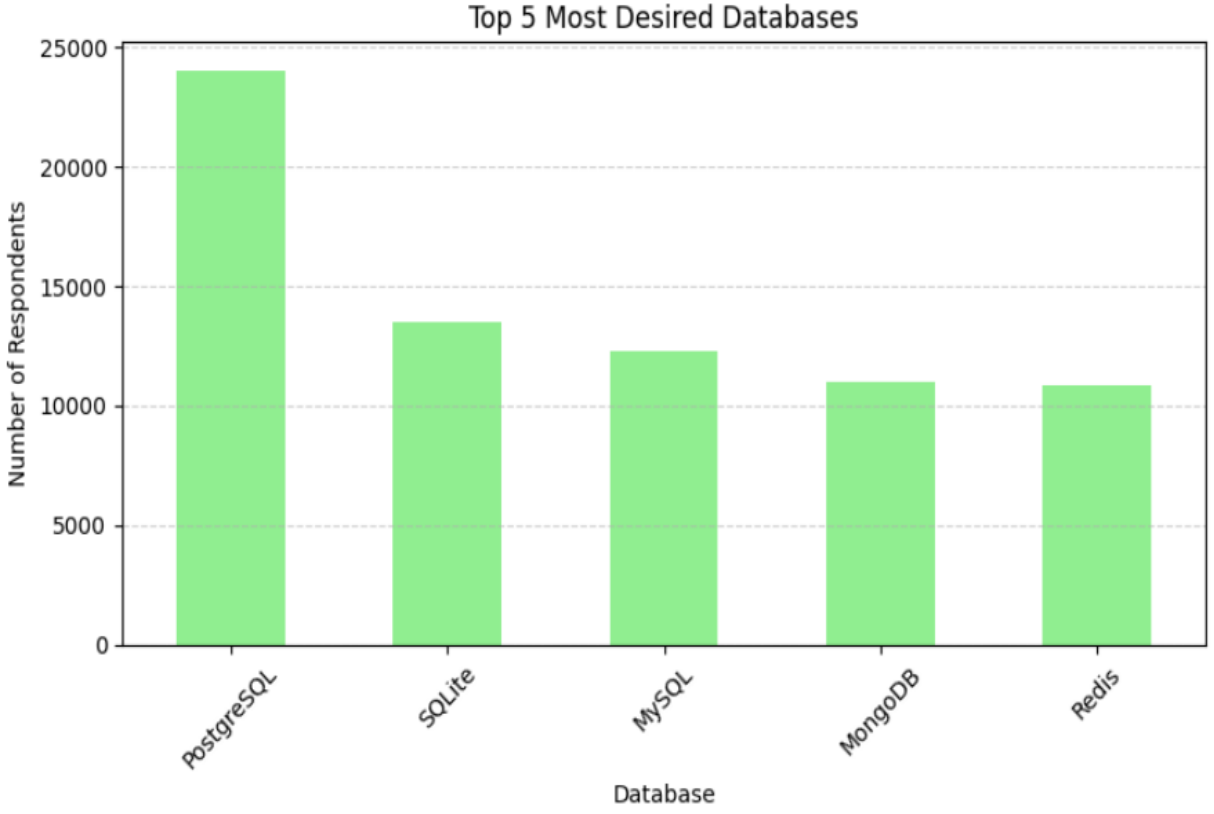


DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- **MySQL**, **PostgreSQL**, and **SQLite** are the most commonly used databases among respondents.
- **PostgreSQL** appears in both **top-used** and **most-wanted** lists—highlighting its growing popularity.
- **MongoDB** ranks high among databases that respondents want to work with.

Implications

- Emphasize support for **PostgreSQL** and **MongoDB** to align with modern developer preferences.
- Candidates with **PostgreSQL** experience may be better suited.
- Education curriculum should include **MySQL**, **PostgreSQL**, and an introduction to **MongoDB**.

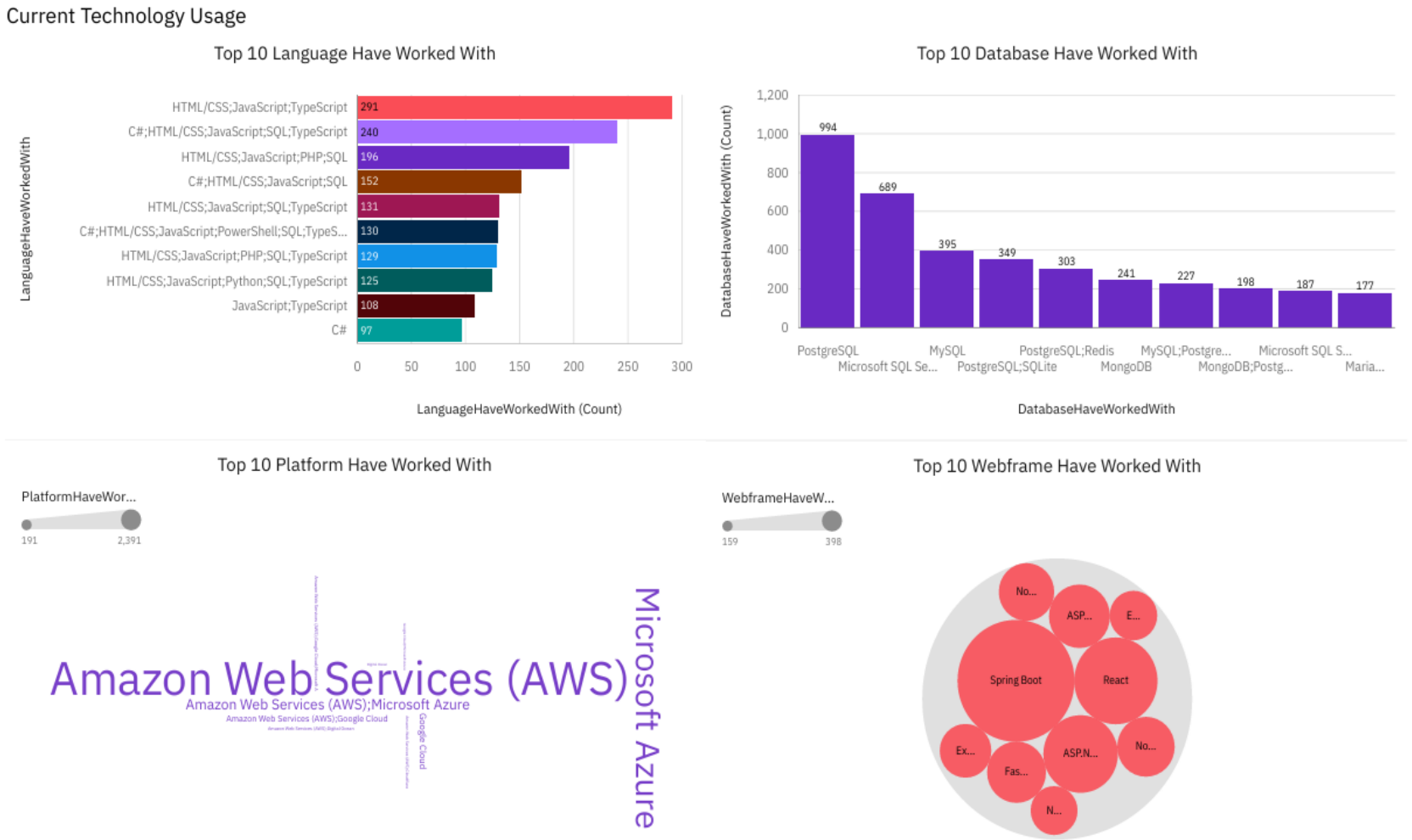
DASHBOARDS

IBM Cognos Analytics:

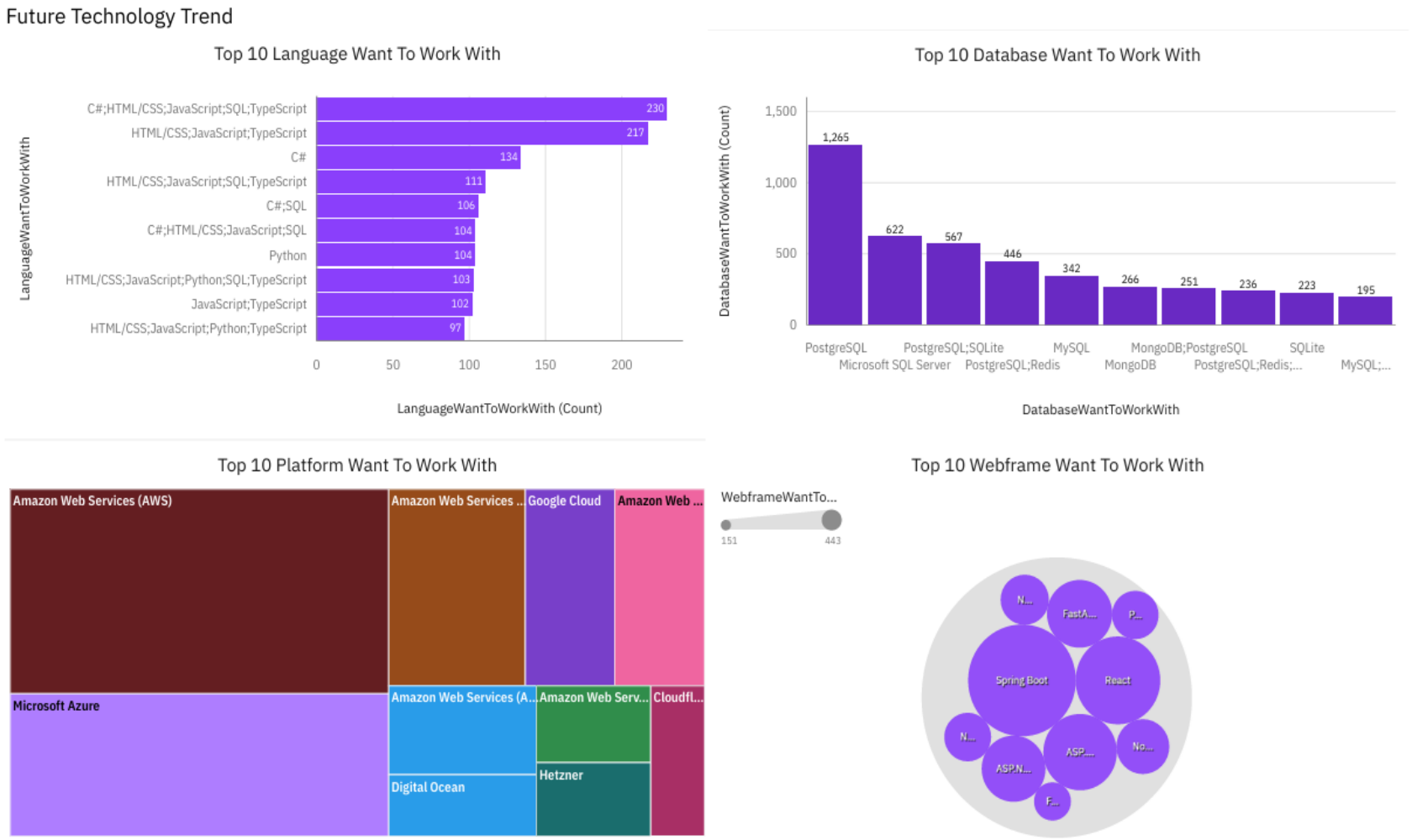
https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FDashboards&action=view&mode=dashboard&subView=model00000197eb017180_00000000

PDF Dashboards Cognos.pdf

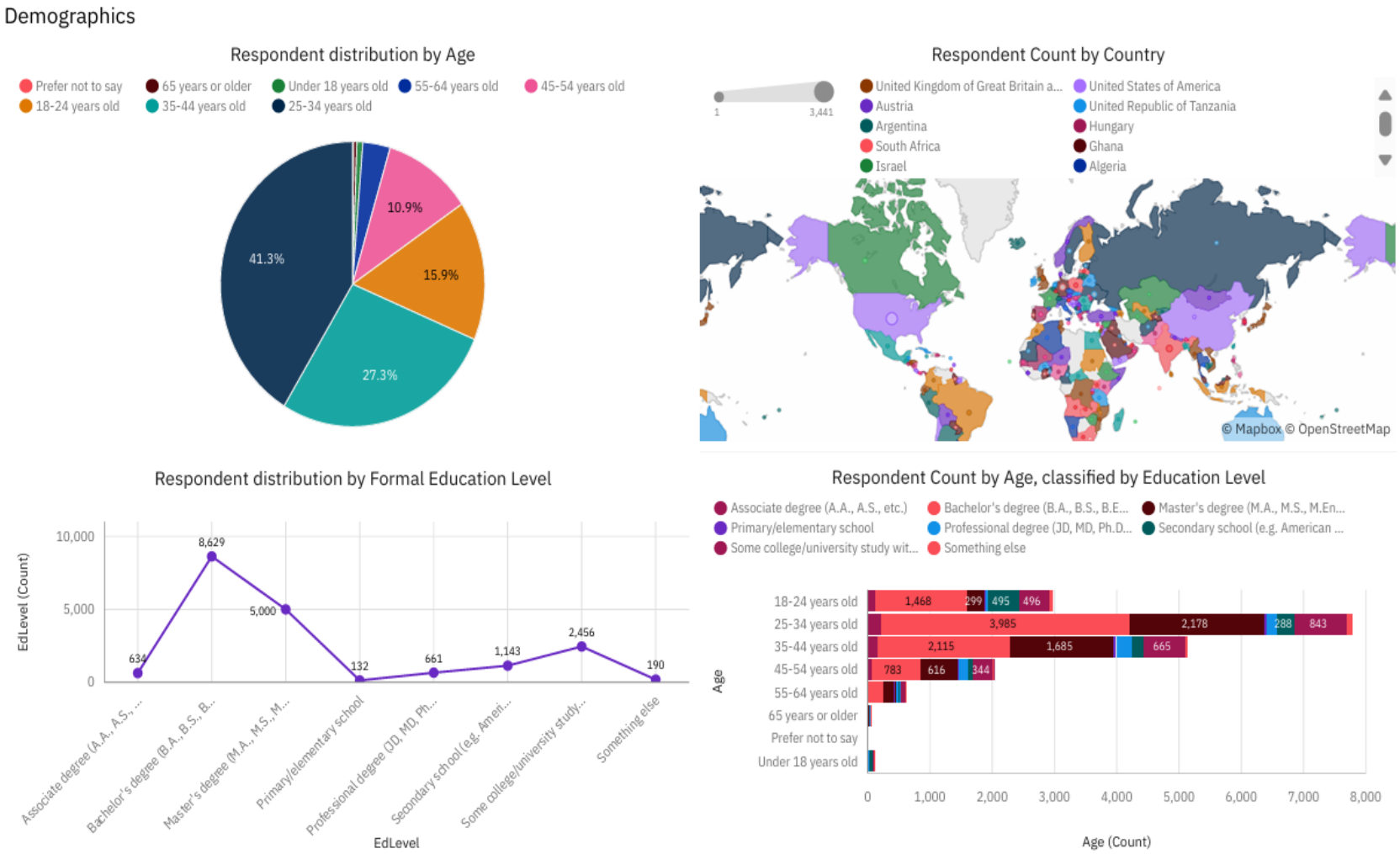
DASHBOARD TAB 1 – Current Technology Usage



DASHBOARD TAB 2 - Future Technology Trend



DASHBOARD TAB 3 - Demographics



DISCUSSION

- The analysis suggest that developers often enjoy working with technologies they already use effectively.
- **Python and JavaScript** continue to dominate the ecosystem and there's a growing interest in **PostgreSQL** and **MongoDB.**
- **Job satisfaction trends** correlate closely with years of experience and compensation.
- Most respondents prefer **remote or hybrid setups.**
- The data emphasizes the need for **continuous learning and adaptability.**

OVERALL FINDINGS & IMPLICATIONS

Findings

- **Python, JavaScript, and SQL** are the most widely used and most admired programming languages across all age groups and experience levels.
- **PostgreSQL** and **MongoDB** stand out as top databases that developers want to work with, reflecting a shift toward open-source and NoSQL systems.
- **Job satisfaction** increases with experience up to a point but tends to level off. **Compensation** correlates strongly with professional coding experience and age group.

Implications

- **Developers** should invest in learning high-demand tools like Python, React, PostgreSQL, and AI platforms to stay competitive.
- **Employers** should align their tech stacks with developer preferences to attract and retain talent.
- **Educators** should revise curricula to focus on in-demand languages and frameworks, and introduce AI/ML foundations early.

CONCLUSION

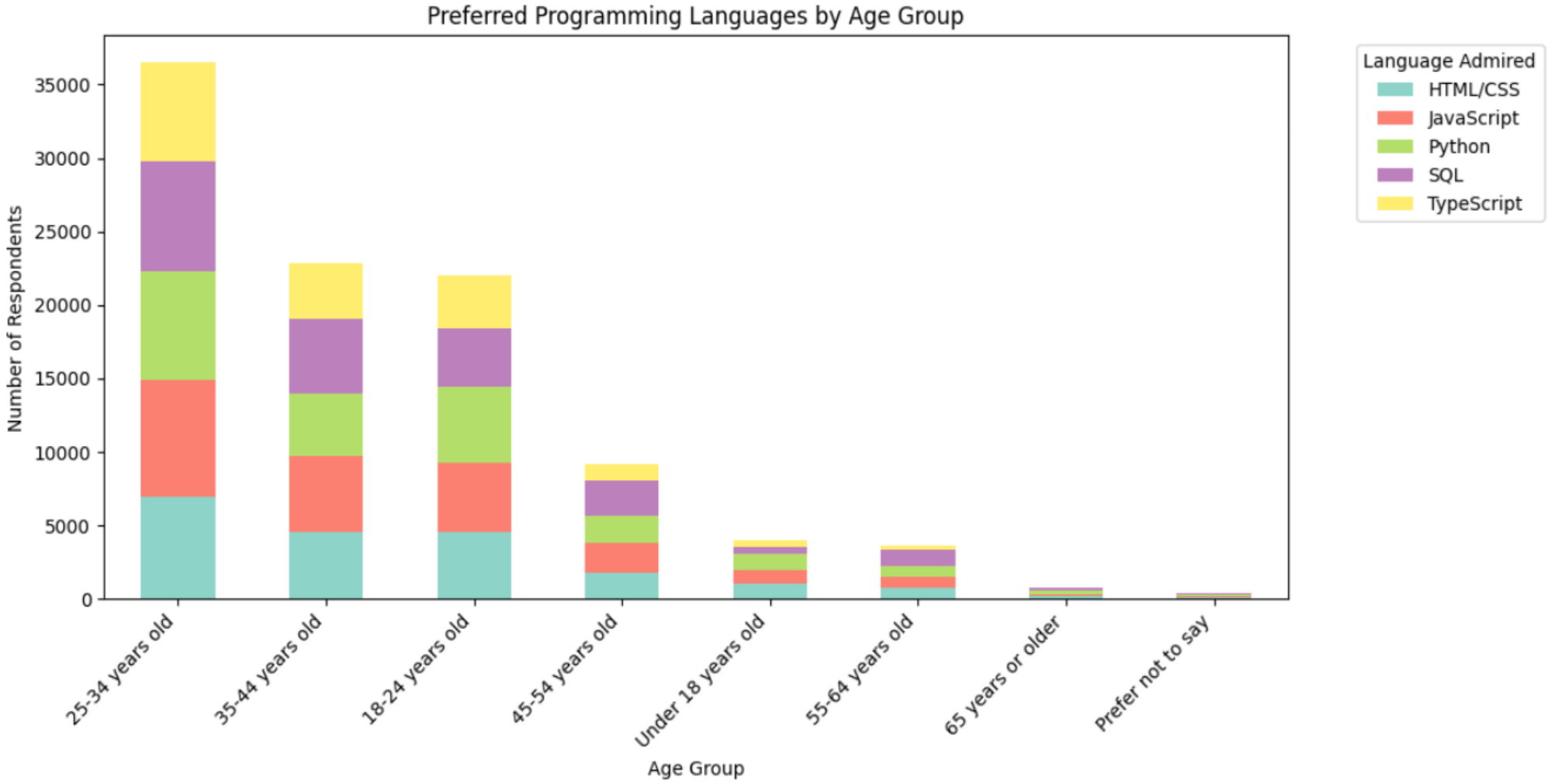
- This project provided a comprehensive analysis of global developer preferences, compensation, and satisfaction using real-world survey data.
- Key insights revealed strong alignment between developer admiration and usage of tools like **Python and PostgreSQL**.
- Experience and age are strong indicators of **higher compensation** and **stable satisfaction.**
- Interactive dashboards and visualizations enable deeper exploration and support **data-driven decision-making** for individuals, teams, and organizations.
- The rise of **remote work**, **AI tools**, and modern frameworks highlights the industry's dynamic nature and the need for ongoing skill development.

APPENDIX

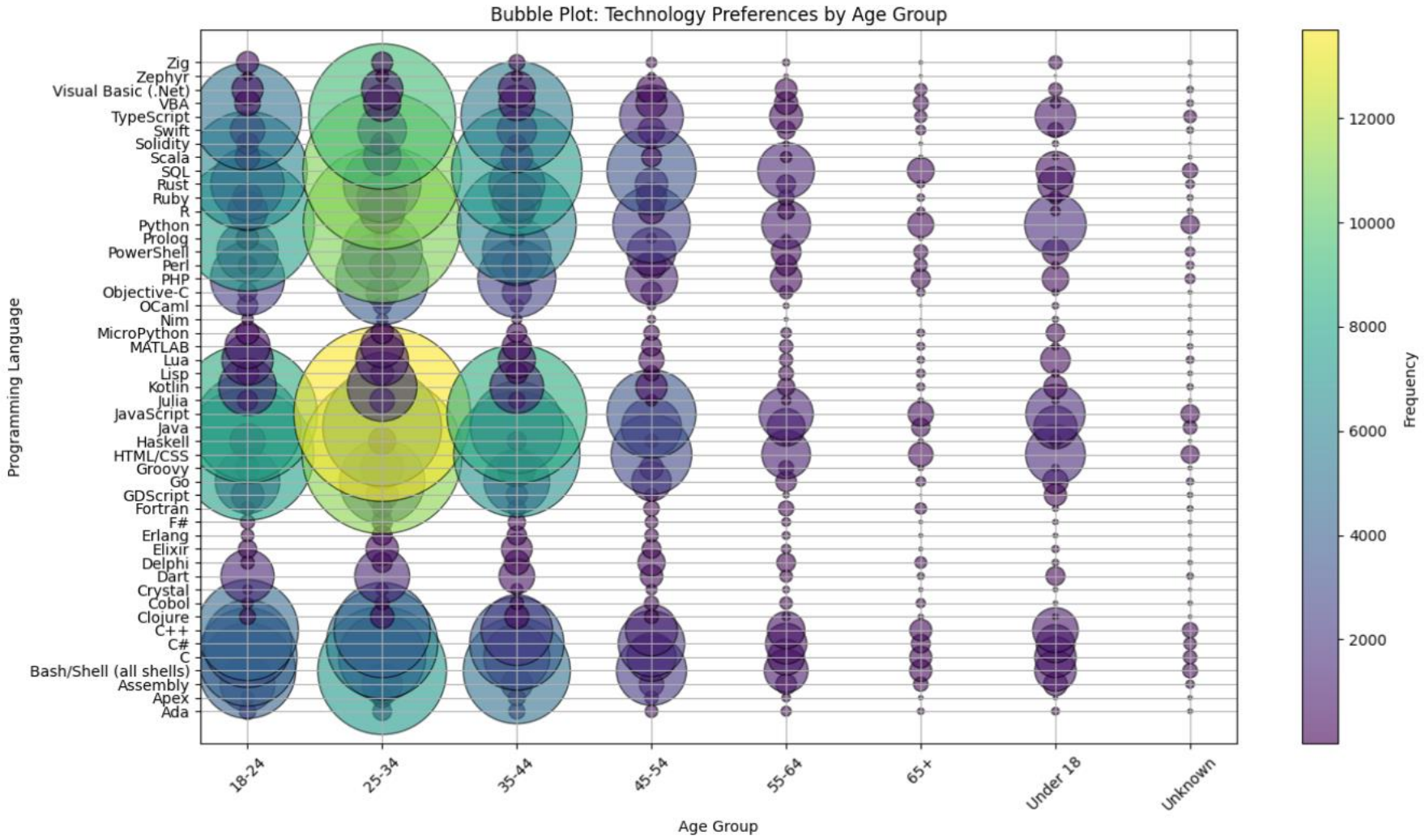
Data Pre-Processing Steps:

```
## Write your code here

# Map Age to numeric values
age_map = {
    'Under 18 years old': 16,
    '18-24 years old': 21,
    '25-34 years old': 29.5,
    '35-44 years old': 39.5,
    '45-54 years old': 49.5,
    '55-64 years old': 59.5,
    '65 years or older': 67,
    'Prefer not to say': None
}
df['Age_numeric'] = df['Age'].map(age_map)

# Drop missing values for all relevant columns
df_filtered = df[['ConvertedCompYearly', 'JobSatPoints_6', 'Age_numeric']].dropna()

# Optional: Remove extreme compensation outliers for better visualization
df_filtered = df_filtered[df_filtered['ConvertedCompYearly'] < 300000]
```

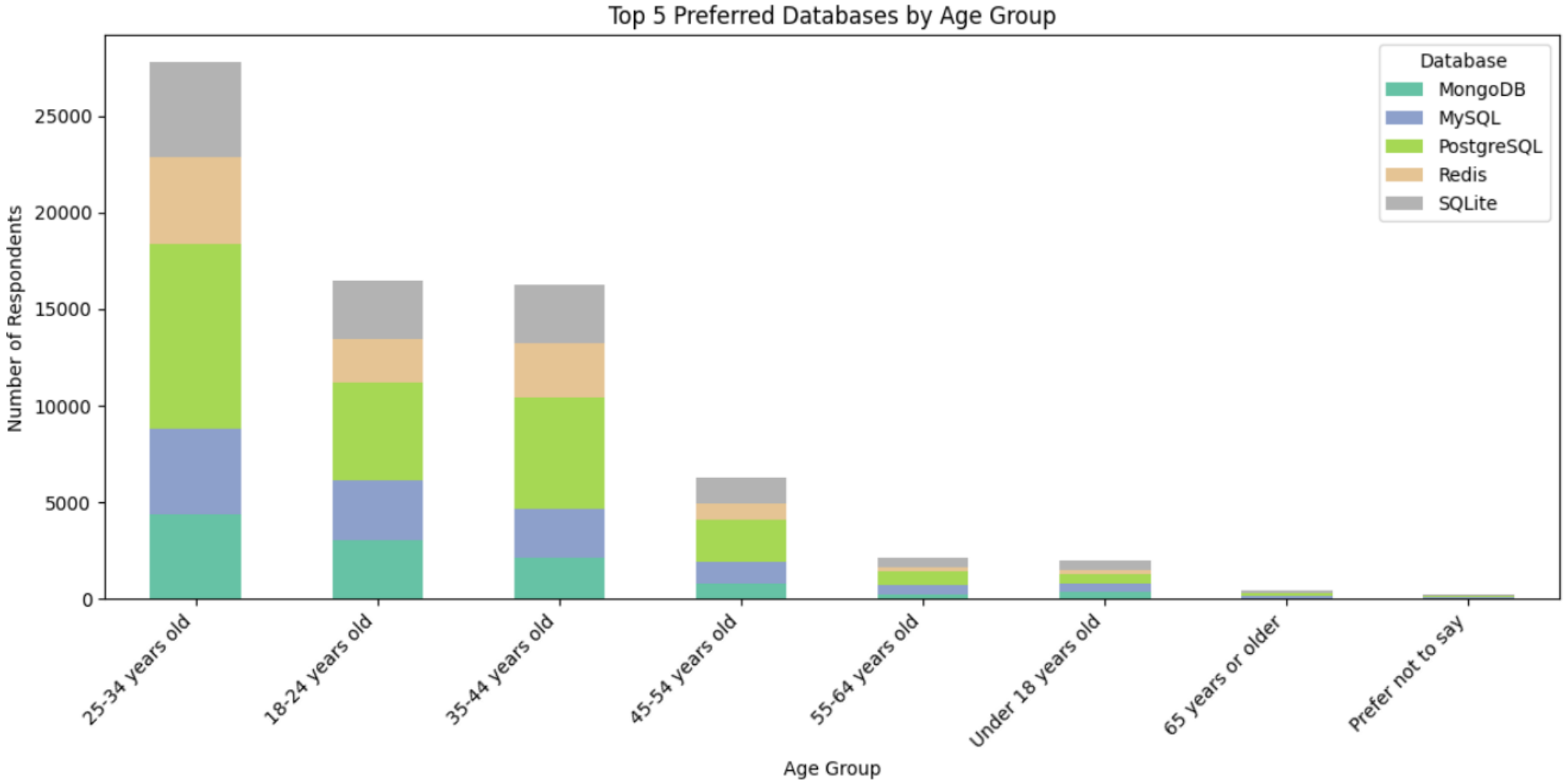
POPULAR LANGUAGES BY AGE



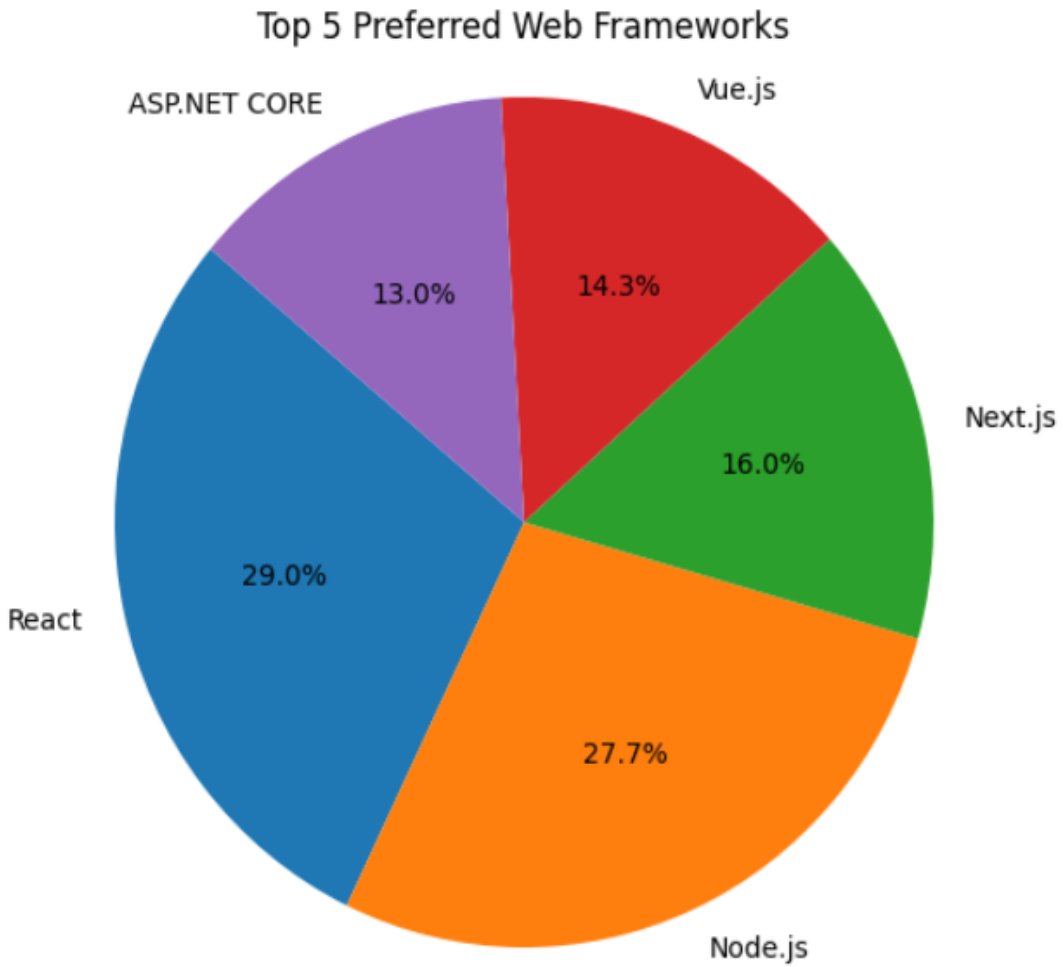
LANGUAGE PREFERENCE BY AGE



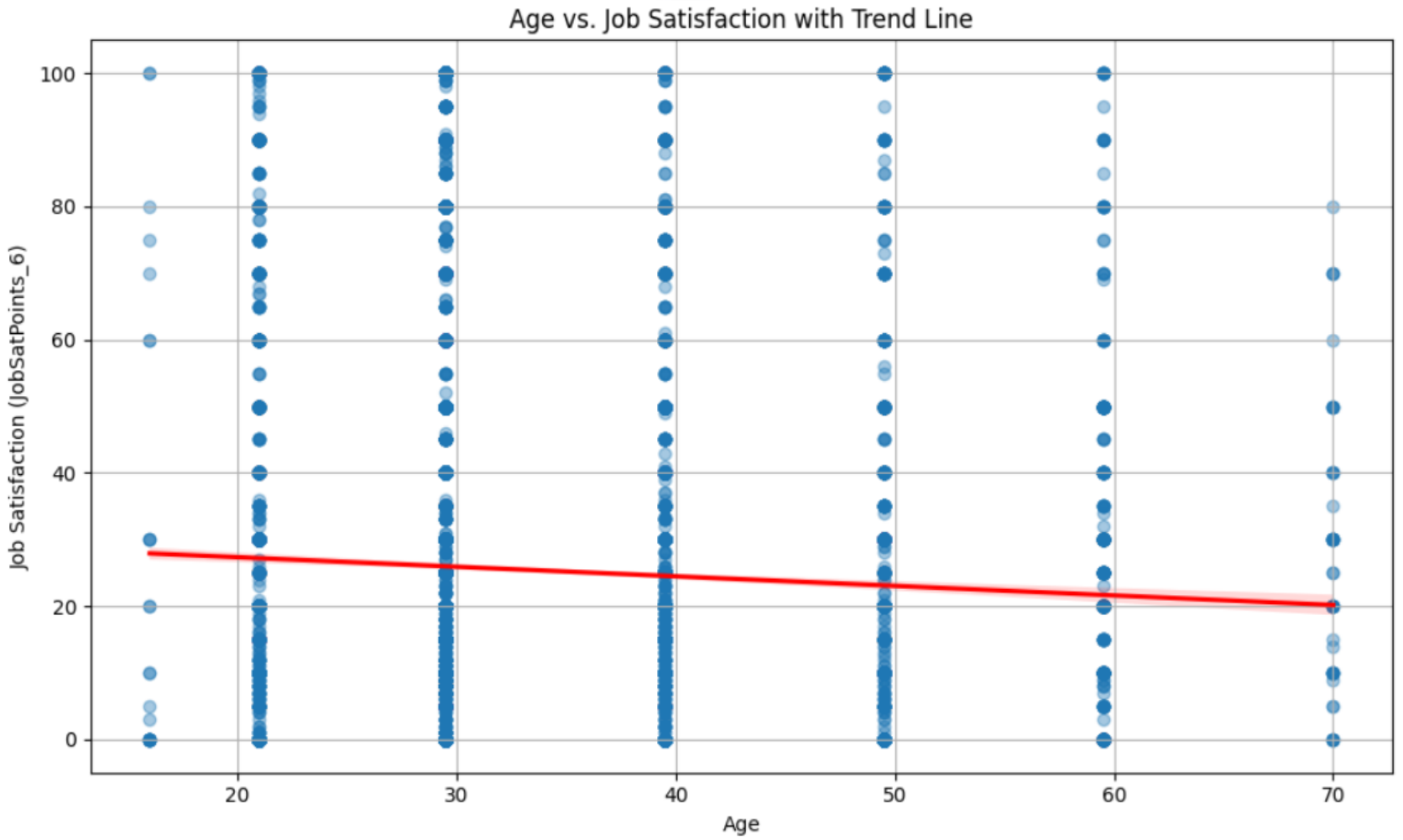
POPULAR DATABASES BY AGE



POPULAR WEB FRAMEWORKS

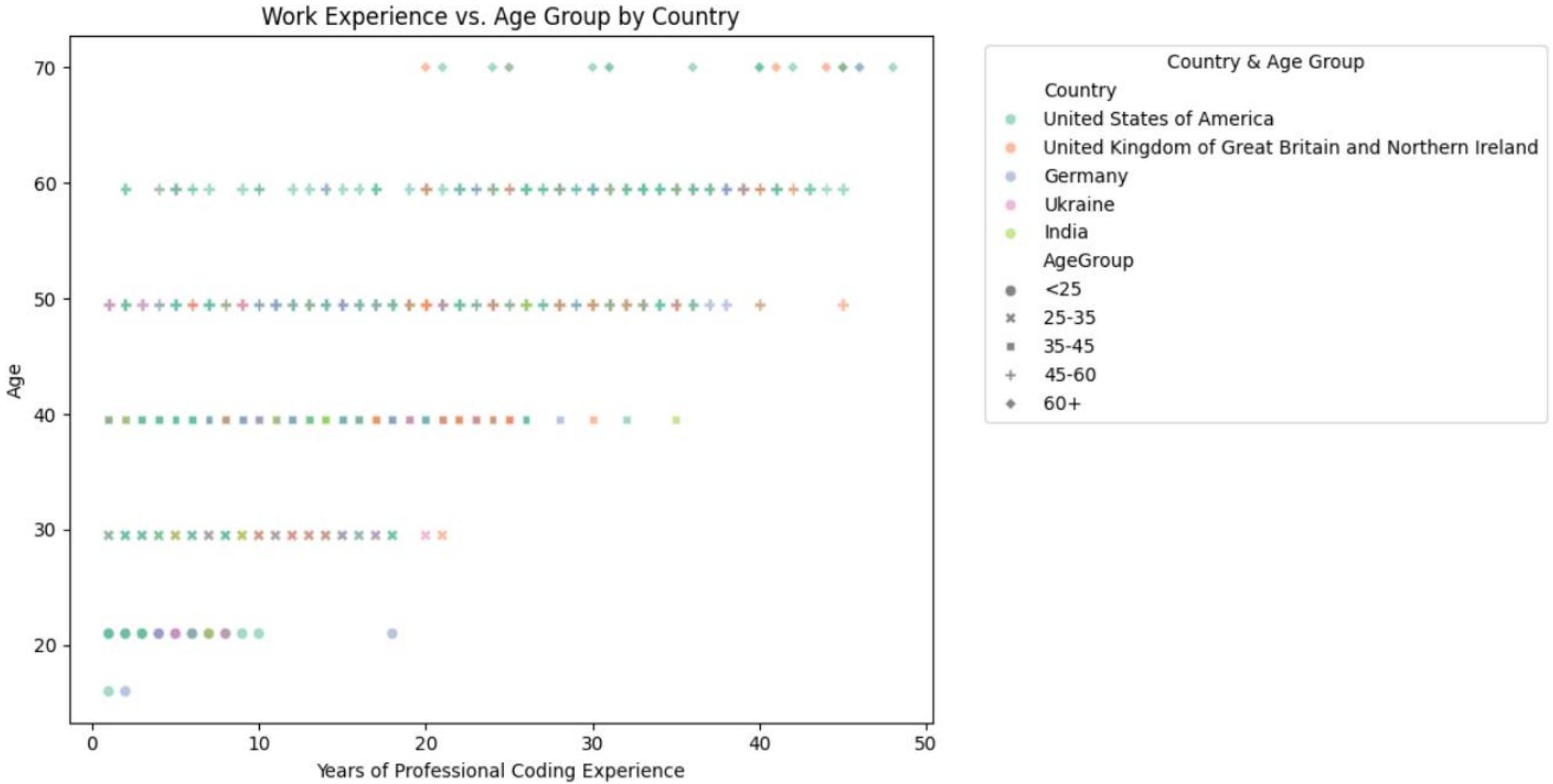


AGE vs JOB SATISFACTION

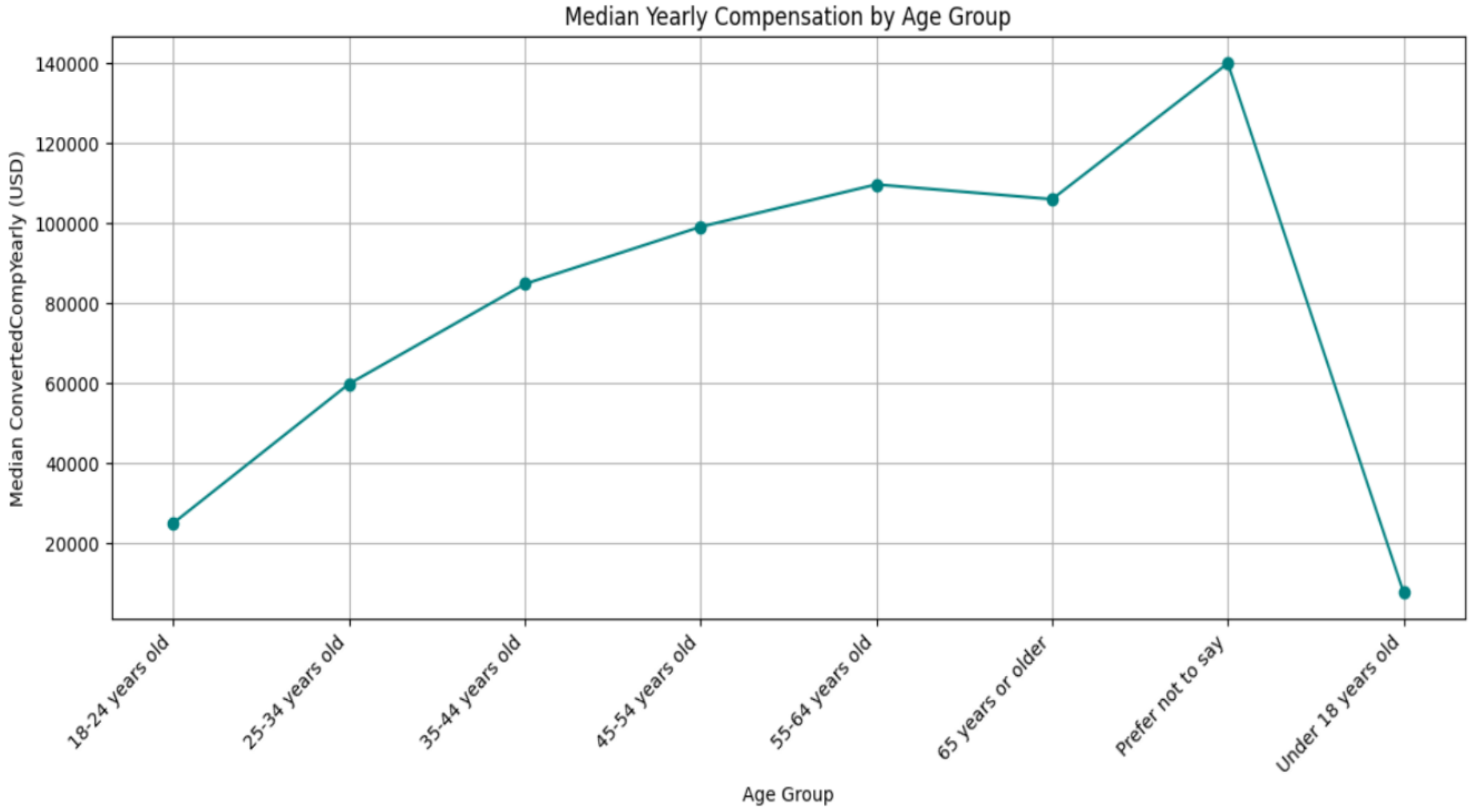


JOB SATISFACTION ACROSS EXPERIENCE

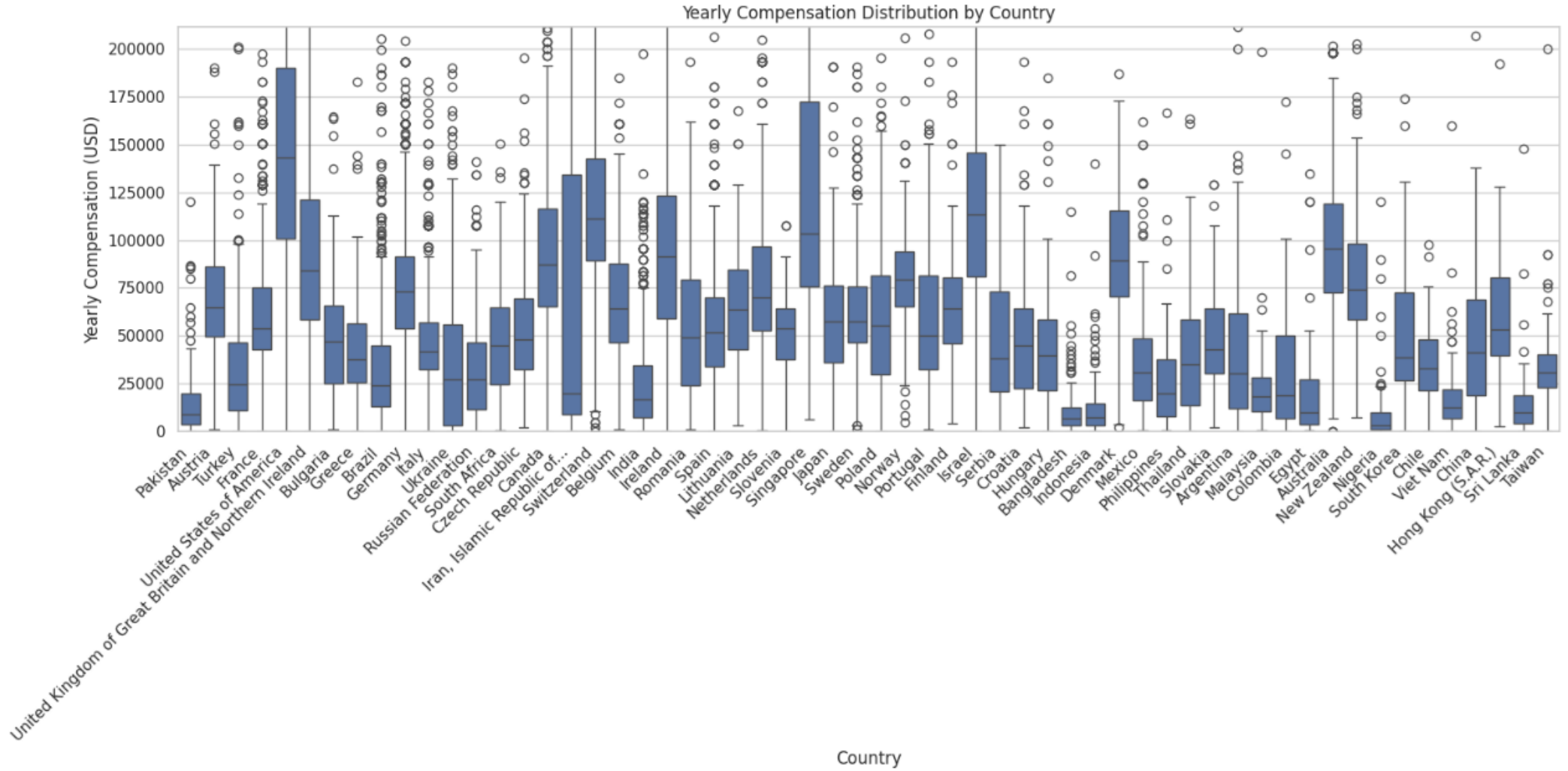
WORK EXPERIENCE vs AGE (COUNTRY)



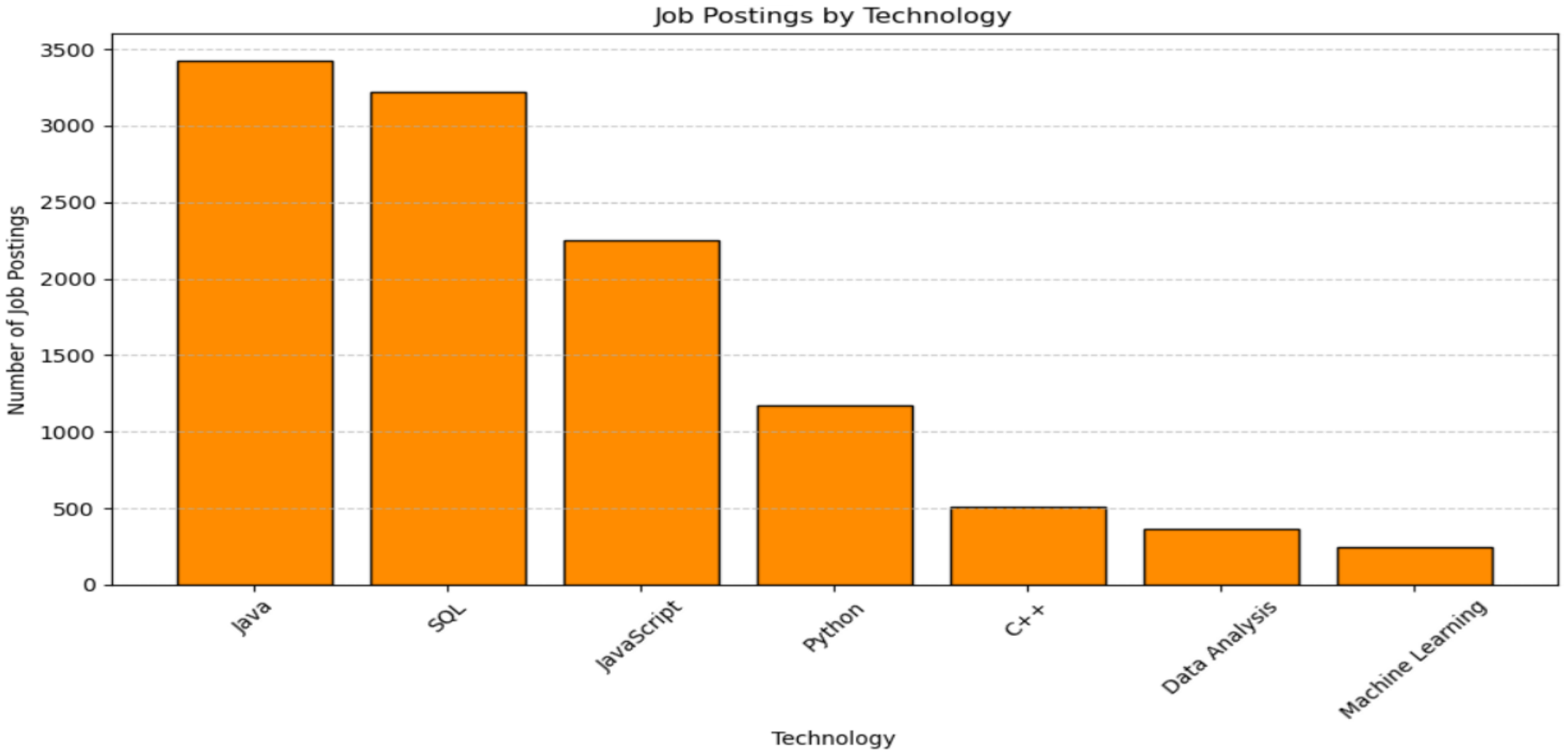
MEDIAN COMPENSATION BY AGE



COMPENSATION BY COUNTRY



JOB POSTINGS



THANK YOU