

IBM Capstone Project



Emerging IT Skills and Trends:

2019 Stack Overflow Developer Survey

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OUTLINE



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EXECUTIVE SUMMARY



- The data used in this project are from 2019 Stack Overflow Survey on about 90.000 respondents from 179 countries.
- By means of cutting-edge data analytics, this report aims to highlight current and future trends skills, mainly focusing on:
 - Programming Languages,
 - Databases Skills,
 - Demographics of Respondents.
- The Data was first cleaned and subjected to exploratory analysis, visualizations and dashboards.
- Our findings indicate that HTML/CSS is currently the leading programming language and is expected to keep its position next year. Meanwhile, MySQL, which is currently the most widely used database, may loose its ranking to MongoDB in the coming year.
- Remarkably, the majority of the survey respondents are men, of age average 28, and are from USA.
- NoSQL Databases will be preferred as compared to SQL Database
- Cloud--based Web development are getting more share in the market

INTRODUCTION



- To stay up to date with the global Information Technology (IT) community, it is essential to keep up with the ever-changing technologies.
- The aim is to highlight current and projected trends in the need for IT skills related to programming languages, databases, web frames and platforms.
- Below are the main questions which have been investigated:
 - What programming languages are most in demand today ?
 - What are the most current in-demand Databases Skills?
 - What are popular web frames and Platforms?
 - What is the demand of all these IT skills in the next year?
- Key findings show that HTML/CSS is the most current and future popular programming language, while MySQL which is the most current used Database may lose its position to MongoDB in the future.
- It also turns out that most respondents are from USA and are men of age of average 28, whose education level is the Bachelor Degree.
- Docker and React.js are expected to be the leading Platform and Web Frame, respectively
- The target audience of this project includes IT professionals, HR Managers, and any other persons interested in IT sector

METHODOLOGY



Methods used in this project are essentially for Data Collection, Data Wrangling, Data Visualization and creation of Dashboards. The **Python programming Language** with its well-equipped **Libraries** has been used.

- **Data Collection**

- 1) Data from files stored locally or in the cloud

- **pandas** for structured data like CSV, Excel, etc, **Openpyxl** for Excel files, **csv** for basic CSV handling, **json** for JSON files

- 2) Data from Database (Database Querying)

- **sqlite3** for SQLite, MySQL

- 3) Data from Websites (Web scraping: Extracting Data from websites)

- **BeautifulSoup** for parsing HTML,

- 4) API Integration (Accessing Data from APIs provided by web services)

- **requests** for REST API

- **Data Wrangling**

- load data, handle missing values, correct data types, normalization, removes duplicates, filter rows, handle outliers, save cleaned data

- **Exploratory Data Analysis**

- Distributions, Correlations, Outliers

- **Data visualization**

- Variety of Graphs and Charts using the rich Library of Python, Excel etc...

- **Creation of Dashboards**

- **Google Looker Studio**, IBM Cognos Analytics, Excel

RESULTS



- **Visualization – Charts**

Results here are trends which are presented in the form of Charts. Each Trend is followed by the associated Findings and implications

- **Programming language trends**

- Findings and implications

- **Database trends**

- Findings and implications

- **Platform trends**

- Findings and implications

- **Web frame trends**

- Findings and implications

- **Dashboards**

Results here are Dashboards organized as follows:

- **Dashboard Tab1**

- Languages, Databases, Platforms and Web Forms for the current Year

- **Dashboard Tab2**

- Languages, Databases, Platforms and Web Forms for the Next Year

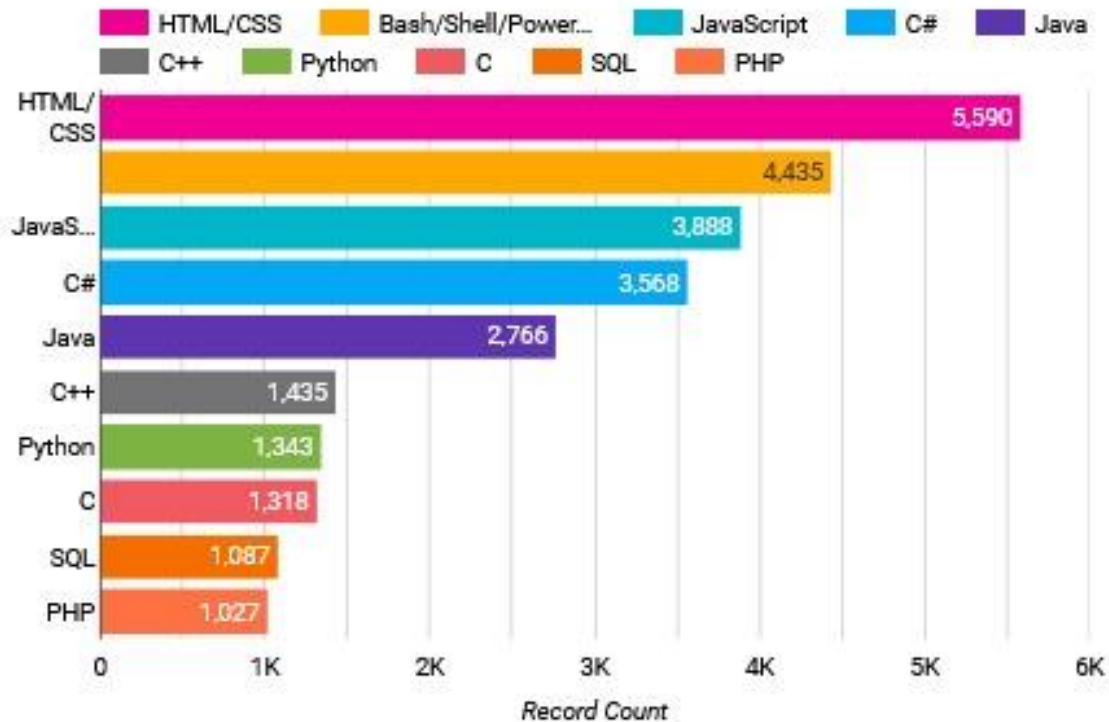
- **Dashboard Tab3**

- Demographics of Respondents

PROGRAMMING LANGUAGE TRENDS

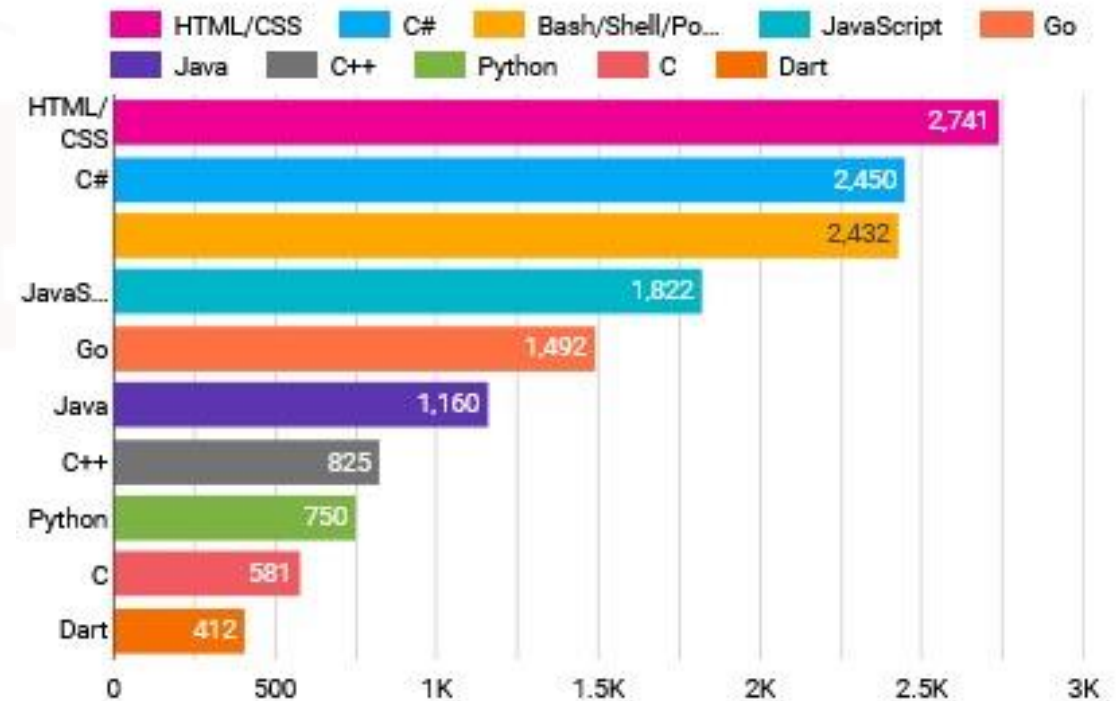
Current Year

Top 10 Programming Languages for the Current Year



Next Year

Top 10 Programming Languages for Next Year



PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

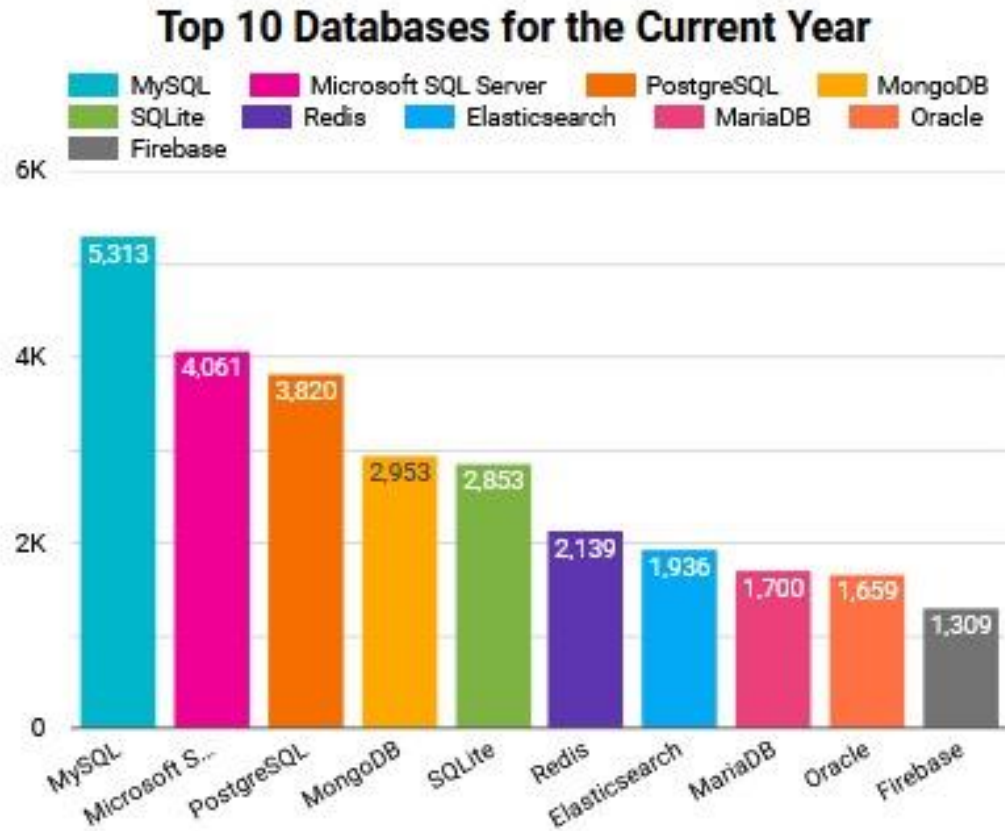
- HTML/CSS, Shell, JavaScript, C#, Java, C++, Go, Python, C, SQL, PHP are the current top 10 languages
- In the next year, HTML/CSS will keep its top position, while SQL and PHP are expected to be out of the top 10
- C# has made a big move in the next year, going from the 4th to the 2nd position, thereby overtaking JavaScript and shell languages
- There is a very strong interest for Go and Dart that just enter the top 10 in the coming Year.

Implications

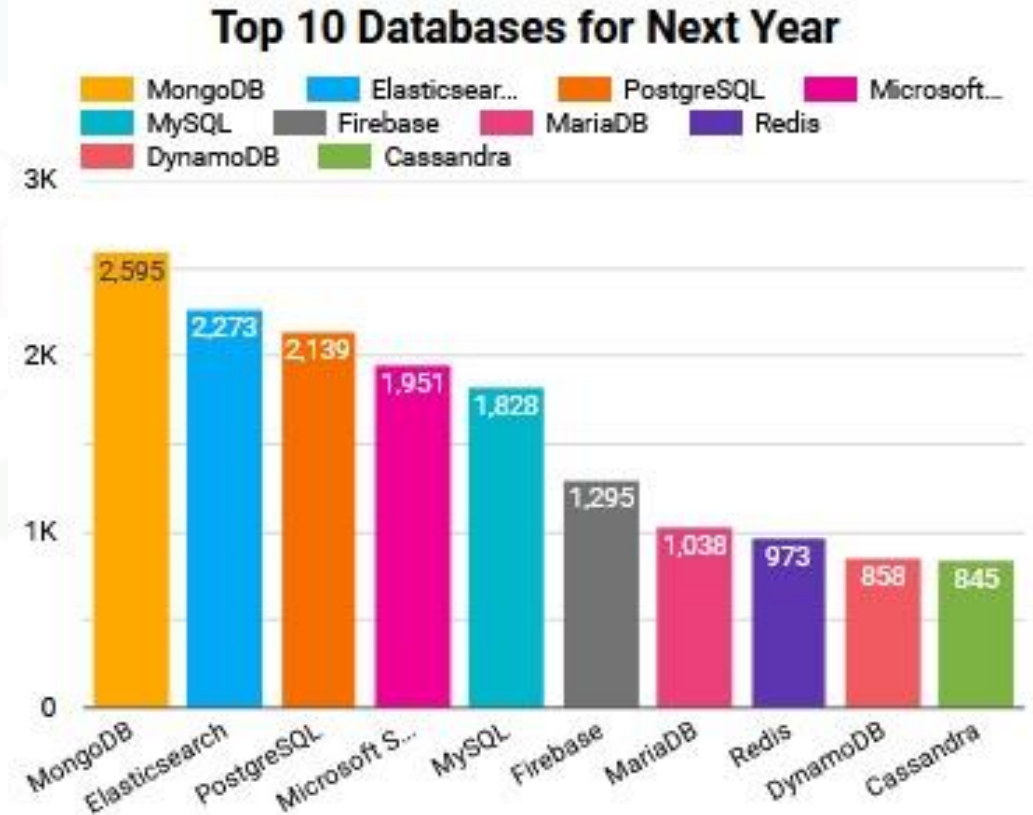
- HTML/CSS which is the most used is for web development. That is why there is much demand for Web developers' skills.
- SQL and PHP, designed to interact and manipulate relational databases, are surprisingly less demanded

DATABASE TRENDS

Current Year



Next Year



DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- MySQL, Microsoft SQL Server, PostgreSQL, MongoDB, SQLite, Redis, Elasticsearch, MariaDB, Oracle, Firebase are the current top databases
- MongoDB, the NoSQL Database, is expected to be top demanded Database next Year in profit to MySQL which has gone down from the topmost to the 4th position
- Elasticsearch will be the 2nd best most demanded Database next Year
- SQLite and Oracle will leave the top 10 databases next year in profit to DynamoDB (NoSQL hosted by Amazon) and Cassandra (NoSQL)
- Redis and Elasticsearch are new tools and are likely to gain more traction in the IT space

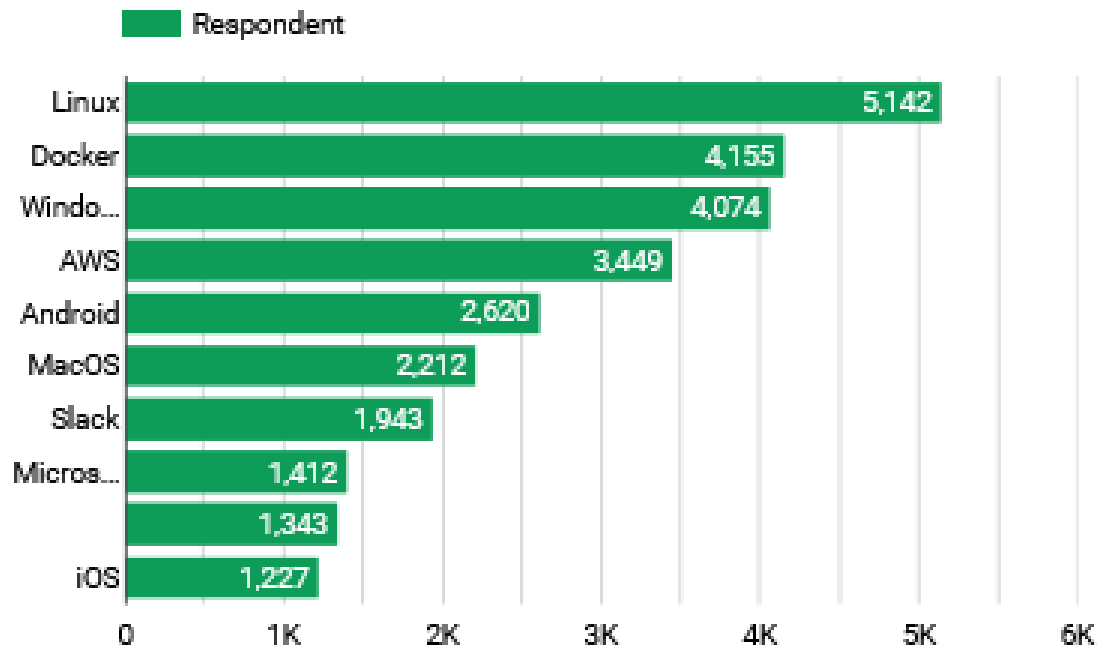
Implications

- The high-demand of MongoDB (NoSQL Database) is certainly due to the fact it stores Data in a flexible, JSON-like format, unlike traditional relational databases such MySQL, PostgreSQL, Microsoft SQL Server, etc...
- MongoDB is document-oriented, schema-less and highly scalable, thereby making it ideal for handling large amounts of unstructured or semi-structured data
- NoSQL, scalable and open-source databases such MongoDB, DynamoDB, Cassandra, are gaining in popularity in the coming year due to their powerful properties
- Companies may prefer open-sources database

PLATFORMS TRENDS

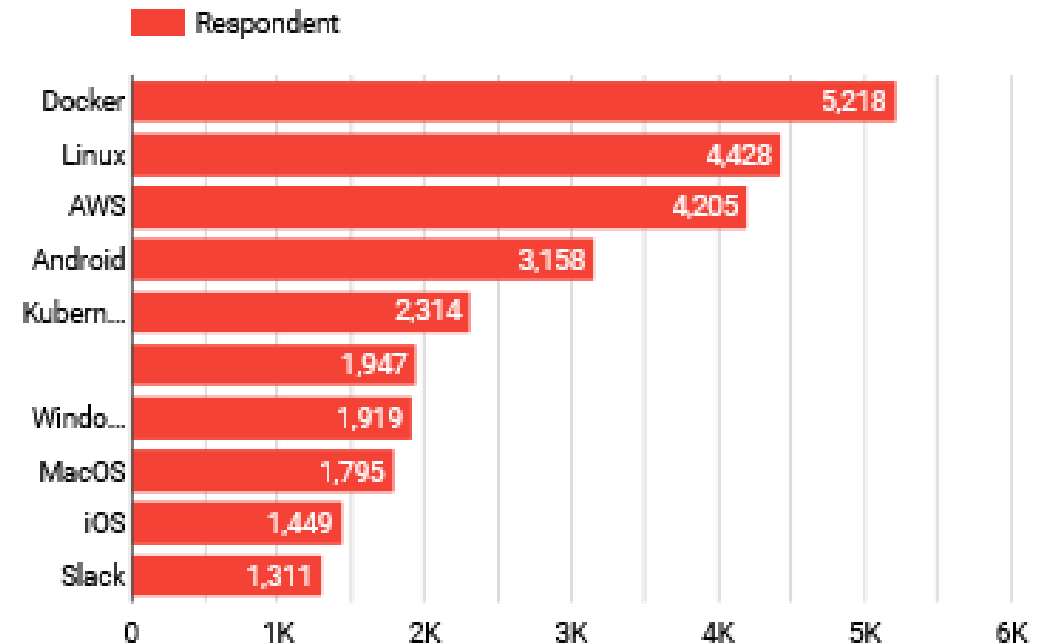
Current Year

Top 10 Platforms for the Current Year



Next Year

Top 10 Platforms for the Next Year



PLATFORMS TRENDS - FINDINGS & IMPLICATIONS

Findings

- Windows is losing its popularity. From its current 3rd position, it is expected to be out of the top 5 next year. A similar trend is observed for the MacOS (Apple Platform)
- Docker (Open-Source Platform) which was 2nd behind Linux is expected to be the leading Platform in the future
- The Cloud platform such as Docker, Kubernetes, AWS is getting more and more market share with the exception for the Slack Platform,
- The Android Platform is the best mobile Platform, followed by iOS

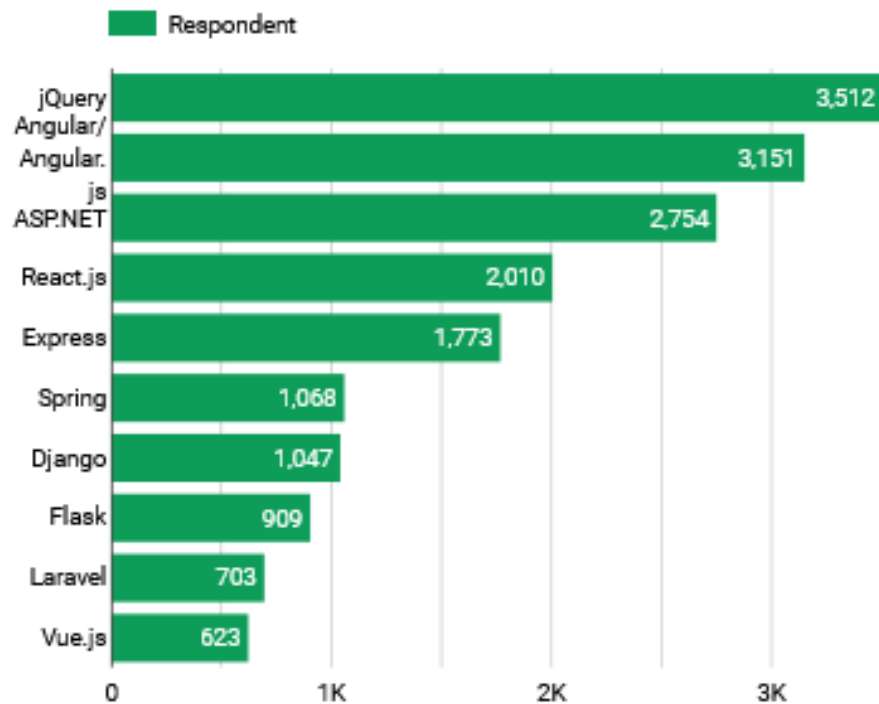
Implications

- Docker Platform is becoming a cornerstone of modern software development by enabling a faster, more reliable, and scalable application deployment.
- The demand on the Cloud Platforms is ever increasing. The transformation to cloud computing may become a non-reversible process

WEB FRAMES TRENDS

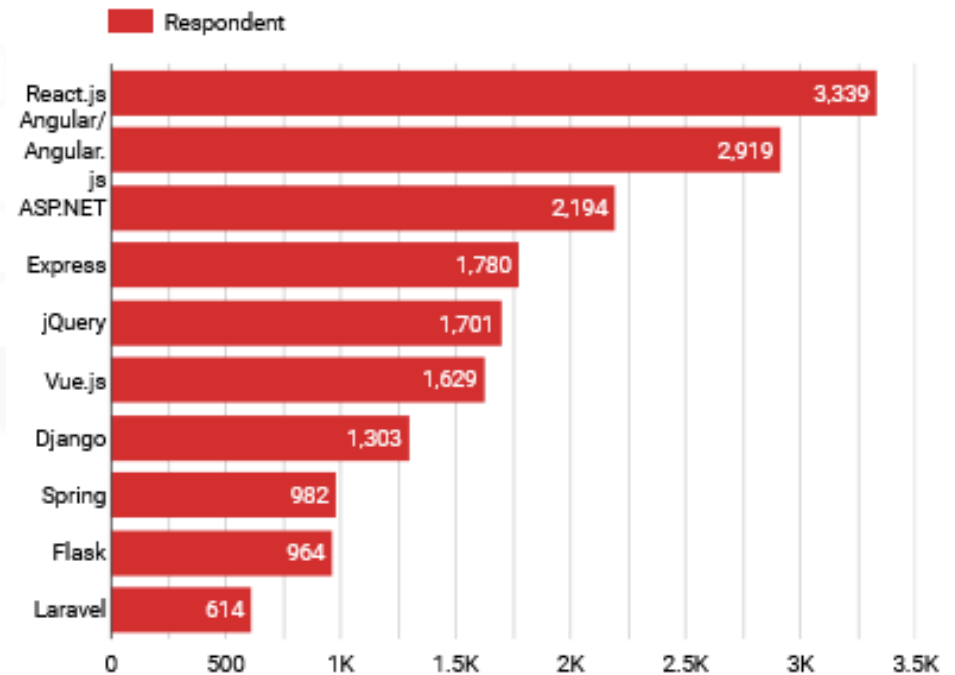
Current Year

Top 10 Web Frames for the Current Year



Next Year

Top 10 Web Frames for the Next Year



WEB FRAMES TRENDS - FINDINGS & IMPLICATIONS

Findings

- jQuery (JavaScript Library) popularity has significantly declined, moving from the 1st to the 5th position in the future
- React.js (JavaScript Library) is going to be the standard choice for the web development in the future, moving from the 5th to the 1st position
- Vue.js is becoming popular, making a significant from the 10th to the 6th position
- Angular, js.ASPNET, Express, Spring, Django, Flask and Laravel popularity is seemingly constant

Implications

- jQuery quickly loses market share, showing lack of interest in its future development ...
- React.js is superior to jQuery due to its flexibility, performance, and active ecosystem. React.js is particularly well-suited for building interactive, dynamic, and scalable applications
- Vue.js popularity is considerably increasing much like React.js

DASHBOARD

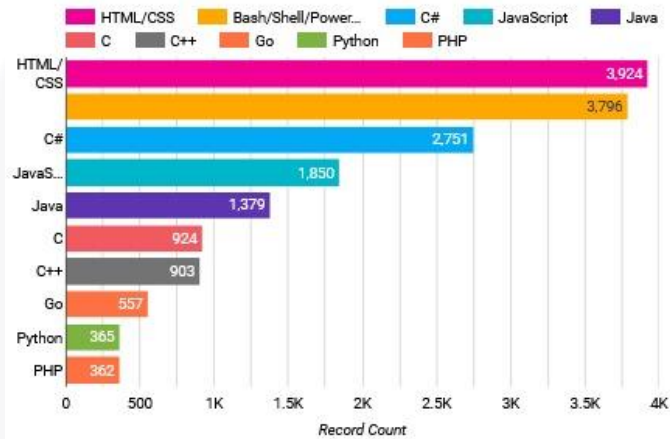


Below is the GitHub link of the Cognos/Looker Studio dashboard

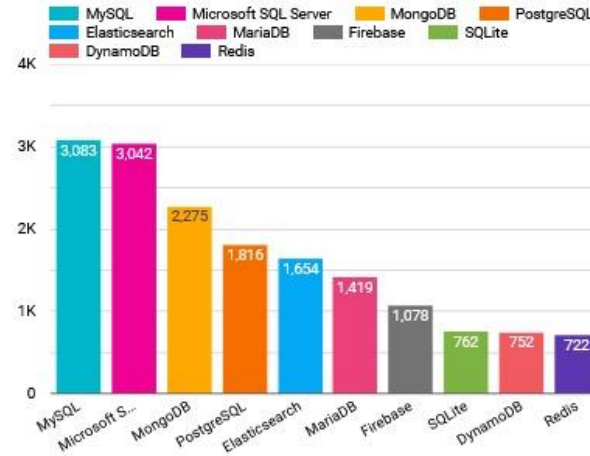
https://github.com/kenfack2022/dataAnalytics0/blob/main/IBMDDataAnalystsCapstoneProject_PeerGradedAssignment_Dashboard.pdf

DASHBOARD TAB 1

Top 10 Programming Languages for the Current Year



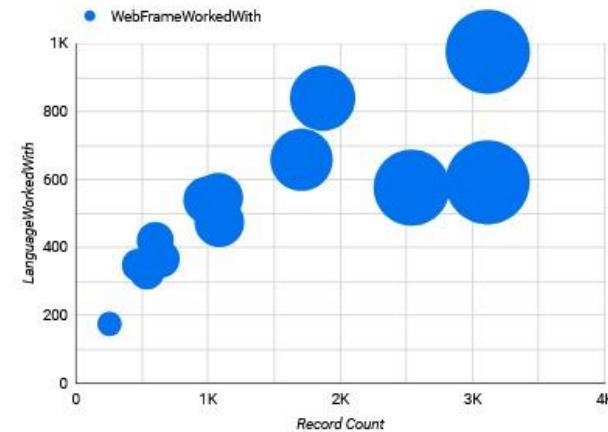
Top 10 Databases for the Current Year



Platforms for the Current Year

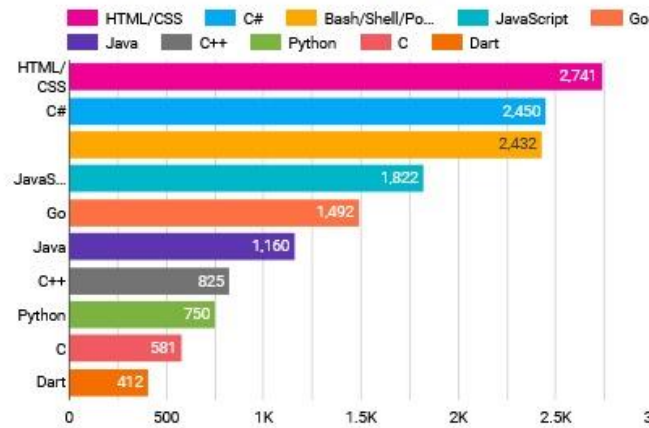


Top 10 Web Frames for the Current Year

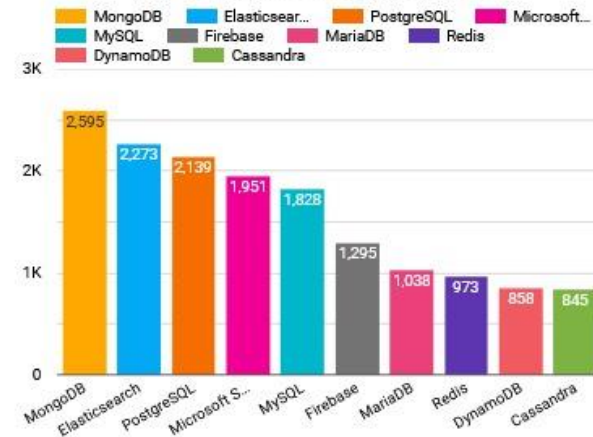


DASHBOARD TAB 2

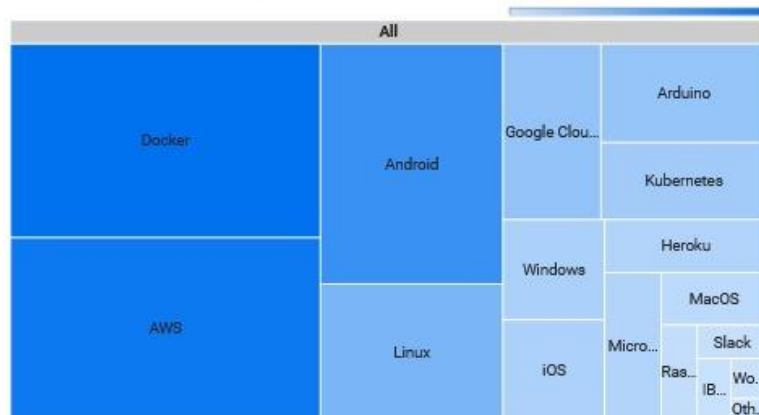
Top 10 Programming Languages for Next Year



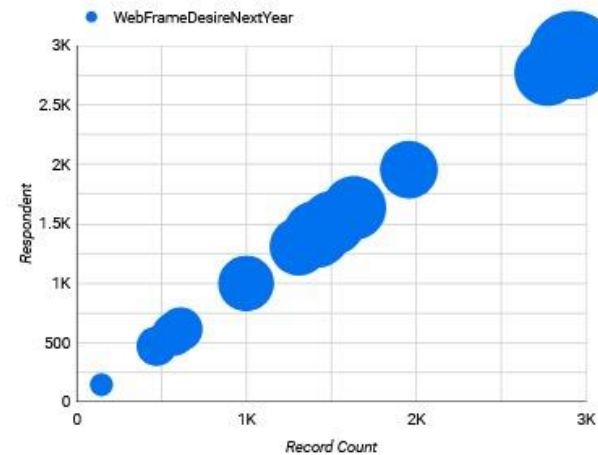
Top 10 Databases for Next Year



Platforms for Next Year

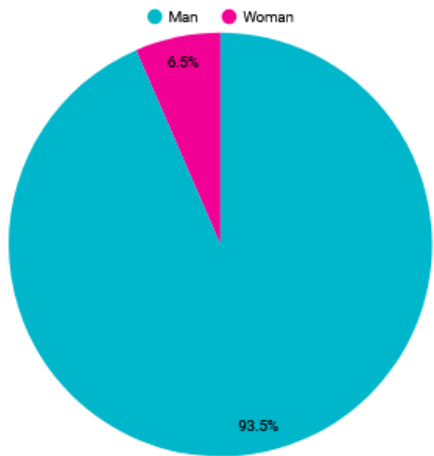


Top 10 Web Frames Next Year

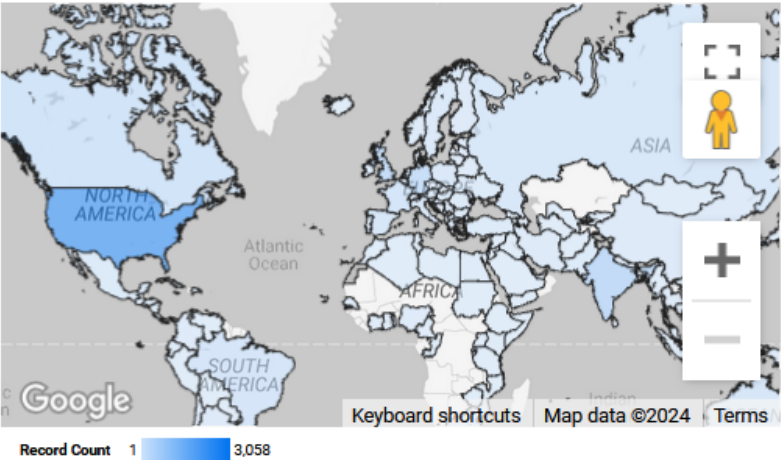


DASHBOARD TAB 3

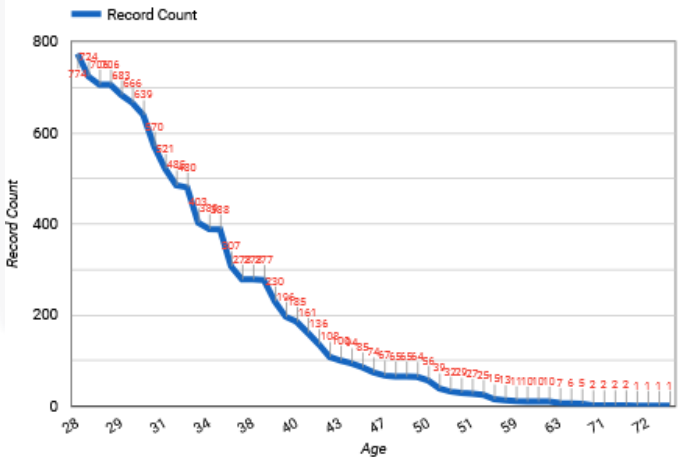
Respondents Classified by Gender



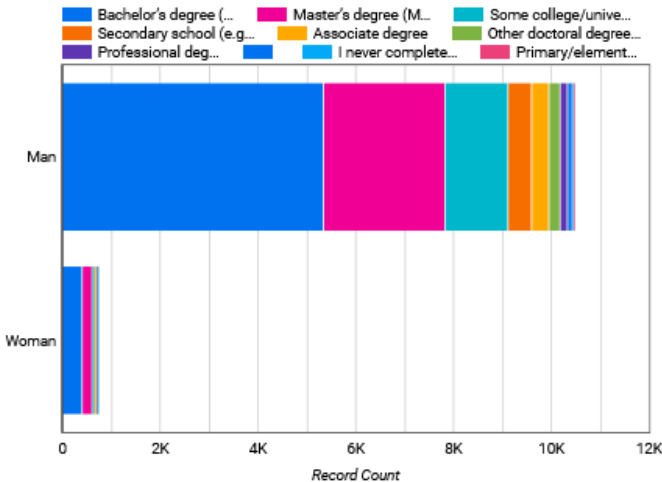
Respondents count by Country



Respondents Count by Age



Respondent Count by Gender, Classified by Formal Ed. Level



DISCUSSION



- Why the IT skills and Trends still receive ever-growing interest?
- What minimum background and Education Level is required for this Data Analytics Job?
- How to fill the gap between Men and Women in this field
- How do you choose the Database and the Programming Language to work with
- Are developers older than about 50 are out of the market?
- Why companies must adapt to web development rapidly changes?
- What is the next Data Analytics project?

OVERALL FINDINGS & IMPLICATIONS

Findings

- HTML/CSS will remain the N°1 programming language
- SQL and PHP are significantly loosing popularity
- MongoDB (NoSQL) is overtaking MySQL (SQL)
- Docker Platform is becoming popular than Linux
- Android is the most popular mobile platform
- jQuery (current N°1) is loosing popularity in favor of React.js which is expected to move from the 5th position to the 1st
- Vue.js is becoming popular
- 93% of respondents are men and have Bachelor degree
- Most respondents are 28 years of Age and are from USA

Implications

- Web based applications are taking over the traditional ones
- The future is on the adoption of Non-relational databases
- The cloud platforms are leaders in the market
- Cloud-based services become top-choice for platform development
- Companies prefer Open-Sources Products

CONCLUSION



- To stay relevant in the technology field, it's important to learn web-based programming languages & non-relational databases
- Among web Frame Works, React.js is the best to learn for your future
- Cloud-based service is the right direction for IT investment
- Learning different technology (programming language, database and cloud services) can be very advantageous
- Employees in IT fields should adapt to continuous changes

APPENDIX



Platforms for the Next Year

