

## Project Title: UCI Bank Marketing Data Analysis

### Overview

This project explores the **UCI Bank Marketing Dataset** to uncover insights into customer behavior and trends. Using Python and key libraries like Pandas, Matplotlib, and Seaborn, the data was cleaned, analyzed, and visualized to answer specific business questions. The findings can help improve marketing strategies, understand customer demographics, and identify patterns for better decision-making.

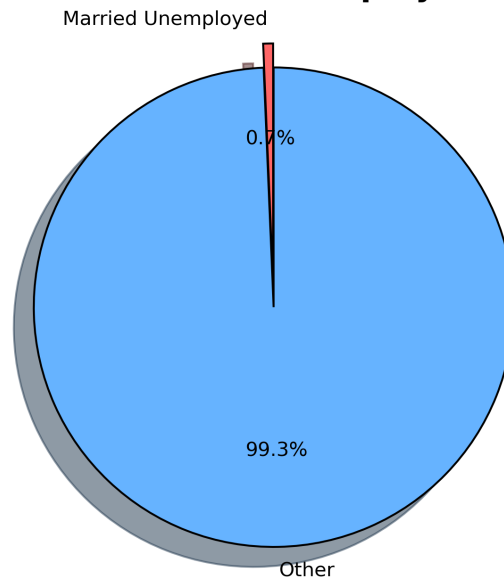
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### Key Questions Analyzed

#### 1. How many married individuals are unemployed?

- We explored the employment status of married individuals, identifying those with an “unknown” job type. A **pie chart** was created to visualize the proportion of unemployed individuals among the married population.

#### Proportion of Married Unemployed Individuals



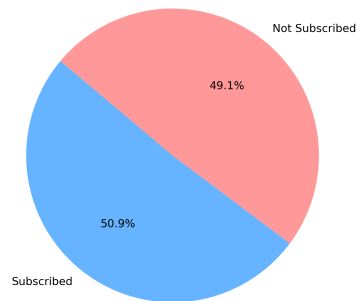
### Report The analysis identifies the number of married unemployed individuals in the dataset by filtering for married individuals with an ‘unknown’ job status. The result is visualized using a pie chart to show the proportion of married unemployed individuals compared to the rest. The chart highlights that a small subset of the population falls into this category. This provides insights into the distribution of employment status among married individuals. The visualization aids in

understanding the relationship between marital status and employment.

## 2. What is the average age of individuals who subscribed to a term deposit versus those who did not?

- The average age of both groups (subscribed vs. not subscribed) was compared. A **pie chart** highlights the age differences to target specific age groups effectively.

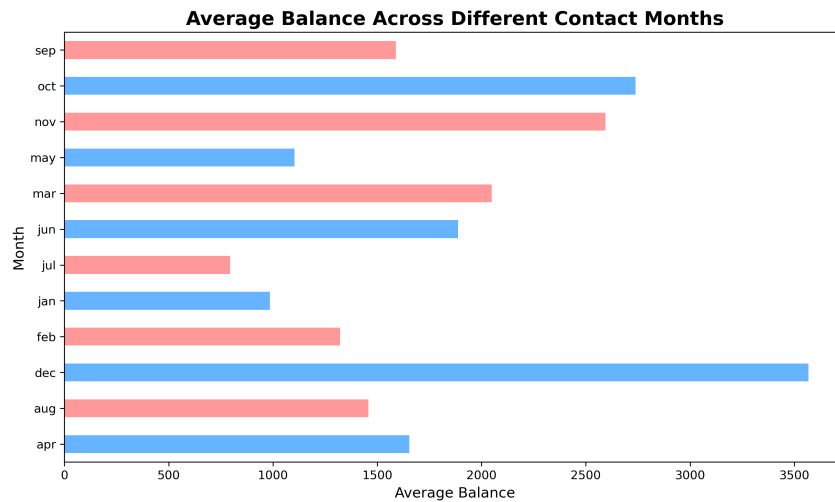
**Average Age of Individuals Who Subscribed vs. Did Not Subscribe to a Term Deposit**



- ### Report The analysis compares the average age of individuals who subscribed and those who did not to a term deposit using a pie chart. The chart highlights the demographic differences between the two groups. It shows that individuals who subscribed have a distinct average age compared to those who did not. This information can help refine marketing strategies targeted at specific age groups. The visualization provides a clear view of the age distribution in relation to term deposit subscriptions..

## 3. How does the average balance vary across different contact months?

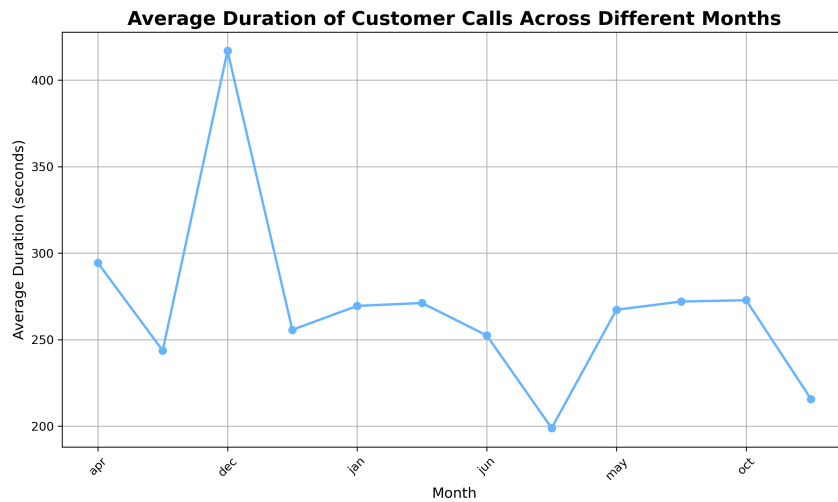
- The dataset revealed how customers' average balance changes by month. A **horizontal bar chart** was used to display monthly trends, showing significant fluctuations in balance patterns.



• ### Report The analysis shows how the average balance varies across different contact months using a horizontal bar chart. The chart reveals fluctuations in average balance throughout the months, with some months having higher average balances than others. These variations might be linked to seasonal factors or marketing campaigns. The visualization provides insights into customer behavior and financial patterns, which could inform targeted marketing strategies. It also highlights months with significant changes in customer balances.

#### 4. How does the average duration of customer calls vary by month?

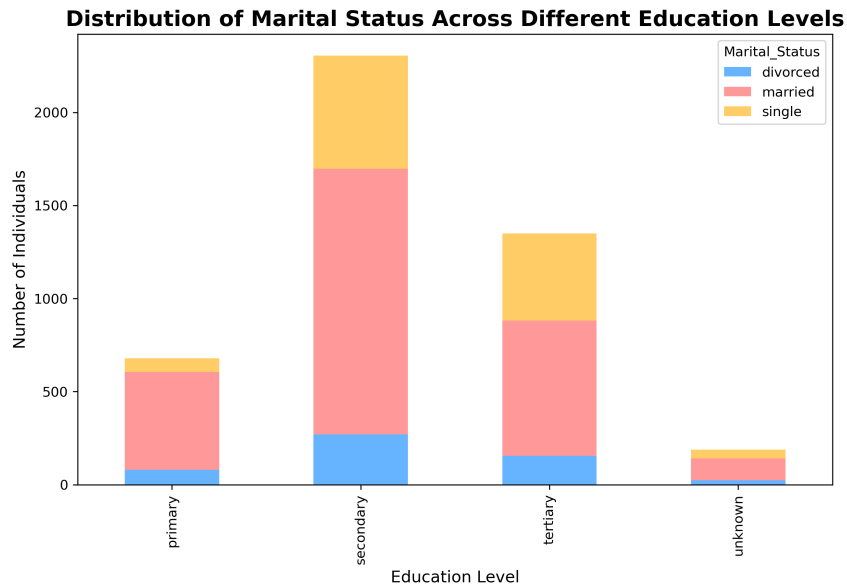
- By analyzing call duration data, we visualized the average call length across different months. A **line chart** shows these variations, offering insights into customer engagement trends throughout the year.



- ### Report The analysis shows how the average duration of customer calls varies across different months. The line chart indicates fluctuations in call duration over the year. Some months show longer call durations, while others have shorter averages. This trend could reflect seasonal marketing efforts or customer engagement patterns. The visualization helps understand how call durations change over time, which can be useful for evaluating the effectiveness of campaigns or customer service performance.

## 5. What is the distribution of marital status (married/single/divorced) across different education levels?

- The relationship between marital status and education levels was analyzed. A **stacked bar chart** illustrates how marital status is distributed among various education groups, offering insights for targeted campaigns.



### Report: The analysis visualizes the distribution of marital status across education levels. Higher education levels show a more balanced marital status, while lower levels have more single individuals. This highlights how marital status varies with education. The chart offers valuable insights for demographic analysis and marketing strategies. —

## Tools and Techniques

- **Python Libraries:** Pandas, NumPy, Matplotlib, Seaborn
- **Data Cleaning:** Handled missing values, corrected column names, and removed duplicates for accurate analysis.
- **Data Visualization:** Created engaging and clear visuals like pie charts, bar charts, and line graphs to showcase findings effectively.

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## Key Insights

- A small portion of married individuals is unemployed, which can be a potential focus group for financial products.
- Customers who subscribed to term deposits have distinct average ages, aiding in demographic-based targeting.
- Monthly balance trends and call durations reveal seasonal patterns that align with campaign effectiveness.

- Marital status distributions across education levels provide insights into lifestyle and financial behavior differences.
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### **Why This Project Matters**

This project demonstrates how businesses can leverage data to **make informed decisions** and refine their strategies. By focusing on customer behavior, trends, and demographics, companies can optimize their marketing campaigns, build better customer relationships, and improve financial outcomes.

### **Get Involved!**

Explore the code, analyze the visualizations, and share your feedback. Let's unlock the potential of data-driven insights together!