Social Ads Data Analysis Report

August 12, 2024

1 Introduction

The purpose of this report is to analyze the data from a social ads campaign, focusing on understanding the relationships between ad spending on various platforms (Google, Facebook, Instagram) and sales. We also perform a correlation analysis and a linear regression model to predict sales based on ad spend.

2 Data Summary

The dataset contains 200 entries with the following columns: `segment`, `google`, `facebook`, `instagram`, `sales`, `size`, `is_large`, `area`, `area_suburban`, `area_urban`.

- `google`, `facebook`, `instagram`: Advertising spend on respective platforms.
- `sales`: Sales figures.
- `size`: Size of the company (large or small).
- `is_large`: Binary indicator for market size.
- `area`, `area_suburban`, `area_urban`: Location data.

3 Correlation Analysis

A correlation analysis was performed to understand the relationships between the variables. The correlation matrix is presented below.

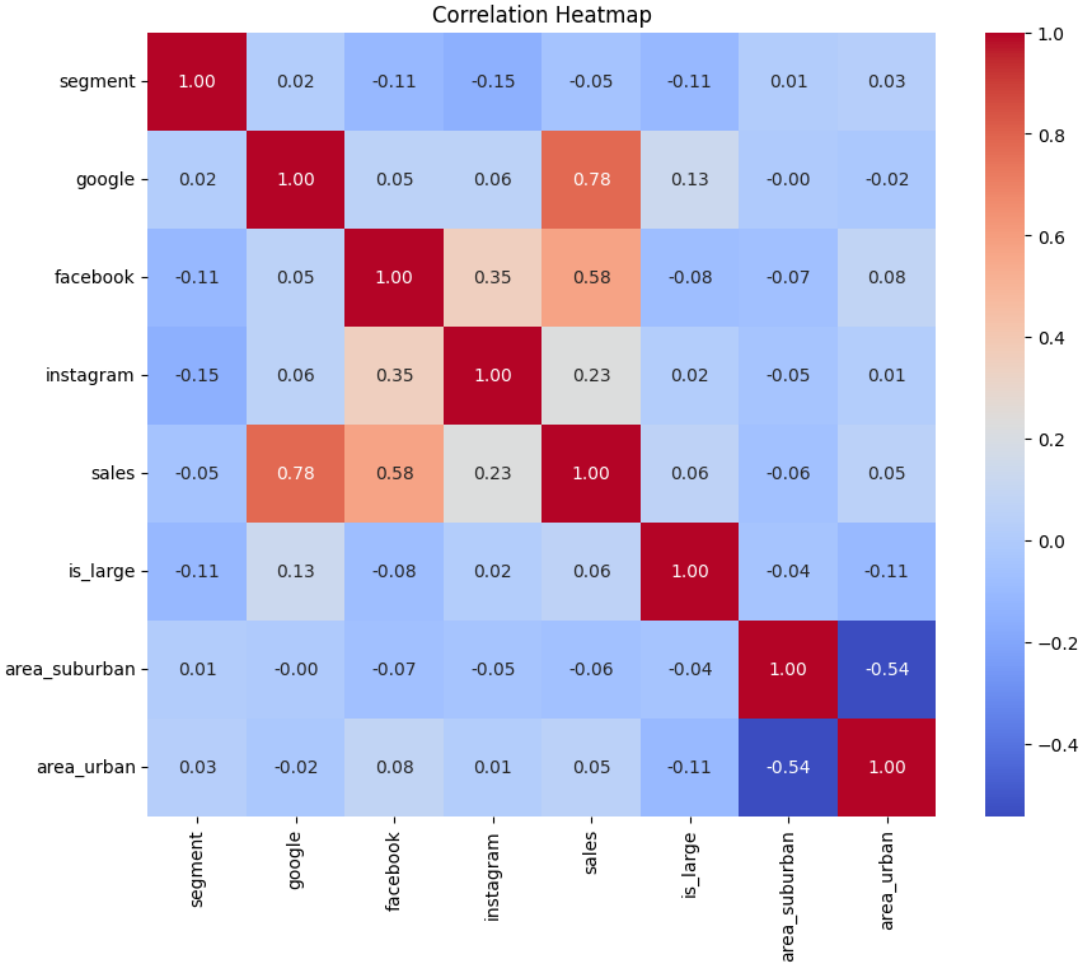

Figure 1: Correlation Heatmap

4 Data Visualization

Several visualizations were created to explore the data.

4.1 Distribution of Area

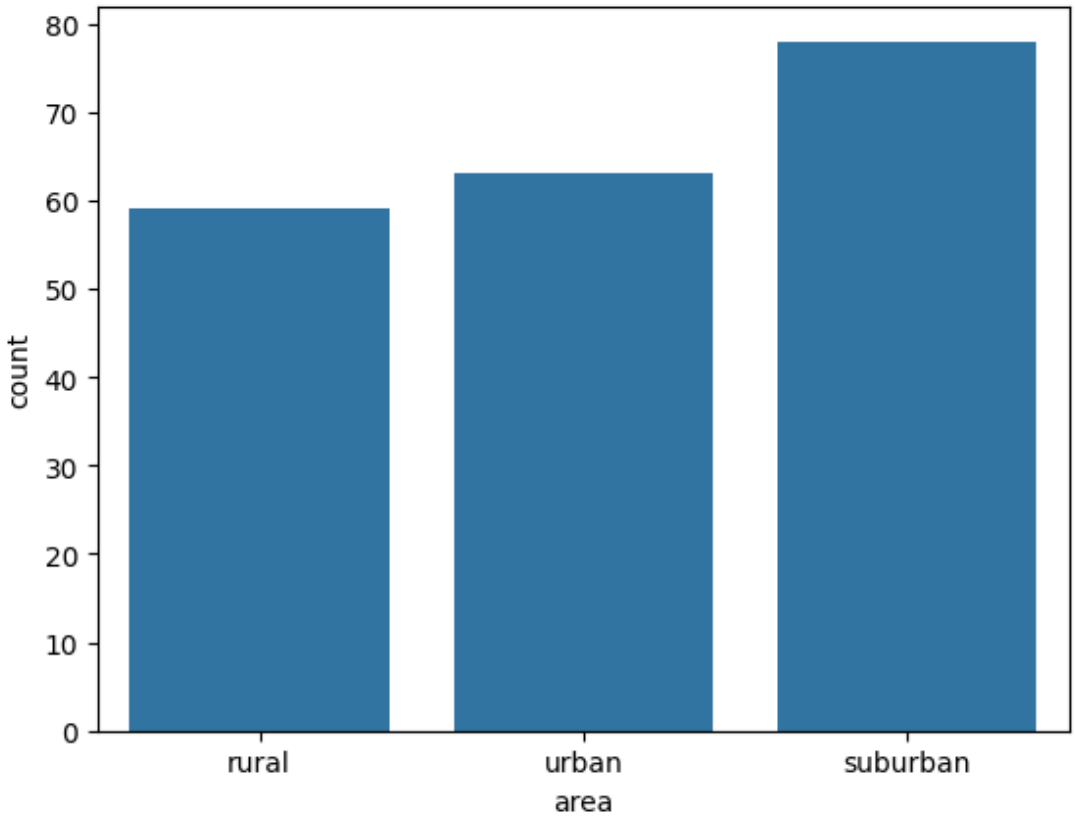

Figure 2: Distribution of Area

4.2 Distribution of Size

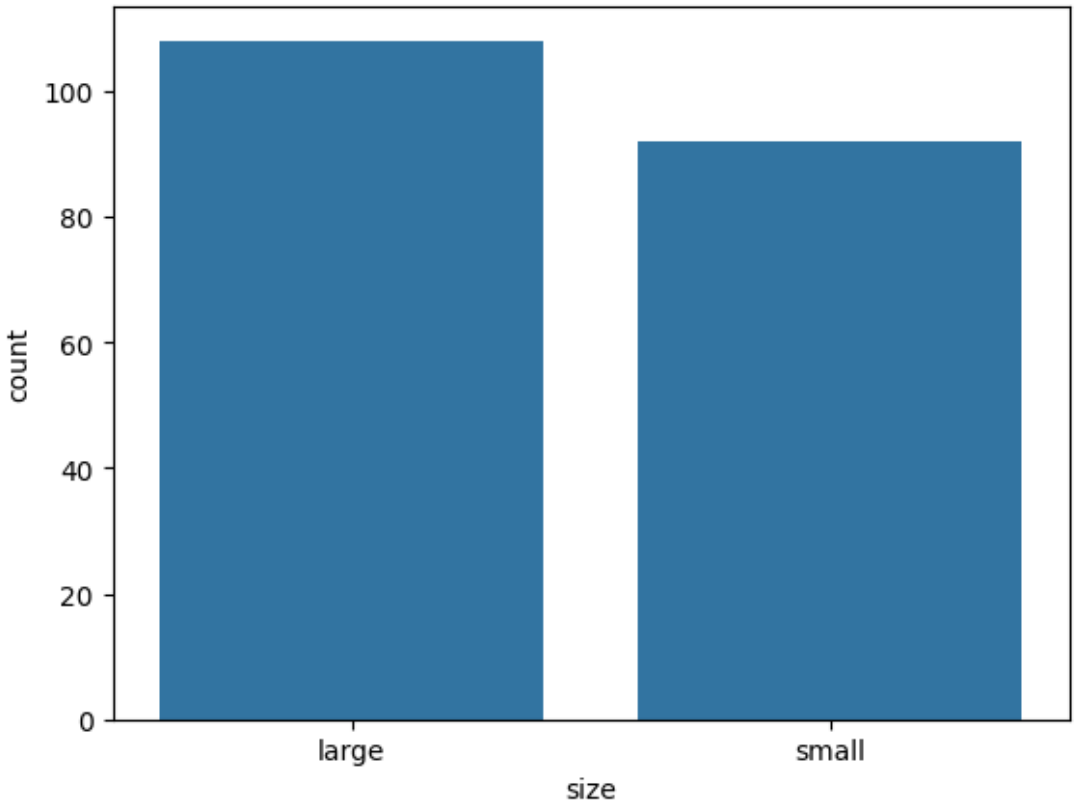

Figure 3: Distribution of Size

4.3 Advertising Spend vs Sales

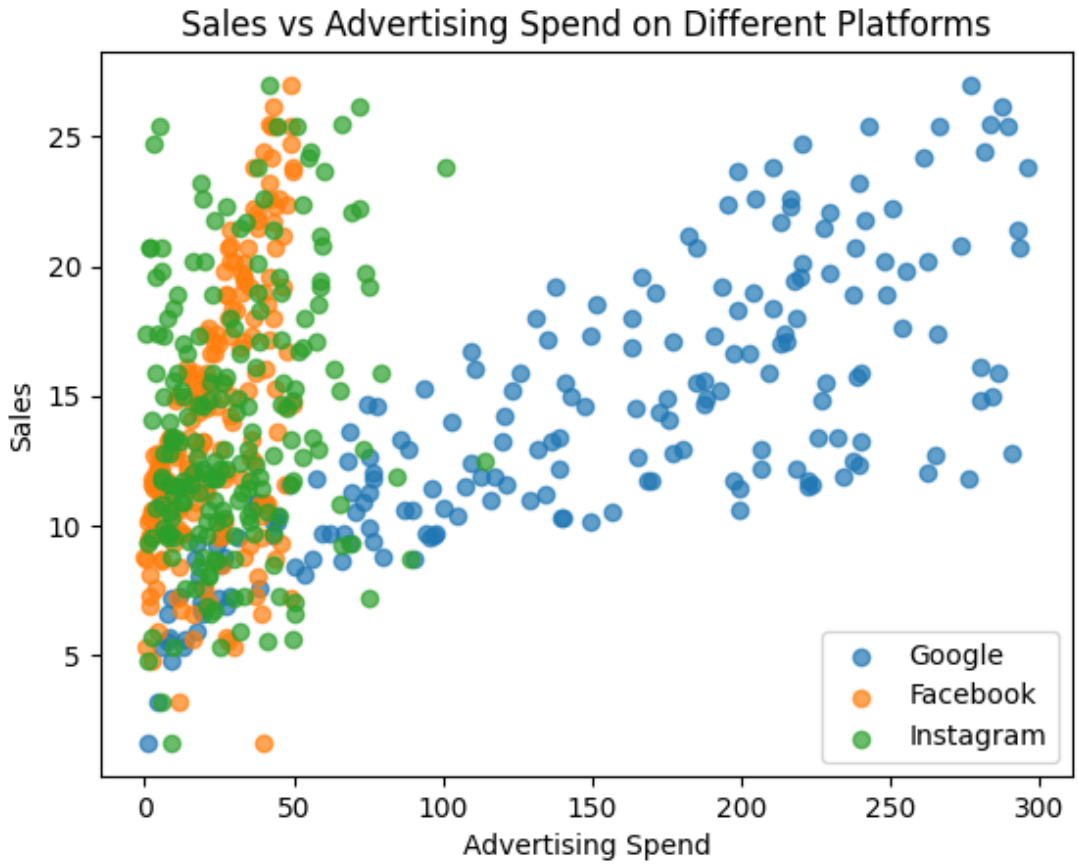

Figure 4: Sales vs Advertising Spend on Different Platforms

5 Regression Analysis

A linear regression model was fit to predict sales based on advertising spend on Google, Facebook, Instagram. The model's coefficients are as follows:

$$\text{Sales} = 2.94 + 0.05 \times \text{Google} + 0.19 \times \text{Facebook} - 0.00 \times \text{Instagram}$$

- **Intercept:** 2.94
- **Google Coefficient:** 0.05
- **Facebook Coefficient:** 0.19

- **Instagram Coefficient:** -0.00

The model's R-squared value is 0.897, indicating that approximately 89.7% of the variance in sales is explained by the model.

6 Conclusion

The analysis reveals that advertising spend on Google and Facebook has a significant positive impact on sales. Specifically, for every unit increase in spending on Google, sales are expected to increase by 0.05 units, while a similar increase in Facebook spending is associated with a 0.19 unit rise in sales.

However, the advertising spend on Instagram does not appear to have a significant effect on sales, as indicated by its near-zero coefficient. This suggests that investments in Instagram advertising, at least in this dataset, do not contribute to an increase in sales.

Overall, the linear regression model provides a good fit to the data, explaining approximately 89.7% of the variance in sales. These findings suggest that companies should prioritize their advertising budgets towards platforms like Google and Facebook for better sales outcomes, while reconsidering the effectiveness of Instagram as part of their advertising strategy.