**Sales Data Analysis**

**Submitted for**

**BUSINESS FORECASTING METHODS AND APPLICATIONS**

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| 1. **ABSTRACT**   This report analyzes sales data for [Company Name] from [Timeframe] to identify key trends and optimize sales performance. We investigated rep activity levels, conversion rates at each stage of the sales funnel, and customer demographics. By leveraging statistical analysis, we revealed that [Key Finding 1] and [Key Finding 2]. These results suggest that [Actionable Recommendation 1] and [Actionable Recommendation 2] have the potential to boost revenue growth by [Estimated Percentage]. This report offers valuable insights for sales managers to improve coaching and tailor strategies for different customer segments.   1. **INTRODUCTION AND RELATED WORK**   The competitive landscape of today's business world demands a deep understanding of customer behavior and sales performance. In this context, the core challenge lies in **unlocking actionable insights** from vast quantities of sales data. By effectively analyzing this data, we can gain valuable knowledge to optimize sales strategies, improve rep performance, and ultimately drive revenue growth.  **Initial Goals**  Our initial goals for this analysis are:   * To identify key trends and patterns within the sales data. * To assess the effectiveness of current sales strategies. * To uncover potential areas for improvement in the sales process. * To formulate data-driven recommendations to enhance sales performance.   Building on existing research, we recognize the importance of key sales metrics, customer segmentation, and statistical analysis. These elements empower data-driven decision making to enhance sales performance.  This initial groundwork paves the way for a deep dive into our sales data analysis. We'll leverage these insights to formulate actionable recommendations for sales success.   1. **SOFTWARE USED**   We've chosen Python for data analysis because it's flexible and user-friendly. We also leverage some specialized helpers called libraries: Pandas, Plotly, Seaborn, and Scikit-learn. These libraries act like extra tools that supercharge Python's capabilities.  Pandas lets us effortlessly organize and manipulate our data, like meticulously arranging it into well-defined categories. Plotly helps us transform our data into vibrant charts and graphs, allowing us to readily identify trends. Seaborn is another valuable tool for creating visually appealing and professional-looking charts. Finally, Scikit-learn acts as our secret weapon for building intelligent models that forecast sales.  By utilizing these tools together, we ensure our analysis is robust and accurate. They assist us in processing massive amounts of data, uncovering crucial sales patterns, and making informed predictions about future sales.   1. **METHODOLOGY --- Flowchart is compulsory.**   **Our analysis follows a structured approach with several steps:**   * **Data Gathering and Cleaning:** We start by importing sales data into a Pandas DataFrame and prepare it for analysis. This might involve handling missing values or inconsistencies. * **Exploring the Data:** We then perform Exploratory Data Analysis (EDA) to understand the distribution of sales figures and how different sales attributes relate to each other. * **Building Sales Models:** We employ various techniques like linear regression, lasso regression, ridge regression, random forest regression, ARIMA, and SARIMA models to uncover the relationships between sales attributes and actual sales figures. * **Assessing Model Performance:** We evaluate the effectiveness of these sales models using appropriate metrics to determine which model performs best. * **Data Visualization:** Finally, we leverage tools like Plotly, Seaborn, and Matplotlib to create clear and informative charts and graphs that help us interpret the results of our analysis.      1. **EXPERIMENTAL RESULTS**   Comparing r2 scores from different methods-          After comparing all the models we can see that we get highest accuracy in Decision tree regressor i.e 98.2 % and lowest accuracy in simple linear regression i.e 74.46%  **CONCLUSION**  **Through the application of data analysis techniques, our investigation has yielded significant insights into the dynamics of sales data.** By leveraging regression analysis and visualization tools, we have been able to elucidate previously unknown relationships between various sales attributes and overall sales performance. These findings contribute to the development of a more comprehensive understanding of sales trends within the market.  By acknowledging and comprehending the identified patterns, businesses are empowered to make data-driven decisions that optimize their sales strategies. This optimization, in turn, leads to demonstrably improved sales performance.  **However, the pursuit of knowledge in this domain remains an ongoing endeavor.** We posit that further exploration utilizing advanced methodologies and incorporating a broader range of sales-related factors has the potential to yield even more refined sales predictions.   1. **REFERENCES**   <https://www.youtube.com/watch?v=2XGSIlgUBDI&ab_channel=KrishNaik>  <https://www.geeksforgeeks.org/ml-linear-regression/>  <https://colab.research.google.com/github/jesperdramsch/skillshare-data-science/blob/book/book/notebooks/33%20-%20Machine%20learning%20classification.ipynb#:~:text=By%20analyzing%20the%20relationships%20between,efficient%20and%20effective%20decision%2Dmaking>.  <https://colab.research.google.com/github/TannerGilbert/Tutorials/blob/master/Scikit-Learn-Tutorial/5.%20Classification%20Algorithms.ipynb#scrollTo=umKHCwXB_OPr>   1. **GitHub Repository Link** |  |
| [**https://github.com/RajK19/BFM\_2024\_Sales-Data-Analysis**](https://github.com/RajK19/BFM_2024_Sales-Data-Analysis) |  |