Comprehensive Analysis of Automobile Sales and Economic Indicators

Welcome to our comprehensive analysis on how various economic indicators impact automobile sales during recession and non-recession periods. This presentation will guide you through our data journey, revealing key insights and innovative approaches

Executive Summary

- Analyzed automobile sales trends during recession and non-recession periods.

- Visualized the impact of economic indicators on sales.

- Developed predictive models to forecast future sales trends.

- Created interactive dashboards for real-time data exploration.

In this project, we embarked on a thorough analysis of automobile sales, exploring how economic conditions shape market dynamics. Our journey involved data visualization, predictive modeling, and the creation of interactive tools to bring our findings to life.

Introduction

- **Objective**: To analyze automobile sales trends and economic indicators.

- **Methods**: Data collection, data wrangling, exploratory data analysis (EDA), predictive modeling.

- **Tools**: Python, Pandas, Matplotlib, Seaborn, Plotly, Dash.

Our objective was clear: to understand the intricate relationship between economic indicators and automobile sales. Using a range of powerful data science tools, we collected, cleaned, and analyzed our data to uncover meaningful patterns and trends.

Data Science Languages

- Python

- R

- SQL

- Julia

- Scala

We leveraged several programming languages throughout our project, with Python being our primary choice due to its robust libraries and versatility. Other languages like R and SQL also played crucial roles in data manipulation and querying

Data Science Libraries

- Pandas

- NumPy

- Matplotlib

- Seaborn

- Scikit-learn

- TensorFlow

- Keras

Libraries are the backbone of our data analysis. Pandas and NumPy were essential for data manipulation, while Matplotlib and Seaborn helped us create insightful visualizations. For predictive modeling, we turned to Scikit-learn and TensorFlow.

Data Science Tools

Tool	Description
Jupyter	Interactive notebook environment
RStudio	IDE for R
PyCharm	IDE for Python
Apache Spark	Big data processing framework
Tableau	Data visualization tool

```python
# Multiply and Add Numbers

x = 5

y = 10

result = (x * y) + y

result
```

```
# Convert Minutes to Hours

minutes = 150

hours = minutes / 60

hours
```

Objectives

- Understand the impact of economic indicators on automobile sales

- Visualize sales trends using various plots

- Compare data between recession and non-recession periods

- Analyze year-by-year trends in sales, profit, and revenue

- Develop predictive models to forecast future trends

- Create interactive dashboards for real-time data exploration

Data Collection

- Collected data from various sources including [source names].

- Included data on sales, GDP, unemployment rate, etc.

Data Wrangling

- Cleaned and transformed the data.

- Handled missing values and outliers.

- Combined multiple datasets for comprehensive analysis.

Exploratory Data Analysis (EDA)

- Analyzed sales trends over time.

- Visualized correlations between sales and economic indicators.

Interactive Visual Analytics

- Used Plotly and Dash for interactive visualizations.

- Developed dashboards to explore data interactively.

Predictive Analysis Methodology

- Developed regression models to predict future sales.

- Evaluated model performance using RMSE, MAE, etc.

EDA Results

- Sales trends during recession and non-recession periods.

- GDP and unemployment rate trends over time.

![Sales Trend Chart](sales_trend_chart.png)

![GDP Trend Chart](gdp_trend_chart.png)

EDA with SQL Results

- Queried sales data to find trends and patterns.

- Analyzed regional sales differences using SQL.

```sql
SELECT year, SUM(sales) AS total_sales

FROM sales_data

GROUP BY year;
```

Slide 17: Interactive Map with Folium Results

```markdown

## Interactive Map with Folium

- Created interactive maps to visualize sales data geographically.


![Map](interactive_map.png)
```

Plotly Dash Dashboard

- Developed interactive dashboards to explore data in real-time.

![Dashboard](dashboard.png)

Predictive Analysis Results

- Developed and evaluated a classification model.

- Presented accuracy, precision, recall, and F1 score.

![Confusion Matrix](confusion_matrix.png)

Conclusion

- Identified key trends in automobile sales and economic indicators.

- Developed interactive tools for deeper insights.

- Created predictive models for future sales trends.

Creativity and Innovation

- Added custom visualizations and interactive elements.

- Discovered significant correlations and regional sales variations.

Sharing and Submission

- [GitHub Repository URL](your-github-repository-url)

- [Presentation PDF](link-to-presentation-pdf)