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SCHOOL OF ENGINEERING AND COMPUTING

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Synopsis

On

Minor Project

Submitted by–Bhanu Goel

21BTCSEAI0056

Vatsalya V Prasad

21BTCSEAI0042

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Title

“ SALES PERFORMANCE ANALYZER ”

Problem Statement

In the fiercely competitive pizza industry, businesses struggle to efficiently analyse and optimize their sales performance due to the complexity and volume of sales data generated from various sources. Manual analysis of this data is time-consuming and prone to errors, hindering businesses' ability to make timely and informed decisions. Additionally, traditional analytics tools lack the flexibility and interactivity required to explore data comprehensively and derive actionable insights. This project aims to address these challenges by developing a Sales Performance Analyzer Dashboard specifically tailored for pizza sales.

Motivation for Project's choice

The motivation for the project could be outlined as follows :

- Industry Relevance: The pizza industry is highly competitive and continuously evolving, making it essential for businesses to stay ahead of the curve. Understanding sales performance is crucial for survival and growth in this competitive landscape.
- Data Abundance: Pizza businesses generate vast amounts of sales data from various sources, including point-of-sale (POS) systems, online orders, and customer feedback. Leveraging this data effectively can provide valuable insights into customer behaviour, preferences, and market trends.
- Decision-Making Challenges: Manual analysis of sales data is time-consuming, error-prone, and often limited in scope. Traditional analytics tools may not be tailored to the specific needs and complexities of the pizza industry, leading to suboptimal decision-making.
- Potential for Improvement: Many pizza businesses rely on intuition or outdated methods for sales analysis and decision-making. By introducing an advanced analytics solution, businesses can unlock untapped opportunities for optimization, efficiency gains, and revenue growth.
- Technological Advancements: The availability of advanced analytics tools such as Power BI, Python, SQL, and DAX provides an opportunity to develop a sophisticated sales performance analyser dashboard that can address the specific challenges faced by pizza businesses.
- Strategic Advantage: A well-designed sales performance analyser dashboard can provide businesses with a strategic advantage by enabling them to make data-driven decisions, identify opportunities for expansion, optimize marketing efforts, and enhance customer satisfaction.

Objective and Scopes

- Develop a comprehensive analytics solution tailored for pizza sales to optimize sales strategies and enhance profitability.
- Provide actionable insights and key performance indicators (KPIs) to support data-driven decision-making processes across all levels of the organization.
- Gain deeper insights into customer behaviour, preferences, and demographics to tailor marketing strategies and improve customer experiences.
- Utilize advanced analytics and forecasting models to predict future sales trends, demand patterns, and market fluctuations, enabling proactive planning and resource allocation.
- Integrate pizza sales data from various sources into a centralized SQL database for efficient data management and analysis.
- Design and develop a user-friendly dashboard interface using Power BI, incorporating interactive visualizations to facilitate intuitive exploration and analysis of sales metrics.
- Offer user training sessions and ongoing support to ensure effective utilization of the dashboard and maximize its value for pizza businesses.

Methodology

- Requirement Analysis: Conduct thorough discussions with stakeholders to understand their specific needs, challenges, and goals related to pizza sales analysis. Define the scope, objectives, and key metrics for the project.
- Data Collection and Integration: Extract pizza sales data from various sources, including POS systems, online platforms, and CRM systems. Transform and load the data into a centralized SQL database, ensuring data quality, consistency, and accessibility.
- Data Preprocessing: Cleanse and preprocess the sales data using Python, including handling missing values, outliers, and inconsistencies. Perform exploratory data analysis (EDA) to gain initial insights and identify data patterns.
- Dashboard Development: Design and develop a user-friendly dashboard interface using Power BI. Create interactive visualizations, charts, and graphs to present sales metrics, trends, and insights effectively. Incorporate user feedback to iterate and improve the dashboard design iteratively.
- Advanced Analytics: Utilize Python for advanced analytics, including segmentation, clustering, and predictive modeling. Analyze customer behavior, product performance, and market trends to derive actionable insights for decision-making.
- Custom Calculations: Implement custom calculations and key performance indicators (KPIs) using DAX within Power BI. Calculate metrics such as revenue, sales volume, average order value, and customer acquisition cost to provide a comprehensive view of sales performance.
- Forecasting: Develop forecasting models using Python, such as time series analysis or machine learning algorithms, to predict future sales trends and demand patterns. Evaluate the accuracy and reliability of the forecasts to support proactive planning and decision-making.
- User Training and Support: Provide training sessions for users to familiarize them with the dashboard interface, functionalities, and interpretation of analytics insights.

- Testing and Validation: Conduct thorough testing of the dashboard and analytics pipeline to ensure functionality, accuracy, and performance. Validate the results against known benchmarks and real-world scenarios to verify the effectiveness of the solution.
- Deployment: Deploy the finalized dashboard and analytics solution for use by stakeholders within the organization. Ensure scalability, security, and accessibility of the dashboard across different devices and platforms.
- Feedback and Iteration: Gather feedback from users regarding the usability, effectiveness, and value of the dashboard. Incorporate user feedback to make iterative improvements and enhancements to the dashboard and analytics pipeline as needed.
- Documentation and Knowledge Sharing: Document the methodology, processes, and findings of the project for future reference and knowledge sharing. Share insights and best practices with stakeholders to foster a culture of data-driven decision-making within the organization.

Hardware & Software to be used

- Database Management System (DBMS): SQL-based DBMS such as PostgreSQL, MySQL, or Microsoft SQL Server for storing and managing pizza sales data.
- Data Preprocessing: Python libraries such as Pandas and NumPy for data cleaning, transformation, and feature engineering.
- Dashboard Development: Microsoft Power BI for designing and developing the interactive dashboard interface.
- Advanced Analytics: Python for advanced analytics tasks, including segmentation, clustering, and forecasting. Libraries like scikit-learn, TensorFlow, and PyTorch may be used for machine learning and predictive modelling.
- Data Visualization: Power BI for creating visualizations and charts within the dashboard, and Python libraries like Matplotlib, Seaborn, and Plotlib for additional data visualization needs.
- Querying: SQL for querying and retrieving data from the database, especially when integrating with Power BI.
- Development Environment: Python IDEs such as Jupyter Notebook or Visual Studio Code for Python development, and Power BI Desktop for dashboard development.

Testing Technologies

- Unit Testing (Python) : Utilize unit test, pytest, or nose for testing Python code units.
- Integration Testing (SQL): Employ SQL scripts or DB Unit for testing SQL queries and operations.
- Power BI Testing: Use built-in features for Data Profiling and Power BI Service testing.
- Data Quality Testing: Implement Great Expectations or PyDeequ for data integrity checks.
- Regression Testing: Use Selenium or PyTest for regression testing of code changes.
- Load Testing: Conduct load testing with JMeter or Locust to assess system performance.
- Security Testing: Employ vulnerability scanners and penetration testing tools.
- Cross-platform Testing: Validate compatibility with Browser Stack or Selenium Grid

Project's Contribution

The Sales Performance Analyzer Dashboard for pizza sales revolutionizes decision-making for pizza businesses by leveraging data-driven insights. It optimizes sales strategies, allocates resources effectively, and enhances operational efficiency through comprehensive analysis of sales data. By uncovering trends, patterns, and customer preferences, businesses can tailor marketing strategies and product offerings, driving increased customer satisfaction and loyalty. Proactive forecasting enables businesses to anticipate future trends and capitalize on emerging opportunities. With advanced analytics capabilities, the dashboard provides a competitive edge, fostering innovation and growth in the dynamic pizza industry while promoting a culture of data-driven decision-making for sustained success.

Guide's Role

As independent data scientists, we've undertaken this project without format guidance. Instead, we've relied on our experience and the wealth of online resources, forums and data developer community. Our passion for the subject matter and our commitment to sharing knowledge make me open to assisting and collaborating with like minded individuals interested in solving data related problems and their advancements. Our journey as an independent data scientists has been driven by a desire to explore the potential of data and create dashboards that benefits users and businesses alike.