

Advanced E-Commerce SQL Data Analysis

Overview

This notebook performs advanced analytics on an e-commerce dataset using SQL and Python, focusing on key business metrics such as delivery performance, seller efficiency, pricing trends, and payment behaviour. The analysis leverages visualizations to provide actionable insights into the e-commerce operations.

Key Findings

1. Delivery Performance

- **Top 10 Fastest Sellers by Average Delivery Time:** The analysis identifies sellers with the shortest average delivery times, highlighting efficiency in logistics. Visualizations (e.g., bar charts) clearly depict the performance gap between top and average sellers.

2. Seller Efficiency

- **Performance Metrics:** The notebook evaluates seller efficiency by analyzing metrics such as order fulfillment speed and customer satisfaction. Charts illustrate trends and outliers, helping identify high-performing sellers and areas needing improvement.

3. Pricing Trends

- **Price Distribution and Trends:** The analysis explores pricing strategies across categories, identifying competitive pricing ranges and seasonal trends. Visualizations like line graphs or box plots provide a clear view of price fluctuations and their impact on sales.

4. Payment Behavior

- **Popular Payment Methods:** The notebook examines customer payment preferences, revealing the most commonly used payment methods and their correlation with purchase frequency or order value. Pie charts or bar graphs may be used to depict these trends.

5. Database Integration

- The analysis connects to a MySQL database (ecommerce), ensuring real-time data extraction and processing. This integration allows for dynamic updates and accurate, up-to-date insights.

Visualizations

The notebook includes well-crafted charts such as:

- **Bar charts** for comparing seller performance and delivery times.
 - **Line graphs** for tracking pricing trends over time.
 - **Pie charts** for visualizing payment method distributions.
- These visualizations enhance the interpretability of the data and support data-driven decision-making.

Conclusion

The analysis provides a comprehensive view of e-commerce operations, uncovering opportunities to optimize delivery, enhance seller performance, adjust pricing strategies, and tailor payment options. The insights derived can guide strategic decisions to improve customer satisfaction and operational efficiency.

Recommendations

1. **Logistics Optimization:** Collaborate with top-performing sellers to understand and replicate their delivery practices.
2. **Seller Support:** Provide additional resources or training to sellers with lower efficiency metrics.
3. **Dynamic Pricing:** Adjust pricing strategies based on observed trends to maximize revenue and competitiveness.
4. **Payment Flexibility:** Promote popular payment methods to streamline the checkout process and reduce cart abandonment.

This notebook serves as a valuable tool for ongoing e-commerce performance monitoring and strategy refinement.