Coffee Sales Analysis Report

Sales Analysis Report

Overview

This report provides an analysis of a sales dataset obtained on Kaggle here containing six columns: Date, Datetime, Cash Type, Card Number, Money, and Coffee Name. The aim of this analysis is to uncover sales patterns, customer purchasing behavior, and trends over time to inform decision-making.

Dataset Description

- **Date**: The transaction date.

- **Datetime**: Combined date and time of the transaction.

- **Cash Type**: Indicates the payment method (e.g., cash or card).

- **Card Number**: Useless column for this analysis; removed during preprocessing.

- **Money**: The transaction value in the local currency.

- **Coffee Name**: The type of coffee purchased.

Data Cleaning and Preparation

1. **Removed Useless Columns**:

   o   The Card Number column was deemed unnecessary and removed.

2. **Checked for Missing Values**:

   o   Verified that there were no significant missing values in critical columns.

3. **Ensured Consistency**:

   o   Checked for extra spaces using the TRIM function in Excel.

   o   Standardized text formatting for coffee names and payment methods.

4. **Removed Duplicates**:

   o   Identified and removed any duplicate transactions to ensure accurate analysis.

5. **Sorted Data**:

   o   Sorted transactions chronologically by date and time.

6. **Created Pivot Tables:**
   o   Created pivot tables to summarize transaction data by date, payment method, and coffee type, helping to identify trends and patterns.

Exploratory Data Analysis (EDA)

Monthly Sales Trends

- Sales were aggregated by month to analyze overall performance.

- **Key Insights**:

    o Identified the highest and lowest-performing months.

    o Observed seasonal trends and potential peak periods for sales.

Hourly Sales Trends

- Transactions were grouped by hour to analyze business activity during the day.

- **Key Insights**:

    o Analysis suggests significant purchasing activity mid-morning and late afternoon.

Sales by Coffee Type

- Sales were grouped by Coffee Name to determine customer preferences.

- **Key Insights**:

    o Identified the most and least popular coffee types.

Payment Method Analysis

- Sales were segmented by Cash Type to understand payment preferences.

Statistical Summary

- **Mean (Average Sales)**: 31.89

    o Represents the average transaction value.

- **Median (Typical Sale)**: 32.82

    o Indicates the "typical" sale value, less influenced by outliers.

- **Standard Deviation**: 5.02

    o Suggests moderate variability in transaction amounts.

Data Visualization

-For detailed visualizations and their insights, please refer to the accompanying presentation.

Key Charts:

1. **Line Graph for Hourly Sales**:

   o Visualized purchasing trends throughout the day.

   o Highlighted peak sales hours.

2. **Bar Chart for Coffee Type Sales & Monthly Sales Percentage**:

   o Displayed the popularity of different coffee types.

3. **Pie Chart for Payment Method**:

   o Illustrated the distribution of payment methods.

Insights from Visualizations:

- Line graphs effectively highlighted trends in sales activity, eliminating the need for strict hourly intervals.

- Bar and pie charts provided a clear breakdown of customer preferences and payment behaviors.

Recommendations

1. **Focus on Peak Sales Hours**:

   o Ensure the vending machines are well-stocked and functioning optimally during peak sales hours (10 AM, 11 AM, 4 PM, and 7 PM) to meet customer demand and avoid potential lost sales.

2. **2. Optimize Inventory for Less Popular Coffee Types**:

   o Adjust inventory levels to ensure even the less popular coffee types (e.g., Espresso, Cocoa, and Cortado) are available without overstocking, minimizing waste while catering to diverse preferences.

3. **Monitor Seasonal Trends**:

   o Use monthly trends to prepare for high-demand periods.

4. **Improve Customer Experience**:

   o Use customer data and sales trends to ensure the vending machine is stocked with high-demand items during peak hours. Consider adding features like quicker restocking alerts or feedback mechanisms to meet customer needs efficiently.

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Conclusion

This analysis provided valuable insights into customer purchasing behavior, peak sales periods, and coffee preferences. By optimizing inventory, ensuring operational efficiency, and leveraging data-driven strategies, the business can maximize sales and improve the overall customer experience.