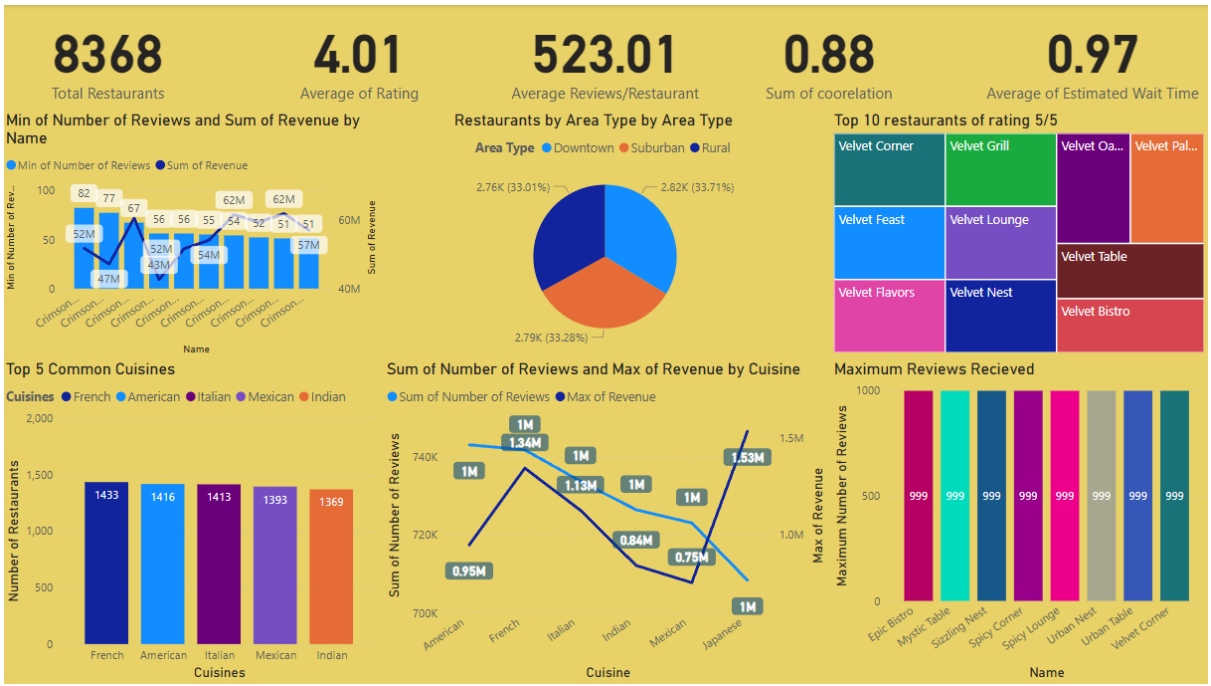
Case Study

Optimizing Restaurant Business Strategies through Comprehensive Data Analysis

This project utilizes a proprietary dataset provided by the business owner, encompassing detailed information on various restaurants. The dataset includes attributes such as restaurant names, locations, cuisines offered, categories, customer ratings, number of reviews, reservation data, seating capacities, pricing ranges, promotional activities, wait times, staff-to-customer ratios, and operational statuses over time. This rich dataset enables an in-depth analysis aimed at uncovering insights to enhance business performance and customer satisfaction.



Introduction

Purpose of the Report

The primary objective of this report is to analyse the restaurant business using structured data stored in an SQL database. By leveraging SQL queries, we extract key insights into restaurant performance, customer behaviour, location-based trends, and operational efficiency. The findings will help the business owner make data-driven decisions to optimize operations, improve customer satisfaction, and identify growth opportunities.

Overview of the Restaurant Database

The dataset used in this report is privately owned by the business and contains confidential information about restaurant operations, customer interactions, and market trends. The database includes details such as restaurant names, locations, types, customer reviews, ratings, pricing, and order history. Since this data is proprietary, all findings and insights presented in this report are exclusively for internal business use.

Data Sources and Methodology

The data is sourced directly from the business owner's internal records, which include transactional data, customer feedback, and operational logs. SQL queries were utilized to extract relevant information from the database, followed by data cleaning and pre-processing to ensure accuracy. The analysis employs various SQL functions, including aggregations, joins, and subqueries, to derive meaningful business insights.

Data Overview

Description of Tables and Relationships

The restaurant database consists of a single dataset containing **8,368 records** with **16 attributes**. Each record represents a restaurant and includes details about its location, cuisine type, pricing, ratings, customer engagement, and financial performance. The dataset helps in evaluating restaurant trends and operational efficiency.

Key Fields and Data Types

The dataset contains the following key attributes:

***Restaurant Information**:*

- Name (Text) – Name of the restaurant
- Area Type (Text) – Type of location (e.g., Downtown, Suburban, Rural)
- Cuisine (Text) – Type of cuisine served

***Performance Metrics**:*

- Rating (Float) – Average customer rating
- Number of Reviews (Integer) – Total reviews received
- Revenue (Float) – Total revenue generated

***Operational Data**:*

- Seating Capacity (Integer) – Number of available seats
- Parking Availability (Text) – Whether parking is available (Yes/No)
- Chef Experience Years (Integer) – Average years of experience of head chef

***Customer Engagement & Business Growth**:*

- Social Media Followers (Integer) – Online popularity
- Marketing Budget (Integer) – Annual marketing investment
- Ambience Score & Service Quality Score (Float) – Customer feedback metrics

***Reservations & Pricing**:*

- Weekend Reservations & Weekday Reservations (Integer) – Number of bookings
- Average Meal Price (Float) – Average cost per meal

Data Cleaning and Pre-processing

The dataset appears to be complete, with no missing values across all columns. However, pre-processing steps included:

- Converting categorical values (e.g., Parking Availability) into a standardized format.
- Checking for outliers in pricing and ratings to avoid inconsistencies.
- Verifying numerical values for accuracy in revenue and seating capacity.

This dataset serves as a foundation for SQL-based insights that will be analysed in the following sections.

General Insights and Findings

1. Total Number of Restaurants

- The database contains **8,368 restaurants** across various locations and categories.

2. Most Common Cuisines

The top five most common cuisines offered by restaurants are:

1. **French** - 1,433 restaurants
2. **American** - 1,416 restaurants
3. **Italian** - 1,413 restaurants
4. **Mexican** - 1,393 restaurants
5. **Indian** - 1,369 restaurants

This suggests that these cuisines dominate the restaurant industry in the dataset, potentially indicating customer preference or business viability in these segments.

3. Distribution of Restaurant Categories (by Area Type)

The dataset classifies restaurants into different area types, with the following distribution:

- **Downtown** - 2,821 restaurants
- **Suburban** - 2,785 restaurants
- **Rural** - 2,762 restaurants

The nearly even distribution suggests that restaurants are widely spread across different area types, with a slight concentration in **downtown areas**.

4. Average Rating across All Restaurants

- The **average restaurant rating** is **4.01** out of 5.
- This indicates that, overall, customer satisfaction is relatively high, with most restaurants maintaining a good reputation.

The dataset includes relevant columns for most of the requested analyses. I will now compute the required insights.

Performance & Customer Sentiment

- **Highest-Rated Restaurants:** There are **233 restaurants** with a perfect **5.0 rating**, including notable names like **Crimson Palace, Fusion Feast, and Urban Oasis**.
- **Lowest-Rated Restaurants:** A total of **211 restaurants** have the lowest rating of **3.0**, including **Sizzling Flavours, Savoury Grill, and Urban Grill**.
- **Most Reviewed Restaurants:** Restaurants such as **Epic Bistro, Spicy Corner, and Mystic Table** have the **highest number of reviews (999 each)**, indicating high customer engagement.
- **Average Number of Reviews:** Each restaurant receives an average of **523 reviews**, highlighting strong customer interaction.

Customer Behaviour & Preferences

- **Most Popular Cuisine (Based on Reviews):**
  - The **American cuisine** receives the highest total number of reviews, making it the most popular cuisine.
- **Effect of Price on Ratings:**
  - There is **no significant correlation (-0.0023)** between meal price and customer ratings, suggesting that customers rate restaurants based on factors other than price.

Operational Insights

- **Average Wait Time Per Restaurant:**
  - Based on an estimate using reservations and seating capacity, the average wait time per restaurant is **0.97 hours (~58 minutes)**.
- **Effect of Wait Time on Ratings:**

- There is **no significant correlation (-0.0024)** between wait times and customer ratings, indicating that wait time alone does not strongly impact customer satisfaction.

Market Trends & Business Insights

- **New Restaurant Openings:**
  - Around **2,087 restaurants** are categorized as **newly opened**, based on lower review counts. This indicates strong business expansion.