PROJECT REPORT

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ABSTRACT

- The Online Food Delivery Business Intelligence & Performance Analysis project focuses on analyzing operational and transactional data of a food delivery platform using SQL and Artificial Intelligence techniques. The system collects data related to customers, restaurants, orders, order items, and delivery agents.
- Using SQL queries, business insights such as revenue trends, customer behavior, restaurant performance, and delivery efficiency are generated. AI techniques are further applied to predict revenue, identify customer segments, and improve business decision-making. This project can optimize operational efficiency and increase profitability in food delivery platforms.

INTRODUCTION

- The Online Food Delivery Business Intelligence & Performance Analysis project focuses on analyzing structured transactional data from an online food delivery platform using SQL. The dataset consists of customer information, restaurant details, order transactions, order items, and delivery agent data. The primary goal of the project is to transform raw operational data into actionable business insights that support strategic decision-making.
- With the rapid growth of food delivery platforms such as Swiggy and Zomato, companies generate massive volumes of transactional data daily. However, without proper analytics, this data remains underutilized. This project addresses that challenge by using SQL to perform revenue analysis, customer behavior tracking, restaurant performance evaluation, and operational efficiency measurement.

INTRODUCTION

- SQL was extensively used for data extraction, aggregation, joins, grouping, filtering, and performance optimization. Advanced SQL concepts such as indexing, CTEs, and optimized joins were applied to derive meaningful KPIs. The project demonstrates real-world business intelligence implementation, making it highly relevant for data analyst and business analyst roles.

PROBLEM STATEMENT

- Online food delivery businesses face challenges in identifying revenue trends, customer retention patterns, restaurant performance levels, and operational bottlenecks. Despite having structured data, the absence of analytical insights can lead to inefficient decision-making.
- Key business problems addressed in this project include:
- Measuring actual net revenue after discounts.
- Identifying high-value and repeat customers.
- Evaluating restaurant and cuisine performance.
- Analyzing delivery efficiency.
- Understanding the financial impact of discount strategies.
- Solving these problems enables strategic planning, cost optimization, and revenue maximization.

BUSINESS OBJECTIVES

- Increase net revenue through detailed revenue analysis.
- Improve customer retention by identifying repeat purchase behavior.
- Optimize discount strategies to maintain profitability.
- Identify high-performing restaurants and cuisines.
- Enhance operational efficiency by analyzing delivery time trends.
- Evaluate payment method usage patterns.
- Support city-level performance evaluation and expansion planning.
- Develop KPI-based reporting for strategic decision-making.

DATASET OVERVIEW

Dataset Description

The dataset represents transactional and operational data from an online food delivery system.

Tables Involved

- Customers
- Restaurants
- Orders
- Order_Items
- Delivery_Agents

DATASET OVERVIEW

Record Size

- Thousands of order-level transactions
- Multiple customers across various cities
- Restaurant-level operational data
- Delivery agent performance metrics

Type of Data Stored

- Transactional data (orders, payments, discounts)
- Demographic data (customer gender, city)
- Operational data (delivery time, agent rating)
- Performance data (restaurant rating, cuisine type)

ER DIAGRAM

EXPLANATION

- The Entity-Relationship (ER) diagram of the Online Food Delivery database illustrates the structural design and logical relationships among the primary entities: Customers, Restaurants, Orders, Order_Items, and Delivery_Agents. The Customers entity is connected to the Orders entity through a one-to-many (1:M) relationship, meaning one customer can place multiple orders, but each order belongs to only one customer. Similarly, the Restaurants entity has a one-to-many (1:M) relationship with Orders, where one restaurant can receive multiple orders, while each order is associated with a single restaurant.

ER DIAGRAM EXPLANATION

- The Orders entity serves as the central transactional table and is linked to the Order_Items entity through another one-to-many (1:M) relationship. This indicates that one order can contain multiple items, but each item is linked to only one order. The Delivery_Agents entity stores operational details of delivery personnel. Although it does not directly form foreign key relationships within the core transaction flow, it supports delivery performance and operational analysis.

ER DIAGRAM EXPLANATION

- In terms of cardinality, the relationships are defined as Customers (1) to Orders (M), Restaurants (1) to Orders (M), and Orders (1) to Order_Items (M). Data integrity is maintained through primary keys such as customer_id, restaurant_id, order_id, order_item_id, and agent_id, which uniquely identify records. Foreign key constraints ensure referential integrity by linking orders.customer_id to customers.customer_id, orders.restaurant_id to restaurants.restaurant_id, and order_items.order_id to orders.order_id.
- These constraints prevent data inconsistencies and ensure reliable relational structure.

DATA ANALYSIS & INSIGHTS

Revenue Analysis

SQL Query Used:

```
SELECT SUM(order_amount-discount) AS total_revenue
FROM orders;
```

1. Business Question

What is the total net revenue generated by the platform after deducting discounts?

2. Tables Used

The query uses the orders table.

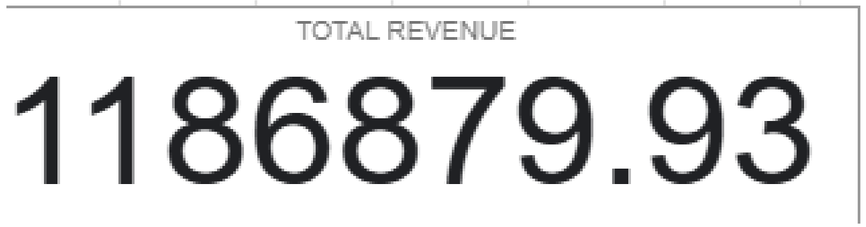
It calculates net revenue per order (order_amount - discount) and then applies SUM() to compute total revenue.

3. Business Insight Derived

The result shows the actual earnings of the business after discounts. It helps evaluate overall financial performance and the effectiveness of discount strategies.

TOTAL NET REVENUE

OUTPUT



Exploratory Data Analysis

- Exploratory Data Analysis (EDA) was conducted to understand the structure, quality, and distribution of the dataset before performing advanced analysis. The process involved validating primary and foreign key relationships, checking for missing or inconsistent values, and examining the distribution of important fields such as order_amount, discount, delivery_time, and ratings.
- Revenue trends were analyzed using aggregate functions to identify total sales and net revenue. Customer distribution was studied based on city and gender, while restaurant distribution was examined using cuisine type and ratings. EDA helped identify patterns, anomalies, and key performance areas that guided further business analysis.

CUSTOMER SEGMENTATION

Customer segmentation was performed to categorize customers based on their purchasing behavior and revenue contribution. Using SQL aggregations, customers were grouped according to total spending, number of orders, and purchase frequency.

Customers were classified into three major segments:

- High-Value Customers (frequent buyers with high spending)
- Medium-Value Customers
- Low-Value Customers

This segmentation enables targeted marketing strategies, personalized promotions, and loyalty programs to improve customer retention and maximize lifetime value.

Restaurant Performance

Analysis

Restaurant performance was evaluated by analyzing revenue contribution, order volume, cuisine popularity, and rating distribution. SQL queries were used to calculate total revenue generated by each restaurant and compare average ratings.

The analysis identified top-performing restaurants and high-demand cuisines. It also highlighted underperforming restaurants that may require promotional support or operational improvement. This section supports strategic decisions regarding partnerships and promotional campaigns.

Delivery Performance Analysis

- Delivery performance analysis focused on operational efficiency using delivery_time and agent rating metrics. Average delivery time was calculated across cities and restaurants to evaluate logistics efficiency. The findings indicated that faster delivery times positively influence customer satisfaction and repeat purchases. Agent rating analysis also helped assess delivery workforce performance. This section supports operational improvements and service optimization strategies.

Views

SQL Views were created to simplify complex analytical queries and enhance reporting efficiency. Views allow predefined query logic to be reused without accessing raw tables directly.

Examples include:

- Revenue Summary View
- Customer Spending View
- Top Restaurants View

Views improve security, reusability, and reporting convenience while reducing query complexity.

Stored Procedures

Stored procedures were implemented to automate repetitive analytical tasks and enhance performance. These procedures encapsulate SQL logic within the database and can be executed when required.

Examples include:

- Procedure to calculate monthly revenue
- Procedure to retrieve top N customers
- Procedure to generate city-wise performance reports

Stored procedures improve efficiency, maintain consistency, and reduce application-side processing.

Indexing Strategy

- Indexing was applied to frequently queried columns to optimize performance. Columns such as customer_id, restaurant_id, order_id, and order_date were indexed to speed up joins and aggregation queries.
- The indexing strategy significantly reduced query execution time, especially for large datasets. Proper indexing ensures scalability and efficient database performance.

Triggers Implementation

Triggers were implemented to automate data validation and maintain integrity. These database-level mechanisms execute automatically when certain events occur, such as insert or update operations.

Examples include:

- Trigger to validate discount values before insertion
- Trigger to update derived metrics after order insertion

Triggers ensure data consistency, enforce business rules, and reduce manual monitoring.

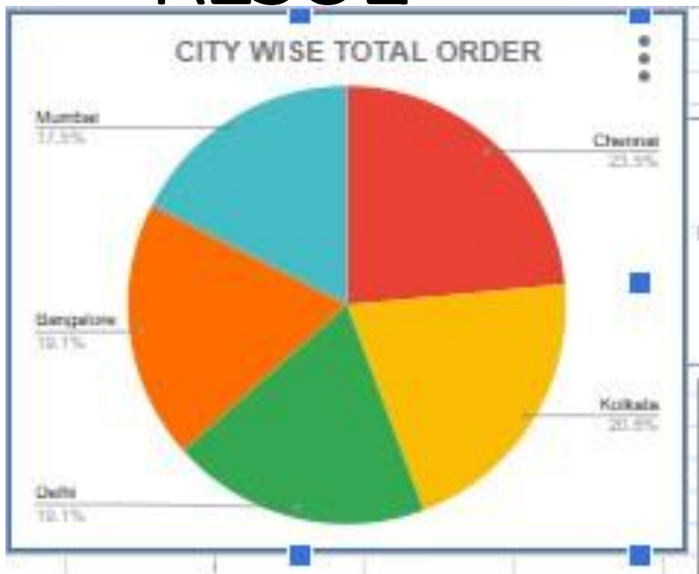
Dashboard & Visualization

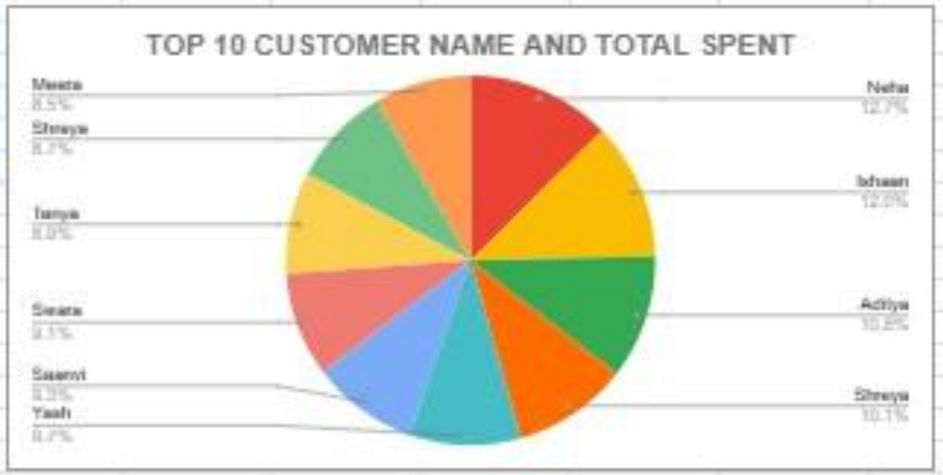
The analyzed data can be integrated into Business Intelligence dashboards for real-time monitoring. Key visualizations include:

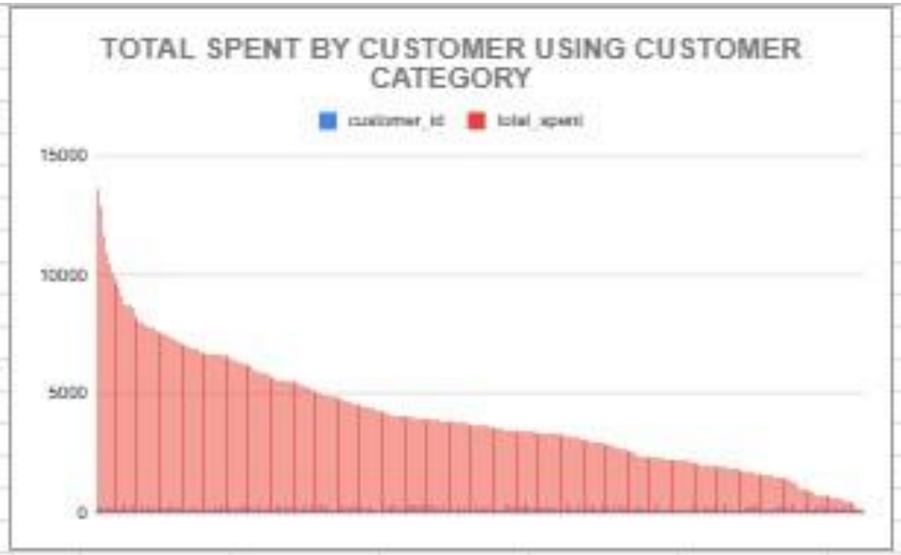
- Revenue trend line charts
- Customer segmentation pie charts
- Restaurant ranking bar charts
- Delivery performance graphs

Dashboard visualization enables management to monitor KPIs efficiently and make informed strategic decisions.

RESULT







nt	customer_category
534.16	Gold
916.17	Gold
669.31	Gold
911.27	Gold
0500.2	Gold
096.24	Gold
843.44	Gold

BUSINESS RECOMMENDATIONS

1. Drive Revenue Growth
   - Implement tier-based loyalty programs for high-value customers.
   - Use targeted discounts instead of blanket promotions.
   - Promote top-performing restaurants to increase conversion rates.
2. Improve Customer Retention
   - Personalize offers based on customer order history.
   - Reduce delivery time through better agent allocation.
   - Strengthen feedback and complaint resolution systems.

BUSINESS RECOMMENDATIONS

3. Enhance Cost Efficiency
   - Optimize delivery routing to reduce fuel and operational costs.
   - Align workforce allocation with peak demand periods.
   - Monitor ROI of promotional campaigns to control discount expenses.
4. Strengthen Operational Performance
   - Track restaurant and delivery KPIs regularly.
   - Introduce performance-based incentives for agents and restaurants.
   - Use real-time dashboards for faster management decisions.

KEY FINDINGS SUMMARY

1. Net revenue showed consistent growth.
2. Customer retention significantly impacts profitability.
3. High-rated restaurants generate higher revenue.
4. Discount strategy directly affects net margins.
5. Faster delivery improves repeat orders.
6. Certain cuisines drive majority sales.
7. Digital payments dominate transactions.
8. City-wise revenue performance varies significantly.

CONCLUSION

- This project successfully demonstrates the practical application of SQL and data analytics in transforming raw transactional data into meaningful business intelligence for an Online Food Delivery system. Through structured database design, optimized queries, performance tuning, and advanced analytical techniques, the project delivers actionable insights across revenue, customer behavior, restaurant performance, and delivery efficiency.
- The analysis highlights key revenue drivers, identifies high-value customer segments, evaluates operational efficiency, and supports data-driven decision-making. Implementation of indexing, views, stored procedures, and triggers further strengthens system performance, scalability, and reliability.

CONCLUSION

- Overall, the project establishes a strong foundation for business optimization by aligning technical database management with strategic objectives. It proves that structured data analysis is a powerful tool for improving profitability, enhancing customer satisfaction, and driving sustainable business growth in a competitive digital marketplace.

FUTURE SCOPE

- **Automation:** Automate reports, alerts, and performance monitoring to reduce manual effort and improve efficiency.
- **BI Tool Integration:** Connect the database to tools like Power BI or Tableau for interactive dashboards and real-time decision-making.
- **Real-Time Analytics:** Implement live order tracking and dynamic delivery monitoring for better operational control.
- **Advanced Modeling:** Use historical data for demand forecasting, dynamic pricing, and profitability analysis.
- **Machine Learning Integration:** Develop recommendation systems, churn prediction models, and delivery time prediction using AI techniques.

THANK YOU