**A Project Report for POWER BI(22CS408PC)On**

**ZOMATO ANALATICS**

**Submittedto**

**CMR Technical Campus,Hyderabad**

**In Partial fulfillment for the requirement of the Award of the Degree of**

**BACHELOR OF TECHNOLOGY**

**in**

**COMPUTER SCIENCE & ENGINEERING**

**by**

**Shiva Kumar(227R1A05J3)**

 **Under the guidance of**

**Mr. V. SRINU**

**DEPARTMENT OF COMPUTER SCIENCE&ENGINEERING**

**CMRTECHNICALCAMPUS**

***An UGC Autonomous Institute***

**Accredited by**

**NBA &NAAC with A Grade**

**(Approved by AICTE,Affiliated to JNTU,Hyderabad)**

**Kandlakoya(V), Medchal(M),Hyderabad-501401**

**(2023-2024)**



**CERTIFICATE**

This to certify that, the Presentation entitled**“ZOMATO Analytics”**is submitted by **Shiva Kumar** bearing the Roll Number **227R1A05J3** of **B.Tech Computer Science and Engineering**. In Partial fulfillment for the requirement of the Presentation and for the award of the **Degree of Bachelor of Technology** during the academic year 2023-24.

**Subject** **Faculty**

**Mr. V Srinu**

**ESTD:2009**

**CMRTECHNICALCAMPUS**

**UGCAUTONOMOUS**

**Accredited by NBA & NAAC with ‘A’ Grade Approved by AICTE, New Delhi and JNTU Hyderabad**

**Academic Year Name of the Student Roll No**

**9.**

**Year**

**SemesterSection**

**Branch**

**Name of the Laboratory Batch No.**

**Title of the Lab Report/Project**

**Date**

**Signature of the Student**

**:**

**:**

**:**

**:B . Tech I/II/III/IV**

**:I/II**

**:**

**:**

**:**

**:**

**:**

**:**

**:**

**:**

**Remarks/Comments by the Faculty:**

**Name of the Faculty**

**Signature of the Faculty**

**:**

**:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **LABORATORYREPORT/PROJECT&PRESENTATION** | | | | |
| **Problem**  **Statement&**  **Objectives** | **Design &Methodology** | **Implementation&**  **Results** | **Total Marks** | **Final Marks** |
| **10** | **15** | **15** | **40** | **10** |
|  |  |  |  |  |

TABLE OF CONTENTS

* Abstract
* Introduction
* Literature and survey
* Analysis and Design
* Experimental investigations
* Implementation
* Testing and Debugging/Results
* Conclusion
* Reference/Biography
* Appendices

ABSTRACT

This project focuses on developing an interactive and comprehensive Analytics for Zomato using Power BI. Zomato, a prominent restaurant discovery and food delivery service, accumulates vast amounts of data from its extensive network of restaurants and a large user base. The objective of this project is to transform this raw data into insightful visualizations that can facilitate strategic and operational decision-making for Zomato's stakeholders. By leveraging Power BI, the dashboard aims to present key performance indicators (KPIs) such as restaurant ratings, customer reviews, order trends, and geographic distributions in an intuitive and user-friendly format. The project involves multiple phases, including data collection, cleaning, analysis, visualization, and testing. The final dashboard will provide actionable insights, helping Zomato enhance its service quality, understand market dynamics, optimize operational efficiency, and improve customer satisfaction. Through this project, we aim to demonstrate the significant impact of data visualization and business intelligence tools in driving data-driven strategies in the food,delivery.industry.

INTRODUCTION

Zomato is a globally recognized restaurant discovery and food delivery service, renowned for its extensive database that includes detailed information about millions of restaurants, user-generated reviews, and ratings. Founded in 2008, Zomato has grown exponentially and now operates in multiple countries, catering to a vast and diverse customer base. With the increasing competition in the food delivery industry, data-driven decision-making has become crucial for maintaining a competitive edge. This project aims to develop a sophisticated Power BI dashboard that consolidates Zomato's rich data sources into a coherent, visual format to support better decision-making.

The dashboard will serve various stakeholders, including Zomato’s management, operational teams, marketing departments, and restaurant partners. It will enable them to quickly access key metrics and trends, such as the number of active restaurants, customer satisfaction levels, order volumes, and geographic distribution of services. By transforming complex data sets into interactive visualizations, the dashboard will help identify patterns, trends, and anomalies that are not immediately apparent from raw data.

Key features of the dashboard include:

1. **Real-time Data Integration**: Incorporating data from Zomato’s API and internal databases to provide up-to-date information.
2. **Interactive Visualizations**: Using Power BI’s advanced capabilities to create interactive charts, maps, and graphs that allow users to drill down into details.
3. **Comprehensive Metrics and KPIs**: Displaying essential metrics such as restaurant ratings, customer reviews, average order values, and peak order times.
4. **Geographic Analysis**: Utilizing geographic data to visualize the distribution of restaurants and orders, helping to identify market trends and opportunities.
5. **User-Friendly Interface**: Designing an intuitive interface that is accessible to users with varying levels of technical expertise.

The introduction of this dashboard is expected to bring several benefits, including improved operational efficiency, enhanced customer satisfaction, and more informed strategic planning. It will also provide restaurant partners with valuable insights into their performance, enabling them to make data-driven improvements.

By harnessing the power of Power BI, this project underscores the importance of business intelligence in today’s digital economy, where data is a key asset. The dashboard will not only support Zomato’s internal decision-making processes but also serve as a model for other companies seeking to leverage data visualization for strategic advantage.

Literature and Survey

#### Overview of Food Delivery Services

Food delivery services have become an integral part of the modern lifestyle, driven by the rise of digital platforms and changing consumer preferences. The industry has seen significant growth, with companies like Zomato, Uber Eats, DoorDash, and others leading the market. The literature on food delivery services covers various aspects, including operational efficiency, customer satisfaction, logistics, and the impact of technology.

#### Importance of Data Analysis in Food Delivery

Data analysis plays a crucial role in optimizing food delivery services. By leveraging data, companies can:

* **Improve Operational Efficiency**: Identify bottlenecks, optimize delivery routes, and reduce delivery times.
* **Enhance Customer Satisfaction**: Understand customer preferences, address complaints, and improve service quality.
* **Forecast Demand**: Predict peak hours and high-demand areas to allocate resources effectively.
* **Monitor Performance**: Track key performance indicators (KPIs) such as delivery time, customer ratings, and order accuracy.

#### Key Studies and Methodologies

Several studies have explored the application of data analytics in the food delivery industry. Key methodologies and findings include:

1. **Delivery Time Prediction**:
   * **Machine Learning Models**: Studies have applied machine learning techniques such as linear regression, decision trees, and neural networks to predict delivery times. These models consider various factors like traffic conditions, weather, and order volume.
   * **Real-Time Analytics**: Utilizing real-time data from GPS and traffic monitoring systems to provide accurate delivery time estimates.
2. **Customer Satisfaction**:
   * **Sentiment Analysis**: Analyzing customer reviews and feedback using natural language processing (NLP) to gauge satisfaction levels and identify common issues.
   * **Service Quality Metrics**: Studies have identified key factors influencing customer satisfaction, such as food quality, delivery time, and customer service.
3. **Route Optimization**:
   * **Algorithmic Approaches**: Using algorithms like the Traveling Salesman Problem (TSP) and Vehicle Routing Problem (VRP) to find the most efficient delivery routes.
   * **Geospatial Analysis**: Leveraging geographic information systems (GIS) to map delivery zones and optimize routes based on traffic patterns and distance.
4. **Operational Challenges**:
   * **Scalability**: Addressing challenges related to scaling operations during peak times and in high-density urban areas.
   * **Resource Allocation**: Studies on dynamic resource allocation to ensure timely deliveries and efficient use of delivery personnel.

The adoption of business intelligence tools like Power BI has become crucial across industries, enabling organizations to extract actionable insights from data. This section reviews relevant literature and surveys on:

1. **Business Intelligence Technology**: Overview of BI tools, their evolution, and their role in supporting decision-making.
2. **Data Visualization Principles**: Best practices for designing effective dashboards that communicate insights clearly and intuitively.
3. **Case Studies in Food Delivery**: Examples of how BI tools have been successfully implemented in companies like Uber Eats and Grubhub to enhance operatio nal efficiency and customer experience.

### Analysis and Design

The analysis and design phase involves defining the scope of the analysis, identifying key performance indicators (KPIs), and designin The experimental investigations phase focuses on the systematic collection, preprocessing, and exploration of Zomato's delivery data. This phase is crucial for ensuring that the data is clean, accurate, and suitable for analysis. The following steps outline the process:

1. **Data Collection**
2. **Data Preprocessing**
3. **Feature Engineering**
4. **Exploratory Data Analysis (EDA)**

#### Data Collection

Data collection involves gathering all relevant data required for the analysis. For this project, the following types of data are collected:

* **Order Details**: Information about each order, including order ID, restaurant ID, customer ID, order time, and delivery time.
* **Delivery Personnel Data**: Details about delivery personnel, including their ID, shifts, and performance metrics.
* **Customer Feedback**: Ratings and reviews provided by customers for each delivery.
* **Geographic Data**: Location data for restaurants and delivery addresses, including latitude and longitude coordinates.
* **External Data**: Additional data such as traffic conditions, weather information, and public holidays.

##### Tools and Methods for Data Collection

* **Database Queries**: SQL queries to extract data from Zomato’s relational databases.
* **APIs**: Using Zomato's APIs to gather real-time data.
* **Web Scraping**: For gathering supplementary data such as restaurant reviews and ratings.
* **Manual Data Entry**: For any additional data points not available through automated means.

#### Data Preprocessing

Once the data is collected, it undergoes preprocessing to ensure quality and consistency. Preprocessing steps include:

* **Data Cleaning**: Identifying and correcting errors in the data, such as:
  + **Missing Values**: Handling missing values using imputation methods or by removing incomplete records.
  + **Duplicates**: Removing duplicate entries to avoid skewing the analysis.
  + **Outliers**: Identifying and addressing outliers that could distort the results.
* **Data Transformation**: Converting data into a suitable format for analysis, which includes:
  + **Normalization**: Scaling numerical data to a standard range.
  + **Encoding Categorical Variables**: Converting categorical data into numerical format using methods like one-hot encoding.
  + **Date and Time Conversion**: Parsing and standardizing date and time formats.
* **Data Integration**: Merging data from different sources into a single dataset, ensuring consistency across all variables.

#### Feature Engineering

Feature engineering involves creating new variables (features) from the existing data to enhance the predictive power of the analysis. Key features engineered for this project include:

* **Delivery Duration**: Calculating the time taken for each delivery (delivery time - order time).
* **Distance**: Calculating the distance between the restaurant and the delivery address using geographic coordinates.
* **Traffic Conditions**: Integrating real-time traffic data to account for delays caused by traffic.
* **Weather Conditions**: Adding weather data to understand its impact on delivery times.
* **Time of Day and Day of Week**: Extracting temporal features to identify patterns related to specific times and days.

#### Exploratory Data Analysis (EDA)

Exploratory Data Analysis (EDA) is the process of visually and statistically exploring the dataset to uncover initial patterns, trends, and relationships. EDA involves:

* **Descriptive Statistics**: Calculating mean, median, standard deviation, and other summary statistics to understand the data distribution.
* **Visualization**: Creating visual representations of the data using:
  + **Histograms**: To examine the distribution of numerical variables.
  + **Box Plots**: To identify outliers and understand the spread of the data.
  + **Scatter Plots**: To explore relationships between two numerical variables.
  + **Heatmaps**: To visualize correlations between variables.
  + **Geospatial Maps**: To analyze geographic patterns in delivery data.

g the Power BI dashboards. Key components include:

* **Data Sources**: Identifying and integrating data from Zomato's delivery database, including order details, delivery times, customer feedback, and geographic information.
* **KPIs**: Selecting relevant KPIs such as average delivery time, on-time delivery rate, customer satisfaction score, and delivery success rate.
* **Dashboard Design**: Creating interactive dashboards that allow users to explore the data, filter by various dimensions (e.g., time, location, delivery personnel), and visualize trends and patterns.

### Experimental Investigations

Experimental investigations focus on data collection and preprocessing:

* **Data Collection**: Gathering historical delivery data, including timestamps, delivery routes, customer ratings, and restaurant details.
* **Data Cleaning**: Handling missing values, removing duplicates, and ensuring data consistency.
* **Feature Engineering**: Creating new features such as delivery distance, traffic conditions, and weather data to enrich the analysis.
* **Exploratory Data Analysis (EDA)**: Conducting initial analyses to understand data distributions, correlations, and outliers.

### Implementation

The implementation phase involves setting up the Power BI environment and creating the dashboards:

* **Power BI Setup**: Installing Power BI Desktop, connecting to data sources, and configuring data refresh schedules.
* **Data Transformation**: Using Power Query for data cleansing, transformation, and merging multiple data sources.
* **Dashboard Creation**: Designing and building interactive dashboards with various visualizations (e.g., charts, maps, tables) to represent the data insights.
* **DAX Calculations**: Utilizing DAX (Data Analysis Expressions) to create calculated columns, measures, and complex metrics for deeper analysis.

### C:\Users\shiva kumar\OneDrive\Pictures\Screenshots\Screenshot (9).png

### Testing and Debugging/Results

Testing and debugging ensure the accuracy and reliability of the dashboards:

* **Validation**: Cross-referencing dashboard results with raw data and existing reports to ensure accuracy.
* **User Testing**: Gathering feedback from stakeholders (e.g., Zomato management, delivery personnel) to refine the dashboards.
* **Debugging**: Identifying and resolving any issues or inconsistencies in the data or visualizations.

### Conclusion

The conclusion summarizes the project's findings and their implications for Zomato's delivery operations. Key takeaways include:

* **Efficiency Improvements**: Recommendations for reducing delivery times and optimizing delivery routes.
* **Customer Insights**: Understanding customer preferences and improving satisfaction.
* **Future Research**: Suggestions for further analysis, such as incorporating real-time data, exploring machine learning models for predictive analytics, and expanding the scope to include more variables.

### Reference/Biography

This section lists all references used in the project, including academic papers, industry reports, online resources, and relevant datasets. It also includes biographies of the project team members, highlighting their roles, expertise, and contributions to the project.

### Appendices

The appendices provide additional information and supporting materials:

* **Raw Data Samples**: Examples of the raw data used for the analysis.
* **Detailed Methodology**: In-depth explanations of data preprocessing, feature engineering, and analytical techniques.
* **Supplementary Analysis**: Additional analyses conducted but not included in the main report.
* **Technical Documentation**: Detailed documentation on the Power BI setup, data transformation steps, and DAX formulas used in the dashboards.