

RESTAURANT DATA WITH CUSTOMER RATINGS

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Abstract:

The "Restaurant Data With Customer Ratings" project focuses on leveraging customer feedback to enhance restaurant operations and improve overall customer satisfaction. This system is designed to analyze customer ratings, identify key trends, and provide actionable insights to restaurants for optimizing their services and offerings. Key features include data collection and visualization, sentiment analysis of customer reviews, and predictive analytics to forecast customer preferences and dining trends. By integrating advanced technologies such as AI and machine learning, the system ensures accuracy, scalability, and adaptability to evolving market demands. The project emphasizes the importance of creating user-friendly interfaces, efficient data processing pipelines, and robust reporting tools to deliver meaningful insights for restaurant management.

KEYWORDS: Customer Feedback, Sentiment Analysis, Predictive Analytics, Scalability, Data Visualization, Machine Learning, Actionable Insights, User-Friendly Interface.

Introduction

Restaurant data, including customer ratings, plays a vital role in the modern restaurant industry by providing valuable information that customers and restaurant owners can use in their decision-making processes. This information typically includes various types of feedback, such as numerical ratings, written reviews, and other details such as the restaurant's location, food type, ingredients, and operating specifications. Together, these elements provide a snapshot of restaurant operations and the customer experience. These ratings are typically based on various aspects of the dining experience, such as food quality, service, ambiance, cleanliness, and overall satisfaction. High ratings



Figure 1 : restaurant-customer-feedback

generally indicate positive customer service, while low ratings indicate areas where the restaurant needs improvement. This numerical index provides customers with a quick and convenient way to evaluate a restaurant before visiting, indicating what they expect from it.

However, while ratings provide general information, written customer reviews provide more detailed information. Customers can describe their experiences, sharing specific opinions about what they liked and didn't like about the food, the service they received, the location of the restaurant, and even the price. This feedback is valuable because it provides more detailed information and reveals personal strengths and weaknesses that a simple test can't capture. For example, a customer may rate a restaurant's food as excellent, but in their review they may note that the service was slow, or they may praise the restaurant's ambiance while noting that the prices are excessively high. , restaurant information with customer ratings is even more valuable: it helps customers make better food choices, and it also helps restaurant owners improve their operations and products. By using this data, both customers and restaurant owners can create a more visually appealing dining experience, resulting in better business results and customer satisfaction.

Objective

The objective of analyzing restaurant data with customer ratings is to provide insights that will inform restaurants and hospitality businesses to deliver better experiences, ensure efficient operations and increase customer satisfaction. Customer ratings directly reflect customers' dining experiences, including food quality, service, atmosphere, price and value for money. By examining these metrics alongside other restaurant data, businesses can identify strengths and weaknesses in their operations. For example, consistently high ratings for a particular dish may indicate it is a top seller, while poor service may indicate a need for staff training or performance improvement. Love and hope. Helps to identify trends, such as popular foods, seasonal preferences or changing eating habits. Restaurants can use this information to customize their menus, promotions, and dining experiences to meet customer needs. In addition to

improving customer satisfaction, the insights gained from this data can help increase revenue by identifying profitable products and cross-selling or up-selling opportunities. For example, customer reviews provide a tool to compare performance across locations. This helps managers implement standard practices and address specific issues in the field. The overall goal is to improve restaurant operations in line with customer needs while driving business growth.

Scope

The scope of restaurant data analytics by guests is broad and covers many aspects of restaurant operations and customer interaction products. It involves collecting, organizing, and analyzing information such as customer ratings, written reviews, sales images, menu details, pricing information, and service-related information. The review begins with the collection of information, which can come from a variety of sources, including internal feedback, online reviews, advertisements, and product deliveries. This data is then processed to remove noise and ensure accuracy before depth measurement. For example, reviews may show that customers prioritize food over ambiance, or price over speed of service. From this perspective, restaurants can prioritize resources to improve the most important aspects of their product. Another area is demographic segmentation, where businesses can examine customer preferences by age, gender, location, and more. This segmentation helps create marketing plans and personalized dining experiences. By identifying areas that are scoring low, restaurants can identify inefficiencies in kitchen operations, staffing, or supply chain management. Predictive analytics is the other side of the spectrum, where historical data is used to predict future trends. For example, it can predict busy hours to better manage staff and inventory, or highlight seasonal food items to keep menus fresh. can be updated over time. It's a restaurant chain. Ratings and reviews can be compared across locations to measure consistency in food quality, service, and overall customer experience. Additionally, a customer analytics perspective can help you understand the psychology behind the analysis and reveal hidden insights that metrics alone can't capture. Restaurant owners and managers can use these insights to make direct operational and business improvements, while delivery teams can use them to enhance the customer experience. Similarly, market researchers and market analysts can use this data to analyze broader trends in the food and hospitality industry. The potential of restaurant data analytics, including customer ratings, has a significant impact on the overall success and sustainability of the restaurant industry by solving short-term operational problems and achieving long-term goals

existing system

There are significant limitations in current restaurant data and customer metrics management that impact customer experience and restaurant operations. Most systems rely on simple ideas where customers can leave reviews and ratings. However, these methods often lack sufficient verification, which creates the potential for fake reviews or ratings, making the platform unreliable. Additionally, many systems do not provide detailed information about customer feedback, leaving restaurants with no clear understanding. Customers face issues accessing the system across multiple platforms, such as desktop and mobile devices, negatively impacting their experience. Additionally, interactive features like loyalty programs or personalized recommendations, which are essential for customer engagement and retention, are rare. This lack of innovation limits the value these machines can offer consumers and restaurant owners. Yelp: Yelp is a widely used platform where consumers can rate and review restaurants. Despite a simple review process, it often encounters fake reviews and lacks a strategy for detailed recommendations. Google Reviews: Google Reviews is integrated with Google Maps to allow users to leave ratings and reviews. While convenient, it can't verify reviews

ews or provide detailed restaurant recommendations. Zomato: Zomato is a popular restaurant discovery and review platform. It allows users to rate food, service, and ambiance separately, but it's still difficult to ensure that reviews are accurate. However, its interface is quite cluttered and it can't personalize recommendations based on user preferences. OpenTable: OpenTable focuses on specific restaurants and includes reviews. While it does analyze some reviews based on bookings, it doesn't provide a good insight into customer feedback trends.

proposed work

The proposed system for customer management of information in the restaurant evaluates the goal of solving the disadvantages of the current systems by introducing new features and functions. The system will change the way customers and restaurant owners collect, analyze and use customer feedback. input. This will make it easier for users to interact with the system anytime and anywhere. In addition, the proposed system includes a strong verification process to ensure that only genuine reviews are published. This will identify customer feedback from features such as link decisions or access to reviews. It enables data-driven decision making by creating graphical analytics dashboards that show detailed trends, strengths, and areas for improvement. The system also supports feedback management, allowing business owners to engage with customers to resolve issues and demonstrate improvements. Real-time updates ensure that the platform reflects new changes in restaurant operations or customer preferences. Security and scalability are essential to ensure data integrity as the system evolves. The gap between customer needs and business goals creates a harmonious and profitable environment for the restaurant industry. Machine learning models like gradient boosting regressors predict restaurant ratings based on attributes like food type and price. Include recommendations from user feedback and engagement metrics. Search and filtering systems allow users to search for restaurants by location, cuisine, price range and service.

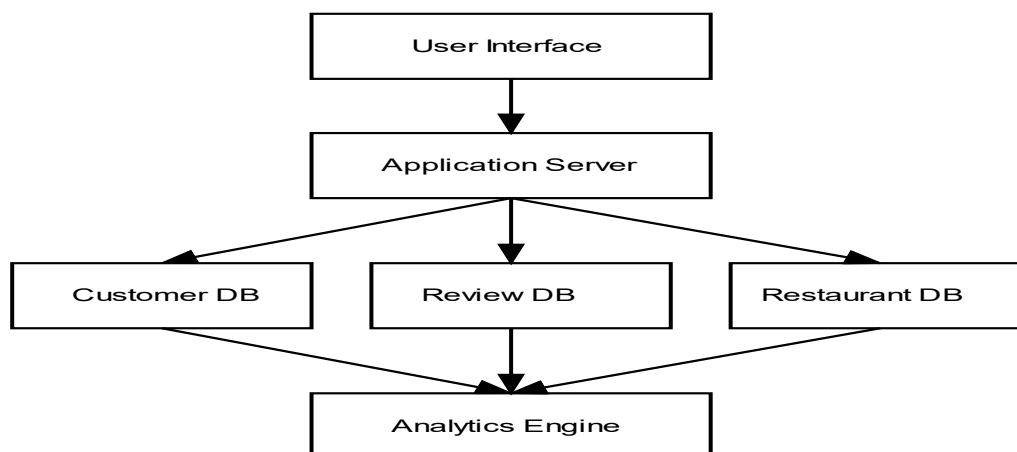
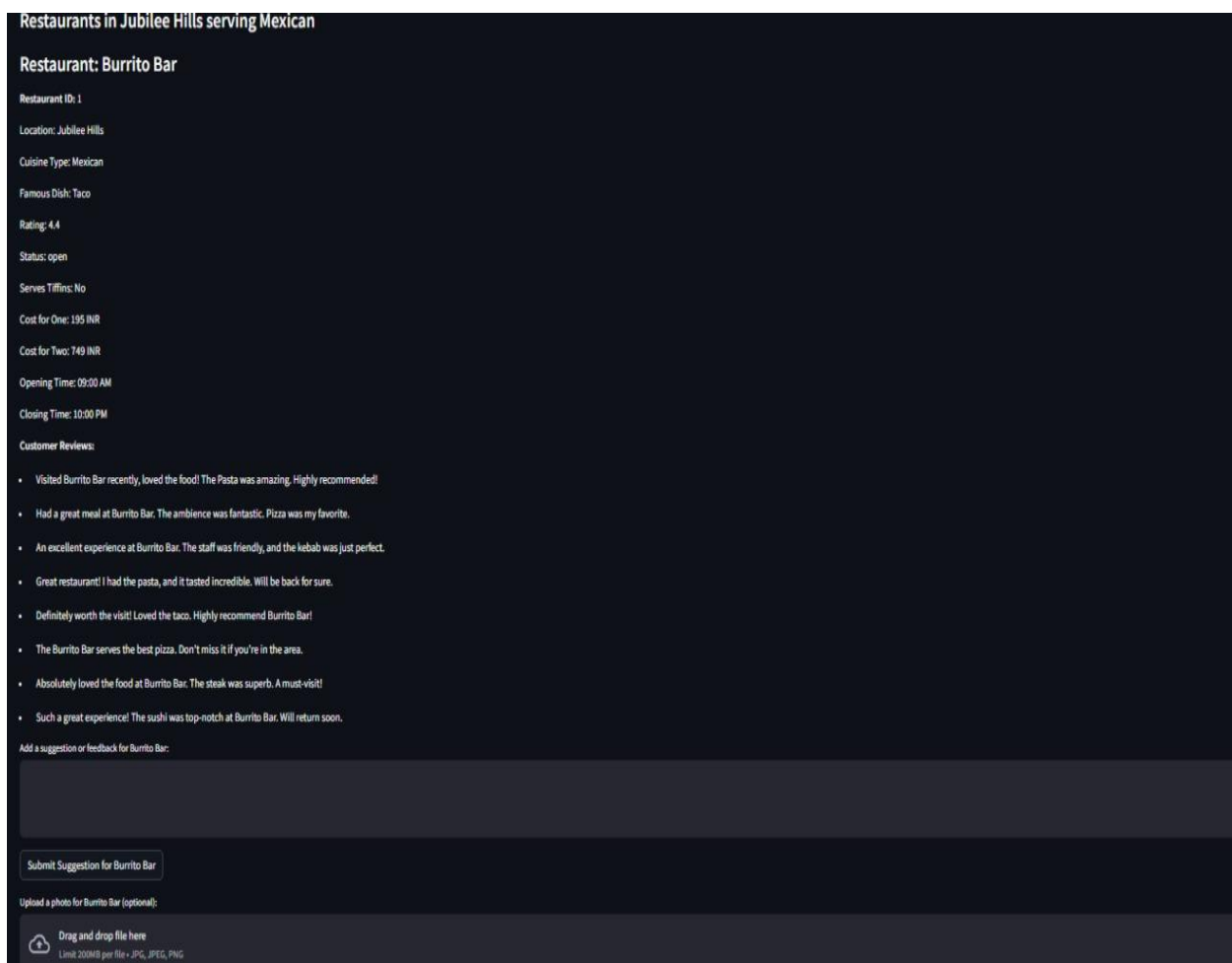


Figure 2: Architecture Diagram

Dataset

This dataset provides a comprehensive overview of restaurants, focusing on various features essential to understanding restaurant operations and customer experience. Each restaurant is uniquely identified by a restaurant ID, along with its name and location. Information about the type of food served, such as North Indian dishes, provides insight into the restaurant's culinary specialties. It also includes customer ratings, shows the quality of service and food, and mentions each restaurant's most famous dishes to drive demand for their products. A great dining scene. The information also shows whether the restaurant is open or closed, and whether it serves lunch. The price ranges of one and two pieces feel cheap. When these elements come together, the dataset becomes useful for analyzing trends, preferences, and competitive landscapes in the restaurant business

Result



The screenshot displays the details for a restaurant named 'Burrito Bar' located in Jubilee Hills. The information is presented in a dark-themed interface. Key details include: Restaurant ID: 1, Location: Jubilee Hills, Cuisine Type: Mexican, Famous Dish: Taco, Rating: 4.4, Status: open, Serves Tiffins: No, Cost for One: 195 INR, Cost for Two: 749 INR, Opening Time: 09:00 AM, and Closing Time: 10:00 PM. Below this information, there is a section for 'Customer Reviews' containing eight bullet points of feedback. At the bottom, there is a 'Submit Suggestion for Burrito Bar' button and an optional photo upload section with a 'Drag and drop file here' prompt and a file size limit of 200MB per file.

Restaurants in Jubilee Hills serving Mexican

Restaurant: Burrito Bar

Restaurant ID: 1
Location: Jubilee Hills
Cuisine Type: Mexican
Famous Dish: Taco
Rating: 4.4
Status: open
Serves Tiffins: No
Cost for One: 195 INR
Cost for Two: 749 INR
Opening Time: 09:00 AM
Closing Time: 10:00 PM

Customer Reviews:

- Visited Burrito Bar recently, loved the food! The Pasta was amazing. Highly recommended!
- Had a great meal at Burrito Bar. The ambience was fantastic. Pizza was my favorite.
- An excellent experience at Burrito Bar. The staff was friendly, and the kebab was just perfect.
- Great restaurant! I had the pasta, and it tasted incredible. Will be back for sure.
- Definitely worth the visit! Loved the taco. Highly recommend Burrito Bar!
- The Burrito Bar serves the best pizza. Don't miss it if you're in the area.
- Absolutely loved the food at Burrito Bar. The steak was superb. A must-visit!
- Such a great experience! The sushi was top-notch at Burrito Bar. Will return soon.

Add a suggestion or feedback for Burrito Bar:

Submit Suggestion for Burrito Bar

Upload a photo for Burrito Bar (optional):

Drag and drop file here
Limit: 200MB per file • JPG, JPEG, PNG

Figure 3: Details of Restaurant 1

Restaurant: Taco Town

Restaurant ID: 2

Location: Jubilee Hills

Cuisine Type: Mexican

Famous Dish: Burrito

Rating: 4.1

Status: open

Serves Tiffins: No

Cost for One: 298 INR

Cost for Two: 752 INR

Opening Time: 10:00 AM

Closing Time: 07:00 PM


Customer Reviews:

- Visited Taco Town recently, loved the food! The Kebab was amazing. Highly recommended!
- Had a great meal at Taco Town. The ambience was fantastic. Biryani was my favorite.
- An excellent experience at Taco Town. The staff was friendly, and the kebab was just perfect.
- Great restaurant! I had the biryani, and it tasted incredible. Will be back for sure.
- Definitely worth the visit! Loved the taco. Highly recommend Taco Town!
- The Taco Town serves the best pizza. Don't miss it if you're in the area.
- Absolutely loved the food at Taco Town. The taco was superb. A must-visit!
- Such a great experience! The sushi was top-notch at Taco Town. Will return soon.

Add a suggestion or feedback for Taco Town:

[Submit Suggestion for Taco Town](#)

Upload a photo for Taco Town (optional):

 Drag and drop file here

Limit: 200MB per file • JPG, JPEG, PNG

Figure 4:Details of Reastaurant 2

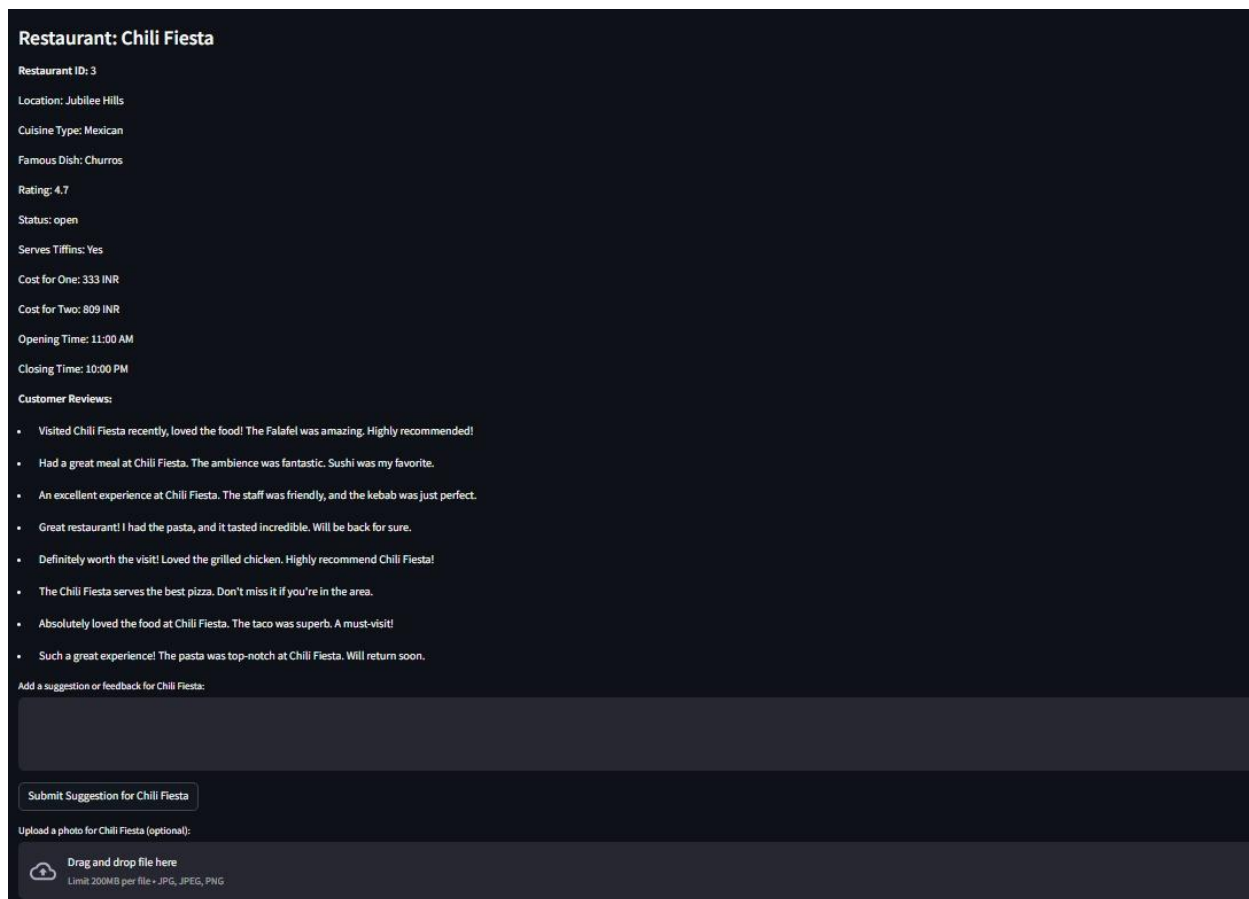


Figure 5:Details of Resturant 3

methods used

A Random Forest Regressor is a machine learning model that creates multiple decision trees and averages their predictions during training, improving accuracy and reducing overfitting. It works well with large datasets and gives good results by considering multiple decision trees, thus reducing the bias that a single model can introduce. It works very well to predict continuous outcomes (e.g. restaurant ratings) by taking into account multiple factors (e.g. location, food type, and price). In the code, the model is trained on the features and then used to predict the restaurant's rating, and performance is measured with metrics such as Mean Squared Error (MSE) and R-squared.

Decision Tree Regressor creates tree models to predict outcomes by subdividing data by values. Very good explanation because it breaks down decisions into understandable steps. The model works by considering each feature, choosing the feature with the highest priority or the best segmentation method. However, decision trees tend to overfit, especially when the tree is very deep. In this code, the decision tree regressor is imported but not used. If applicable, it would be an alternative to predicting restaurant ratings based on attributes such as food and location.

Label encoding is a preprocess used to convert categorical data into a digital format that can be used by machine learning models. By assigning a unique number to each category in the feature, it allows the model to check for features like "address" and "food type." However, it thinks that there is a relationship between the groups that may

not be necessary. In this code, label encoding is used to convert the Location and Cuisine type rows into numeric values so that these features can be used as input to learning models like Random Forest.

Evaluation metrics used in this code include accuracy metrics such as Mean Square Error (MSE), R-squared (R^2), and measurement. MSE measures the mean squared difference between the actual and predicted values, penalizing larger errors more severely, which helps evaluate model performance. R-squared indicates how well the model explains the variance of the target variable. The closer the value is to 1, the better the fit. The accuracy metric measures how often the prediction is within ± 0.5 of the actual measurement, which more practically describes the accuracy of the prediction model. These metrics help evaluate the performance of the Random Forest Regressor in predicting restaurant ratings based on the characteristics of the data.

Training the Model:

The training model involves teaching the machine learning algorithm to predict restaurant ratings based on various factors like location, food type, and price using the prepared data. After the dataset is preprocessed, a random forest regression model is initialized and trained on the training subset of the dataset. The model learns the patterns and relationships between the features and the target variables (ratings) by fitting the data. This is done using the `.fit()` method, where the model is presented with the training data (`X_train` and `y_train`). The Random Forest Regressor creates multiple decision trees during training, each tree makes one prediction, and the final result is the average of all the predicted trees, which helps reduce overfitting and increase accuracy. Once trained, the model can make predictions on measured data, so its performance can be measured.

Performance Evaluation:

performance evaluation is done by measuring the performance of the training random forest regression model on the test data. After the model makes predictions on the observed set, the mean square error (MSE) is calculated to measure the mean squared difference between the predicted and true measurement, with lower prices indicating better performing models. The R-squared (R^2) score is also calculated, which shows how well the model explains the variance of the target variable, the closer the value is to 1, the better the fit. An accuracy measure is also included, which measures the percentage of time the predicted values are ± 0.5 close to the true value, thus providing a measure of how close the measurement is to the standard estimate. These metrics provide insight into the ability of the model to be extended to new data.

CONCLUSION:

In summary, the “Restaurant Data with Customers” review highlights the important role that data-driven insights play in shaping the future of the restaurant industry. By leveraging technology and focusing on customer feedback, restaurants can increase personalization, improve efficiency, and effectively resolve issues. This approach not only increases customer satisfaction, but also drives innovation, sustainability, and long-term growth. Ultimately, using analytics will pave the way for a smarter, more competitive, and customer-

centric restaurant ecosystem. Understand the importance of customer preferences and improve your restaurant services. By analyzing customer ratings, restaurants can identify key areas for improvement and deliver exceptional dining experiences. These evaluations act as a feedback loop that allows restaurants to adapt and make adjustments based on customer needs, building trust and confidence. Many. The ability to process and interpret this data provides restaurants with insights that allow for better operations and business strategies. . This tool allows for predictive analytics, personalized recommendations, and rapid feedback, which are essential for creating an exceptional customer experience. A service model to ensure that customers have a good and memorable dining experience. This not only improves customer loyalty, but also enhances reputation. This will increase profitability and create a more sustainable economy. By overcoming these issues, restaurants can maintain high service standards and customer satisfaction. This technology can help restaurants achieve significant gains by offering new services and clarifying operations. By sharing best practices and using insights from data, businesses can collectively model and meet customer needs. Business. By prioritizing customer feedback, leveraging technology, and focusing on sustainability, restaurants can thrive in a competitive market while delivering unrivaled value to their customers. The journey toward a smarter, customer-centric restaurant ecosystem is just beginning, and the possibilities are endless.

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