Restaurant recommendation system

-Find your ideal dining place

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Overview

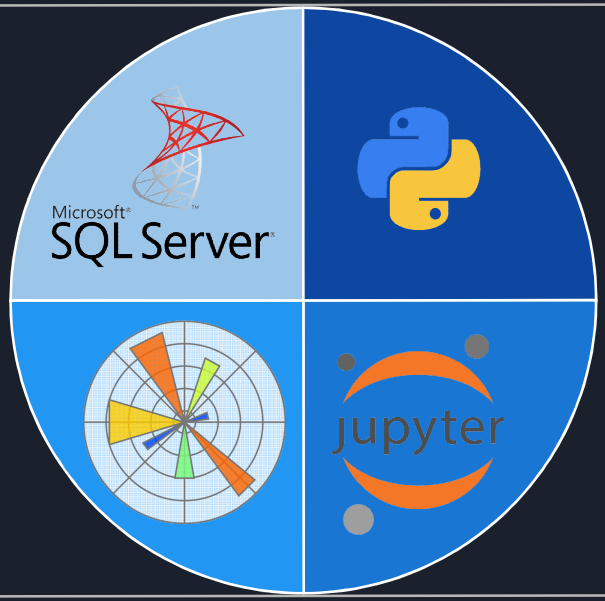
Restaurants can be suggested using this recommendation system based on customer reviews. Customers can search for restaurants by cuisine, service, location, and other factors.

Additionally, they can receive recommendations based on their preferred environment, smoking and drinking habits, and other preferences. Business analysts can also use this system to examine which are the restaurants that are doing well and the most popular type of food.

Tools Used

SQL server

Python



Matplotlib

Jupyter notebook

Scope and Feasibility

A survey from MGH found that 77% of diners visit a restaurant's website before they dine in or order out from the establishment.

This system can benefit users in finding restaurants without any hassle.

Can be implemented on cloud and database is scalable with increase in raw data and users.

Target Market and user base

- Common people looking for best restaurants
- Tourists
- Food bloggers
- Business analysts

Source Data

The source data for this project is a collection of restaurants, customers, and ratings data in Mexico from UCI Machine Learning Repository.

The data is organized into nine CSV files, which are divided into three categories. Each of these files has been imported into a separate table in an SQL database.

Restaurants

- acceptedpayment
- cuisine
- hours
- parking
- restaurants

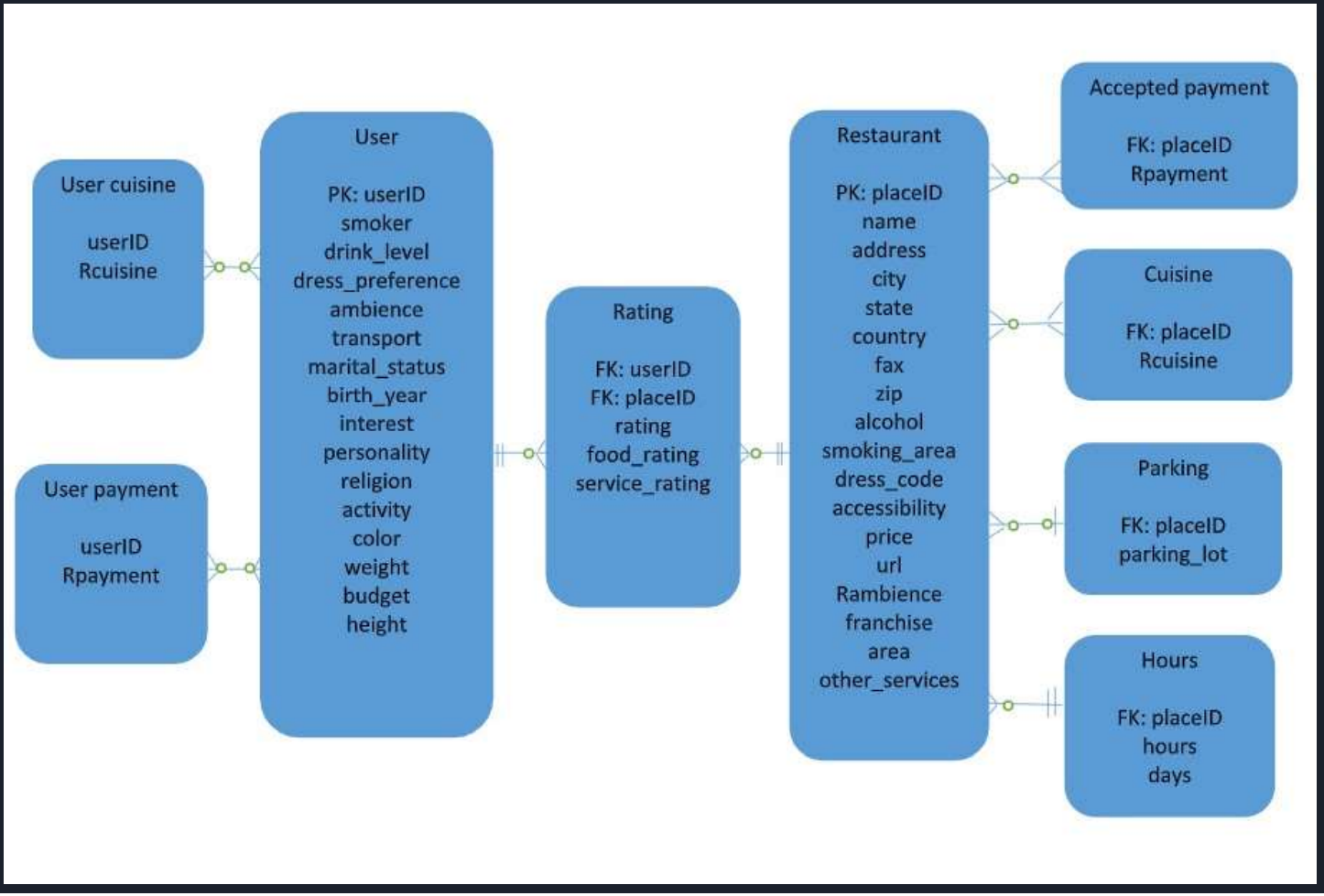
Consumers

- userCuisine
- userPayment
- userProfile

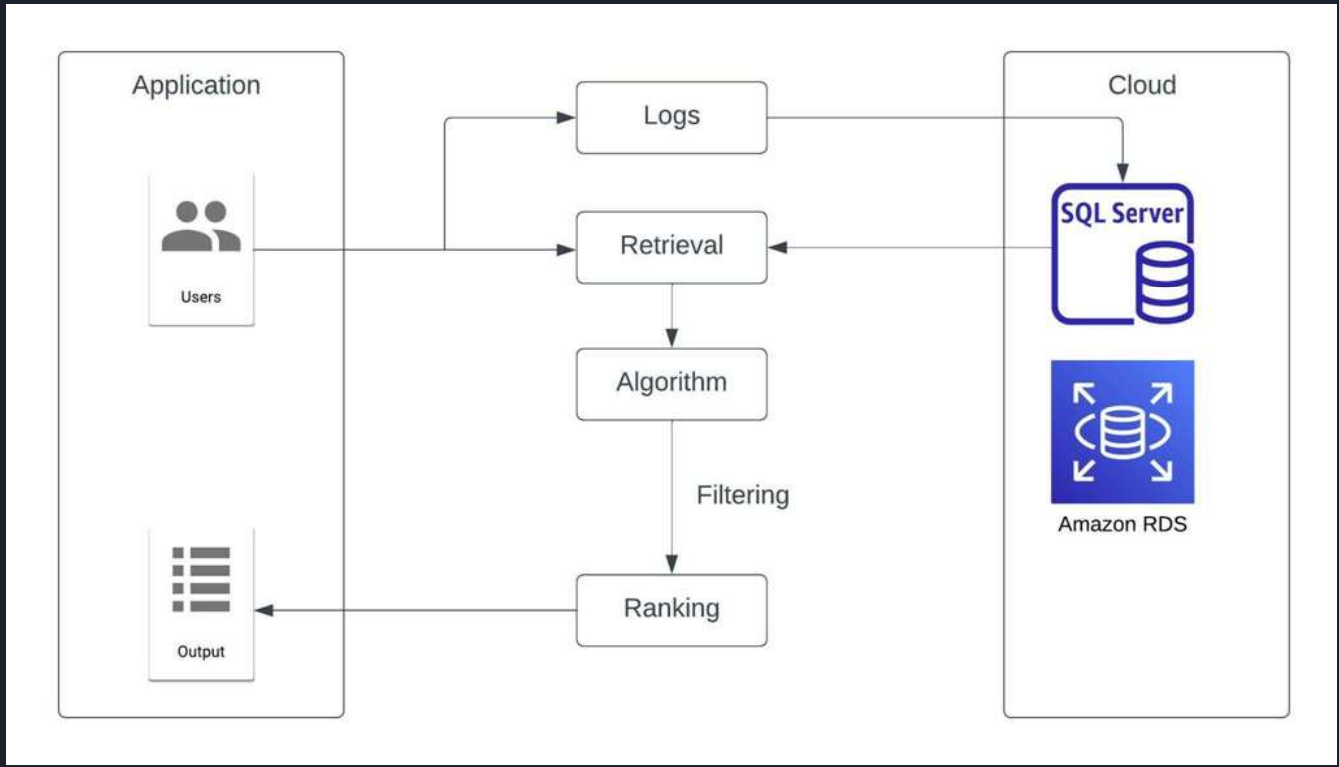
User-Item-Rating

- rating

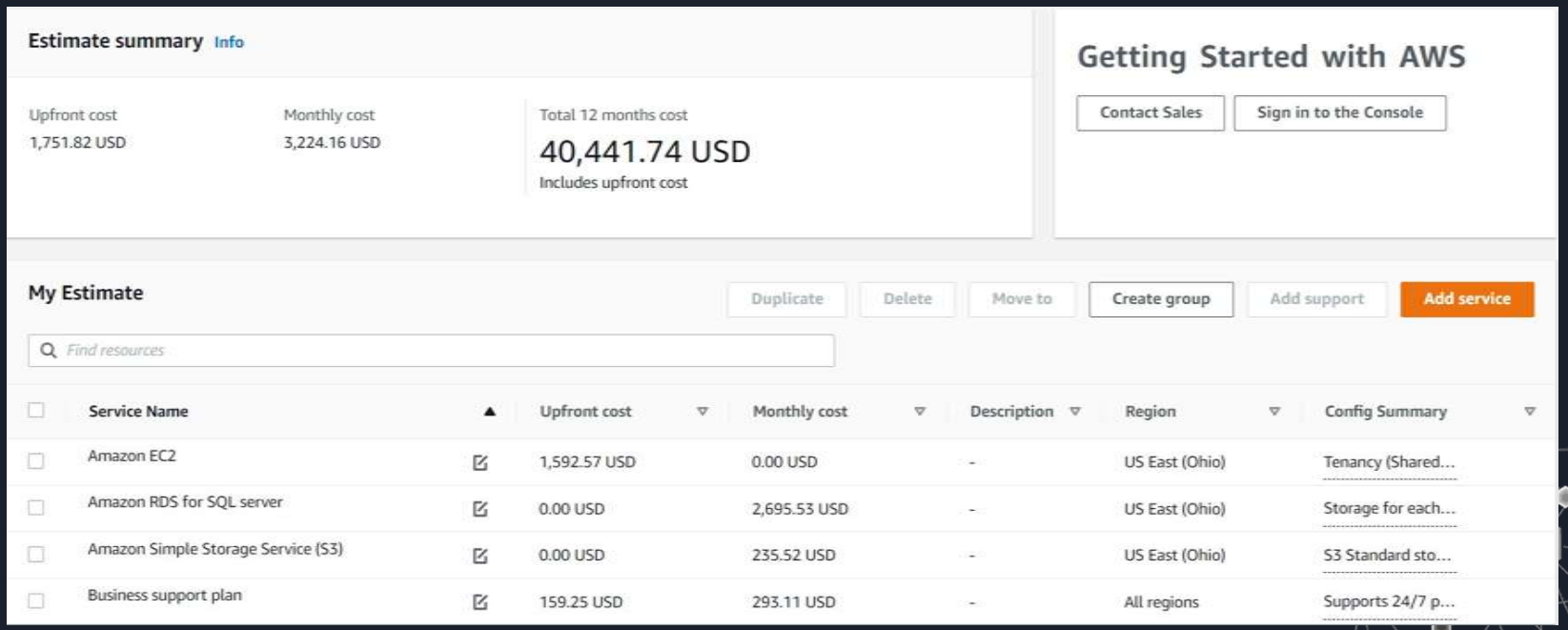
ER Diagram


User cuisine
userID
Rcuisine
User payment
userID
Rpayment
User
PK: userID
smoker
drink_level
dress_preference
ambience
transport
marital_status
birth_year
interest
personality
religion
activity
color
weight
budget
height
Rating
FK: userID
FK: placeID
rating
food_rating
service_rating
Restaurant
PK: placeID
name
address
city
state
country
fax
zip
alcohol
smoking_area
dress_code
accessibility
price
url
Rambience
franchise
area
other_services
Accepted payment
FK: placeID
Rpayment
Cuisine
FK: placeID
Rcuisine
Parking
FK: placeID
parking_lot
Hours
FK: placeID
hours
days

Tech architecture



Cost estimation



Estimate summary Info

Upfront cost	Monthly cost	Total 12 months cost
1,751.82 USD	3,224.16 USD	40,441.74 USD
		Includes upfront cost

Getting Started with AWS

Contact Sales | Sign in to the Console

My Estimate

Duplicate | Delete | Move to | Create group | Add support | Add service

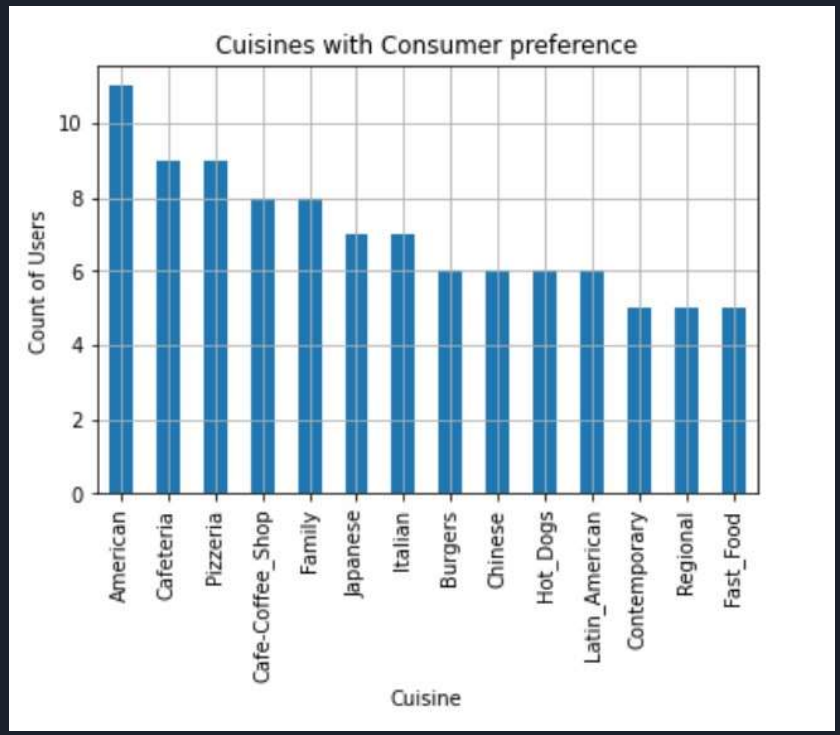
Find resources

Service Name	Upfront cost	Monthly cost	Description	Region	Config Summary
Amazon EC2	1,592.57 USD	0.00 USD	-	US East (Ohio)	Tenancy (Shared…
Amazon RDS for SQL server	0.00 USD	2,695.53 USD	-	US East (Ohio)	Storage for each…
Amazon Simple Storage Service (S3)	0.00 USD	235.52 USD	-	US East (Ohio)	S3 Standard sto…
Business support plan	159.25 USD	293.11 USD	-	All regions	Supports 24/7 p…

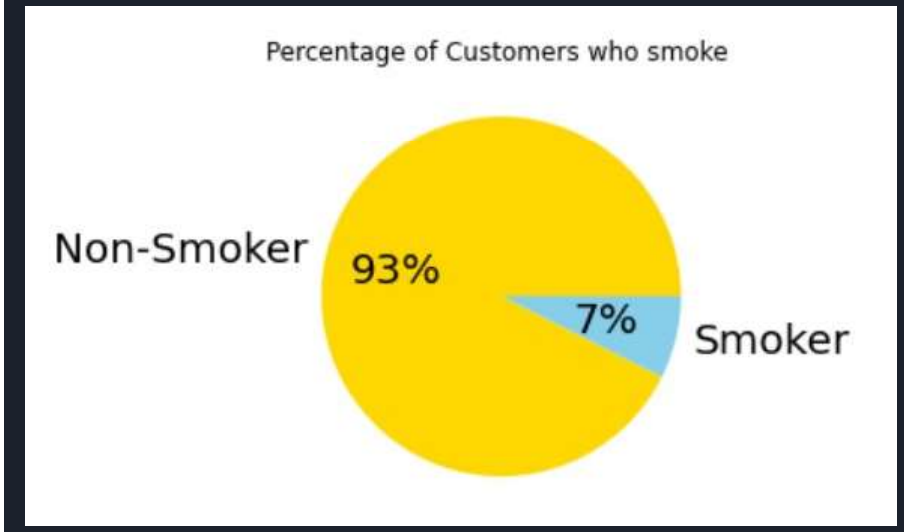
Analysis

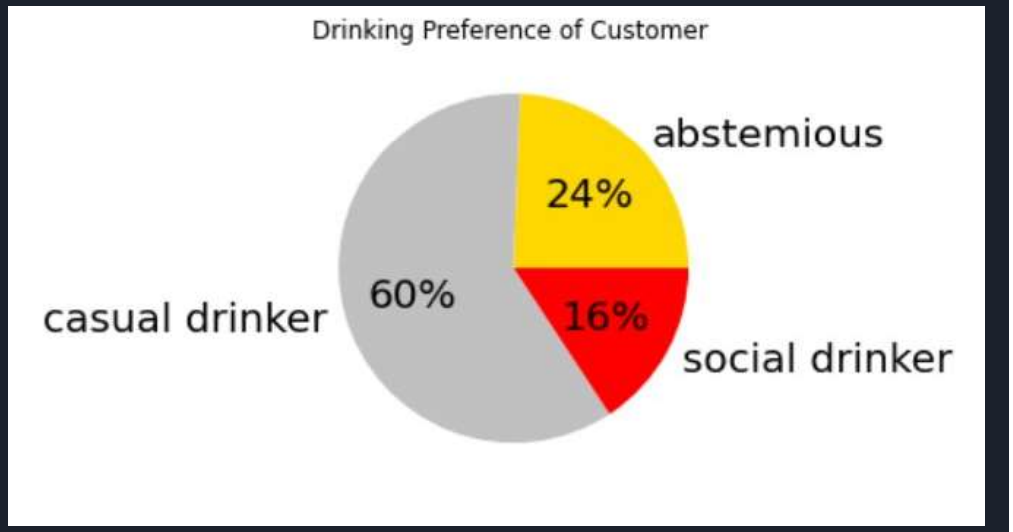
Which cuisine is most preferred by the consumers

Mexican	97
American	11
Cafeteria	9
Pizzeria	9
Cafe-Coffee_Shop	8
Family	8
Japanese	7
Italian	7
Burgers	6
Chinese	6
Hot_Dogs	6
Latin_American	6
Contemporary	5
Regional	5
Fast_Food	5

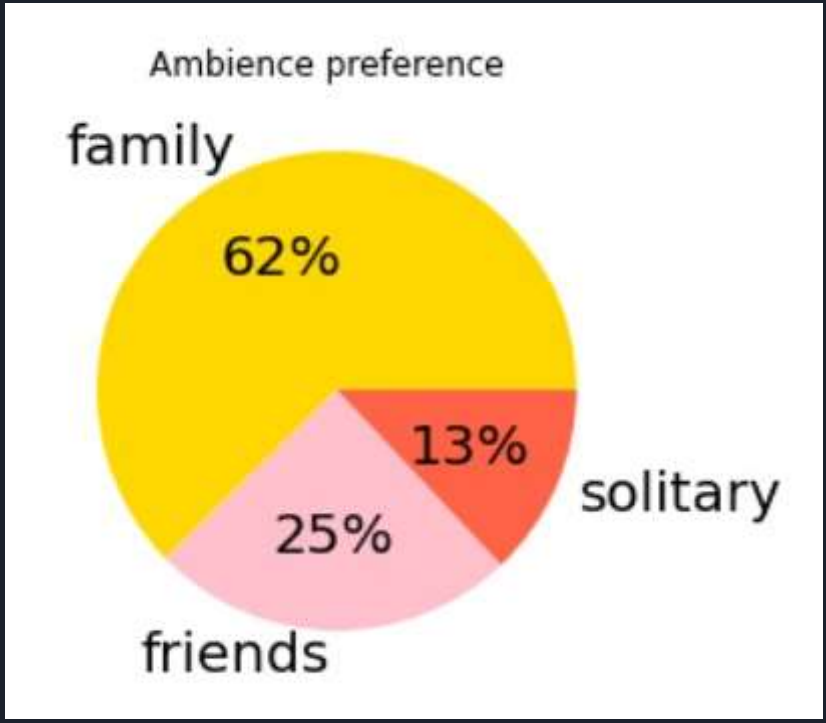


Percentage of Smokers and Drinkers

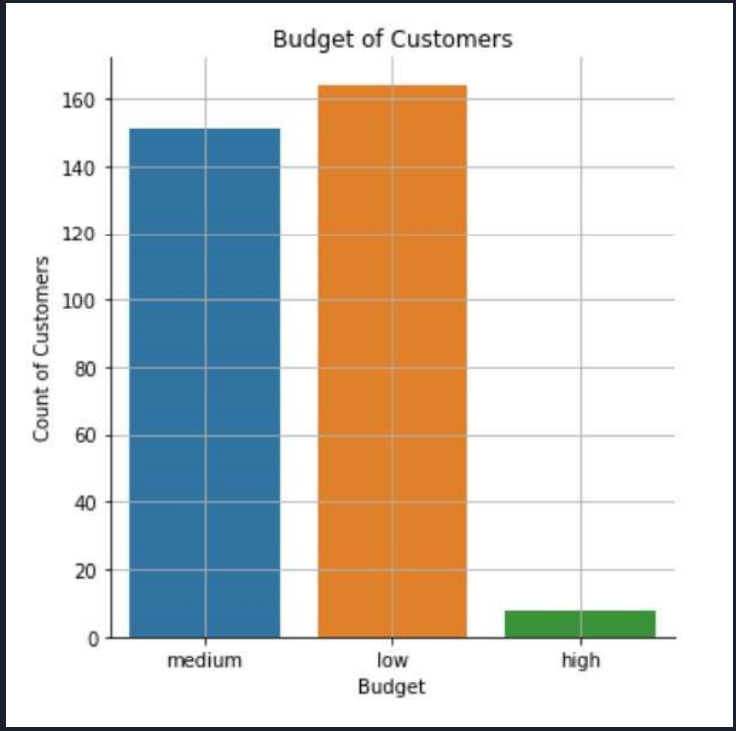




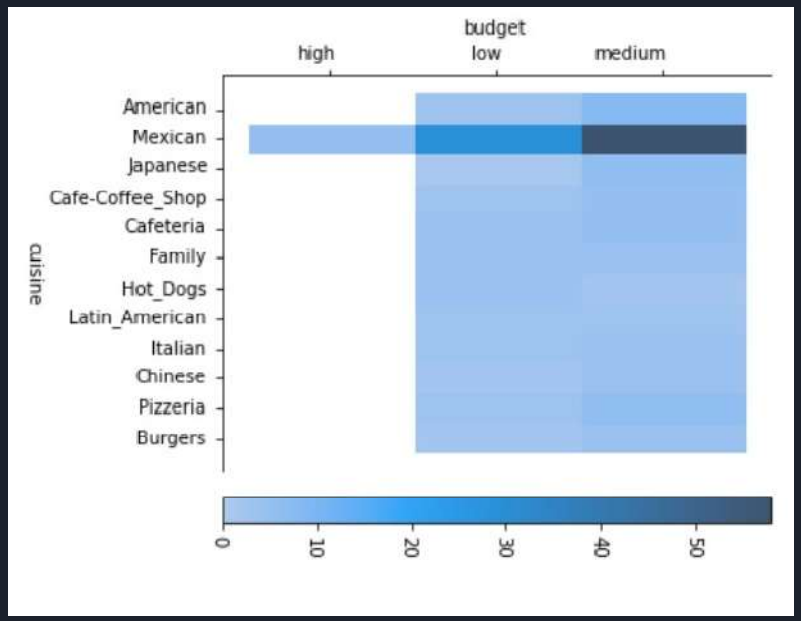
Ambience preference by customers

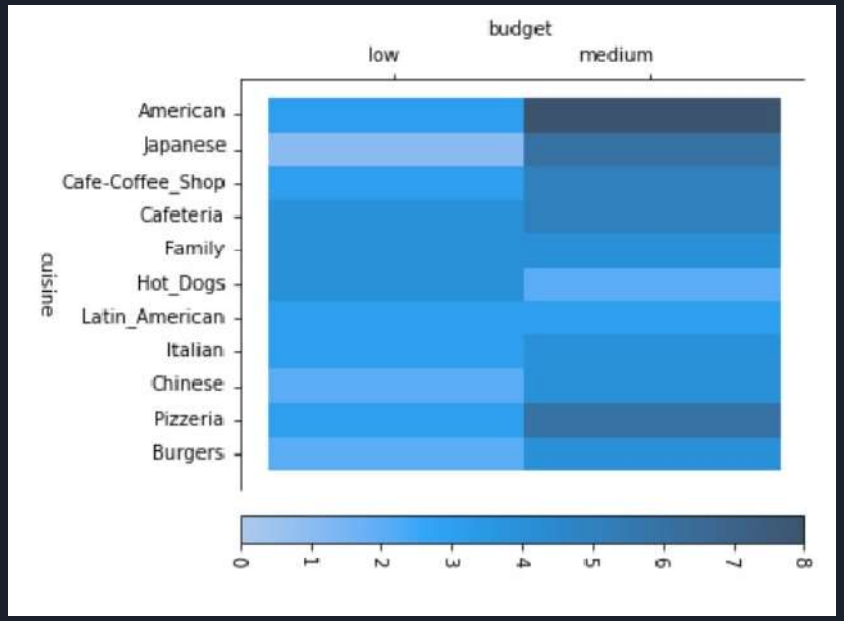


Budget of consumers



Budget vs Cuisine



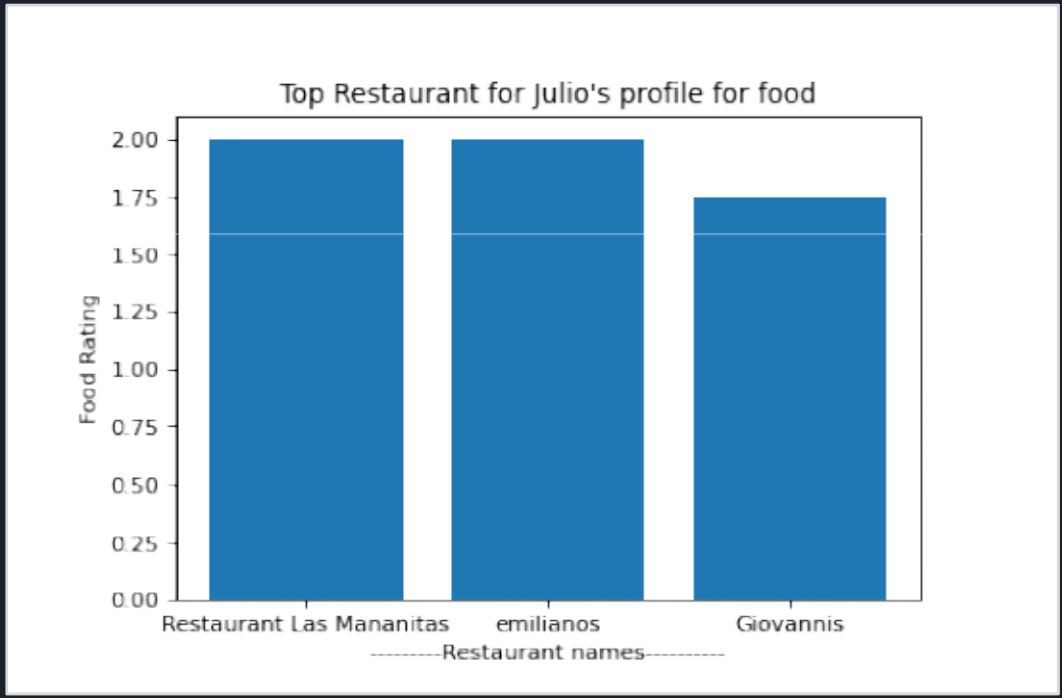


Example

User: Julio
Smoking: No
Drinking: Social
Budget: Low

```
SELECT res.name, AVG(rating.rating) rating FROM
restaurant.restaurants res
JOIN users.rating rating ON rating.placeID = res.placeID
WHERE (smoking_area = 'none' OR smoking_area = 'not
permitted')
AND price = 'low'
AND alcohol != 'No_Alcohol_Served'
GROUP BY res.name
ORDER BY AVG(rating.rating) DESC
```

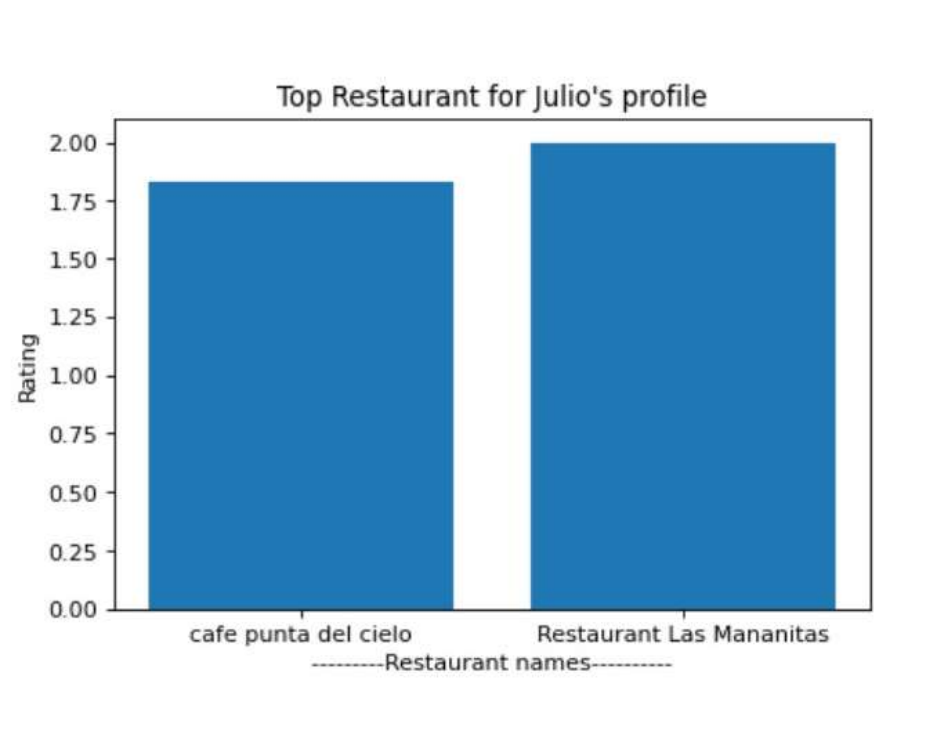
If Julio doesn't care about alcohol and price




```
SELECT TOP 3 res.name, AVG(rating.food_rating)
rating FROM restaurant.restaurants res
JOIN users.rating rating ON rating.placeID =
res.placeID
WHERE (smoking_area = 'none' OR smoking_area
= 'not permitted')
GROUP BY res.name
ORDER BY AVG(rating.food_rating) DESC
```

Julio wants to host a party for his office employees at an ambience with a formal setting

```
SELECT TOP 3 res.name, AVG(rating.rating) rating FROM
restaurant.restaurants res
JOIN users.rating rating ON rating.placeID = res.placeID
AND res.dress_code = 'formal'
GROUP BY res.name
ORDER BY AVG(rating.rating) DESC
```



Results

- Our app obtains the user's location and uses a geographic database to find the closest restaurants before generating recommendations. At the moment of execution, an analysis is created using this data. In our analysis, we analyzed the customers database with respect to their smoking, drinking and cuisine preferences and used that data to find restaurants for one specific subject.
- The instances that fill the ontology get closer and closer restaurants. Then, models are applied to a set of semantic rules to match the on-text. Based on a market analysis of consumer behavior that we did earlier, this set of guidelines was developed.
- A relation is built from the attributes of the restaurant profile (i.e., service model) to see if its value corresponds to that in the user profile. For instance, the suggested restaurants must provide a no-smoking area if the user does not smoke.
- Each restaurant will be added a weight for our Machine Learning model for the specific user according to his preferences and the priority or recommendation will be based on it.

Conclusion

- This database can be used to analyze the customer data to find the type of customers in the area and their preferences and then can create an app to recommend restaurants in the area according to their specific profile and preferences with the respective rating.

- This system is beneficial to the target users and market where restaurant options are limitless and customers want to find their preferred restaurant in an time efficient manner.

References

- Anant Gupta, Kuldeep Singh, “Location Based Personalized Restaurant Recommendation System for Mobile Environments”, International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2013.
- https://www.researchgate.net/publication/312829358_A_Restaurant_Recommendation_System_by_Analyzing_Ratings_and_Aspects_in_Reviews
- https://ceur-ws.org/Vol-791/paper8.pdf
- Workshop on Context Aware Recommender Systems (CARS-2011), Chicago, IL, USA, October 23, 2011.
- G. Adomavicius, R. Sankaranarayanan, S. Sen, and A. Tuzhilin. Incorporating contextual information in recommender systems using a multidimensional approach. ACM Transactions on Information Systems, 23:103–145, January 2005.

THANKYOU