

# Agenda Case Study










# Agenda

- ❖ Problem Statement
- ❖ Data Overview
- ❖ Approach
- ❖ Commission Rate Estimation
- ❖ Customer Segmentation.
  - Spend Based Classification
  - Customer Classification - Frequency of Booking
- ❖ Merging Classifications
- ❖ Final Classification

# Problem Statement

- ❖ Agoda VIP Program
- ❖ How to segregate existing customers.



	VIP Bronze	VIP Silver 	VIP Gold 	VIP Platinum 
				
Best Price Guarantee	✓	✓	✓	✓
Insider deals	✓	✓	✓	✓
VIP deals up to 12% off	✗	✓	✓	✓
VIP deals up to 18% off	✗	✗	✓	✓
VIP deals up to 25% off	✗	✗	✗	✓
Free breakfast and other perks on selected properties!	✗	✗	✗	✓

# Data Overview

	travelCode	userCode	name	place	days	price	total	date
0	0	0	Hotel A	Florianopolis (SC)	4	313.02	1252.08	09/26/2019
1	2	0	Hotel K	Salvador (BH)	2	263.41	526.82	10/10/2019
2	7	0	Hotel K	Salvador (BH)	3	263.41	790.23	11/14/2019
3	11	0	Hotel K	Salvador (BH)	4	263.41	1053.64	12/12/2019
4	13	0	Hotel A	Florianopolis (SC)	1	313.02	313.02	12/26/2019

40552 rows × 8 columns

# Approach

	travelCode	userCode	name	place	days	price	total	date
0	0	0	Hotel A	Florianopolis (SC)	4	313.02	1252.08	09/26/2019
1	2	0	Hotel K	Salvador (BH)	2	263.41	526.82	10/10/2019
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3	11	0	Hotel K	Salvador (BH)	4	263.41	1053.64	12/12/2019
4	13	0	Hotel A	Florianopolis (SC)	1	313.02	313.02	12/26/2019

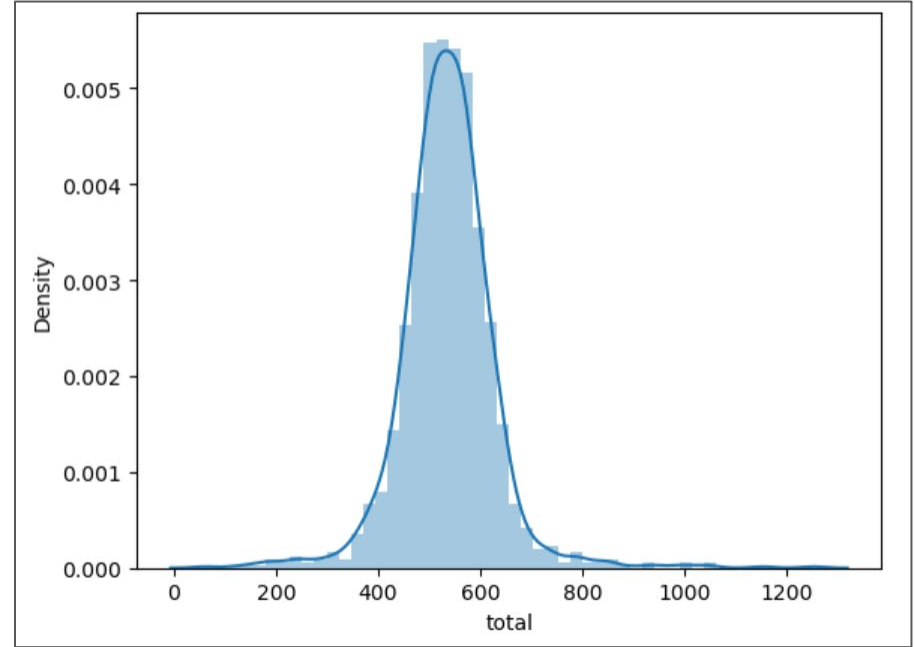
Classification Based on Spend

Classification Based on  
Booking frequency

# Data Overview

- ❖ Group By “userCode” column.
- ❖ Plot pdf on total again.
- ❖ Total Unique Users: 1310

	userCode	days	total
0	0	2.629630	593.145185
1	1	1.000000	193.360000
2	2	2.694444	558.003333
3	3	2.300000	499.568500
4	4	2.571429	565.316071



# Commission Rate Estimation

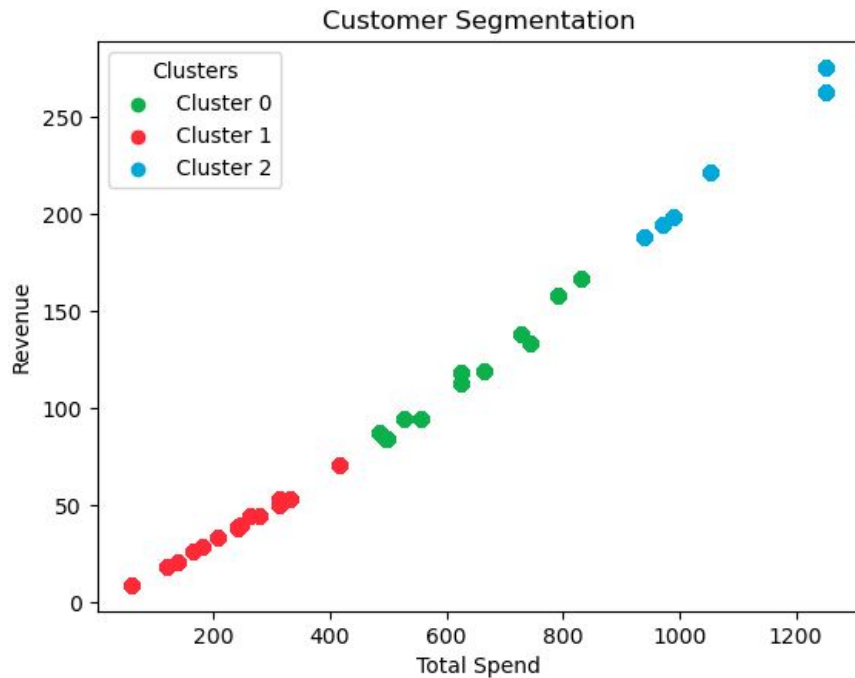
- ❖ The code defines the range of commission rates as 15% to 22%.
- ❖ It performs linear regression using the 'total' column as the independent variable and the 'price' column as a proxy for the commission rate.
- ❖ The predicted commission rates are normalized between the defined range and added as a new column ('commission\_rate') in the 'hotels' DataFrame.

userCode	price	total	commission_rate	revenue
0	313.02	1252.08	0.22	275.4576
0	263.41	526.82	0.18	94.8276
0	263.41	790.23	0.19	150.1437
0	263.41	1053.64	0.21	221.2644
0	313.02	313.02	0.16	50.0832

$$\text{price} = m * \text{total} + C$$

# 1. Spend Based Classification

- ❖ K-means classification with  $K = 3$





# Customer Segmentation - K-means

- ❖ Ticket classification: Categorizing customers based on revenue

- ❖ Categories: Low Ticket, Medium Ticket, High Ticket

	userCode	revenue	cluster	Ticket_Classification	Preference
0	0	262.9368	2	High Ticket	High Ticket
1	0	94.8276	0	Medium Ticket	High Ticket
2	0	158.0460	0	Medium Ticket	High Ticket
3	0	221.2644	2	High Ticket	High Ticket
4	0	50.0832	1	Low Ticket	High Ticket

## 2. Customer Classification - Frequency of Booking

- ❖ Groups by 'userCode' and 'year', counting the number of occurrences for each combination.
- ❖ It then transforms the grouped data into a wide format using the 'unstack' method, filling missing values with zero.
- ❖ Categories: Regular, Disconnected, Potential Regular

userCode	2019	2020	2021	2022	2023	Classification
0	5	18	4	0	0	Disconnected
1	2	0	0	0	0	Disconnected
2	4	15	12	5	0	Potential Regular
3	4	16	14	12	14	Regular
4	3	14	13	18	8	Regular

# Merging Classifications

userCode	Preference
0	High Ticket
0	High Ticket
0	High Ticket
0	High Ticket
0	High Ticket



userCode	Classification
0	Disconnected
1	Disconnected
2	Potential Regular
3	Regular
4	Regular

# Merging Classifications

userCode	place	days	price	total	revenue	date	cluster	Preference	Classification
0	Florianopolis (SC)	4	313	1252.08	275.4576	2019-09-26	2	High Ticket	Disconnected
0	Salvador (BH)	2	263	526.82	94.8276	2019-10-10	0	High Ticket	Disconnected
0	Salvador (BH)	3	263	790.23	150.1437	2019-11-14	0	High Ticket	Disconnected
0	Salvador (BH)	4	263	1053.64	221.2644	2019-12-12	2	High Ticket	Disconnected
0	Florianopolis (SC)	1	313	313.02	50.0832	2019-12-26	1	High Ticket	Disconnected

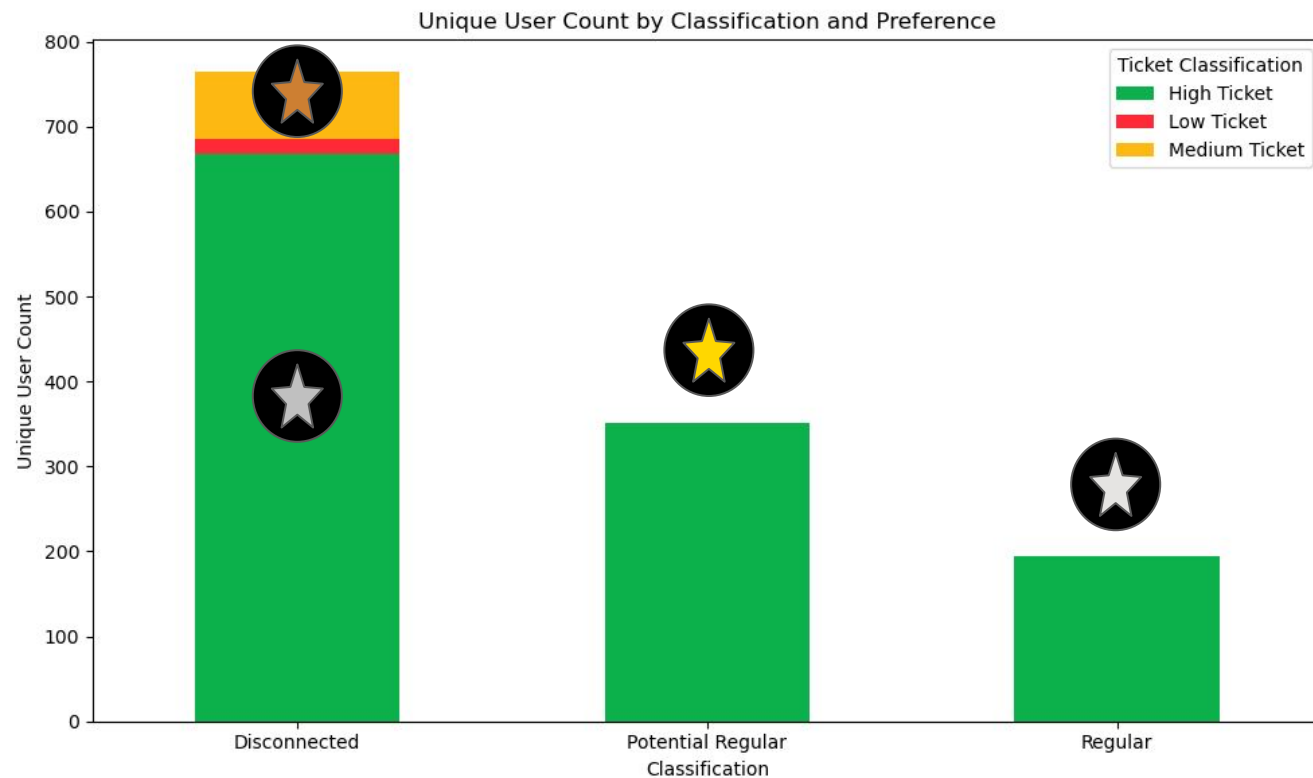
40552 rows

# Final Classification





- ❖ The code groups the data by "Classification" and "Preference" columns, then calculates the count of unique "userCode" values for each group, resulting in the final classification of users based on their preferences.

	Classification	Preference	userCode
0	Disconnected	High Ticket	668
1	Disconnected	Low Ticket	17
2	Disconnected	Medium Ticket	79
3	Potential Regular	High Ticket	352
4	Regular	High Ticket	194

1310





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VIP deals up to 18% off	✗	✗	✓	✓
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Free breakfast and other perks on selected properties!	✗	✗	✗	✓

# Observations

This screenshot shows the Agoda listing for 'Entire 2BHK Flat for Parties/ Family'. The header includes the property name, dates (16 Jun 2023 Friday to 17 Jun 2023 Saturday), and guest information (2 adults, 1 room). The price is listed as 'from Rs. 9,344'. The property is highlighted as 'Entire villa' and 'Professionally managed'. It has a 9.1 Exceptional rating based on 21 reviews. The location is South Delhi, New Delhi and NCR, India. The description mentions it's a private villa with car park, close to attractions, and has 5-star facilities. The 'Highlights' section lists: Sparkling clean, 490 meters to public transportation, Top Value, Excellent room comfort & quality, and Air conditioning. The 'Space & Rooms' section shows 'Entire villa (Room size: 400 m²/4306 ft²)' and 'Max 7 guests | 2 bedrooms | 2 bathrooms'.

Entire 2BHK Flat for Parties/ Family

16 Jun 2023 Friday 17 Jun 2023 Saturday 2 adults 1 room UPDATE

Overview Rooms Facilities Reviews Location from Rs. 9,344 VIEW THIS DEAL

Entire villa Professionally managed

### Entire 2BHK Flat for Parties/ Family ★★★★★

South Delhi, New Delhi and NCR, India - SEE MAP

If you're looking for a private villa with car park free of charge, look no further. Conveniently situated in the South Delhi part of New Delhi and NCR, this property puts you close to attractions and interesting dining options. Don't leave before paying a visit to the famous Qutub Minar. This 5-star property is packed with in-house facilities to improve the quality and joy of your stay.

#### Highlights

- Sparkling clean
- 490 meters to public transportation
- Top Value
- Excellent room comfort & quality
- Air conditioning

#### Space & Rooms

Select room

Entire villa (Room size: 400 m²/4306 ft²)

Max 7 guests | 2 bedrooms | 2 bathrooms

#### 9.1 Exceptional

21 reviews

"Great location, really pleasant and clean rooms, but the thing that makes this such a good place to stay are the..."

Kamlesh

SEE MAP

9.1 Exceptional Location rating score

Exceptional location

This screenshot shows the same Agoda listing from a slightly different angle. The header and navigation tabs are visible. The 'Entire villa' tag is highlighted with a red box. The 9.1 Exceptional rating and 21 reviews are prominent. The 'Highlights' section is clearly visible. The 'Space & Rooms' section shows the room size and a 'Select room' button. The '9.1 Exceptional' rating is also shown in a separate box on the right.

Entire 2BHK Flat for Parties/ Family

16 Jun 2023 Friday 17 Jun 2023 Saturday 2 adults 1 room UPDATE

Overview Rooms Host Facilities Reviews Location from Rs. 9,344 VIEW THIS DEAL

Entire villa

### Entire 2BHK Flat for Parties/ Family ★★★★★

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#### Highlights

- Sparkling clean
- 490 meters to public transportation
- Top Value
- Excellent room comfort & quality
- Air conditioning

#### Space & Rooms

Select room

Entire villa (Room size: 400 m²/4306 ft²)

#### 9.1 Exceptional

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SEE MAP

9.1 Exceptional Location rating score

Exceptional location



# Observations

Entrie 2 acre Farmhouse with Pool n 2 rooms

Manesar, New Delhi and NCR, India - [SEE MAP](#)

If you're looking for a private villa with car park free of charge, look no further. Conveniently situated in the Manesar part of New Delhi and NCR, this property puts you close to attractions and interesting dining options. Don't leave before paying a visit to the famous Qutub Minar. This 5-star property is packed with in-house facilities to improve the quality and joy of your stay.

**Highlights**

- Check-in [24-hour]
- Air conditioning
- Car park

**Facilities**

- ✓ Pets allowed
- ✓ Car park
- ✓ Free Wi-Fi in all rooms!
- ✓ Check-in [24-hour]
- ✓ Hot tub
- ✓ Swimming pool [outdoor]
- ✓ Balcony or terrace
- ✓ Wi-Fi in public areas

**7.5 Very good**  
21 reviews

**Entrie villa**

Entrie 2 acre Farmhouse with Pool n 2 rooms

Manesar, New Delhi and NCR, India - [SEE MAP](#)

If you're looking for a private villa with car park free of charge, look no further. Conveniently situated in the Manesar part of New Delhi and NCR, this property puts you close to attractions and interesting dining options. Don't leave before paying a visit to the famous Qutub Minar. This 5-star property is packed with in-house facilities to improve the quality and joy of your stay.

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- Check-in [24-hour]
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**7.5 Very good**  
21 reviews

**Entrie villa**