EduNet Hotel Booking Analysis - Exploratory data analysis (EDA)

By - Farhan Akhtar
farhanakhtar358@gmail.com

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Agenda of Data Analysis

- Have you ever wondered when the best time to book a hotel room is?
- Or the optimal length of stay in order to get the best daily rate?
- What if you wanted to predict which hotel likely to receive a disproportionately high number of special requests?

So, this hotel booking dataset can help us to explore all of this questions!

Hotel Booking Data

Introduction

This Dataset contains data that compares various booking information between two hotels, City Hotel and Resort Hotel. So, here i will be using the data to analyze the factors affecting the hotel bookings. These factors can be used for reporting trends and predict the future bookings.

This Dataset contains the booking data of hotels from year 2015-2017.

Data Description

hotel	There are two types of hotels, one is City Hotel and another is Resort Hotel
is_canceled	Here 0 and 1 value indicates booking was cancelled (1) or not (0)
lead_time	Time-lapse between reservation and actual arrival date
arrival_date_year	Year of arrival date
arrival_date_month	Month of arrival date
arrival_date_week_number	Week number of arrival date
arrival_date_day_of_month	Day of arrival date
stays_in_weekend_nights	Number of weekend nights (Saturday or Sunday) spent at the hotel by the guests

Data Description

stays_in_week_nights	Number of weeknights (Monday to Friday) spent at the hotel by the guests
adults	Number of adults among guests
children	Number of children among guests
babies	Number of babies among guests
meal	Type of meal booked
country	Country of guests
market_segment	Designation of market segment
distribution_channel	Name of booking distribution channel

Data Description

is_repeated_guest	If the booking was from a repeated guest (1) or not (0)
previous_cancellations	Number of previous bookings that were cancelled by the customer prior to the current booking
previous_bookings_not_canceled	Number of previous bookings not cancelled by the customer prior to the current booking
reserved_room_type	Code of room type reserved
assigned_room_type	Code of room type assigned
booking_changes	Number of changes/ amendments made to the booking
deposit_type	Type of the deposit made by the guest
agent	ID of travel agent who made the booking

Data Description

company	ID of the company that made the booking
days_in_waiting_list	Number of days the booking was in the waiting list
customer_type	Type of customer, assuming one of four categories
adr	Average Daily Rate, as defined by dividing the sum of all lodging transactions by the total number of staying nights
required_car_parking_spaces	Number of car parking spaces required by the customer
total_of_special_requests	Number of special requests made by the customer
reservation_status	Reservation status (Canceled, Check-Out or No-Show)
reservation_status_date	Date at which the last reservation status was updated

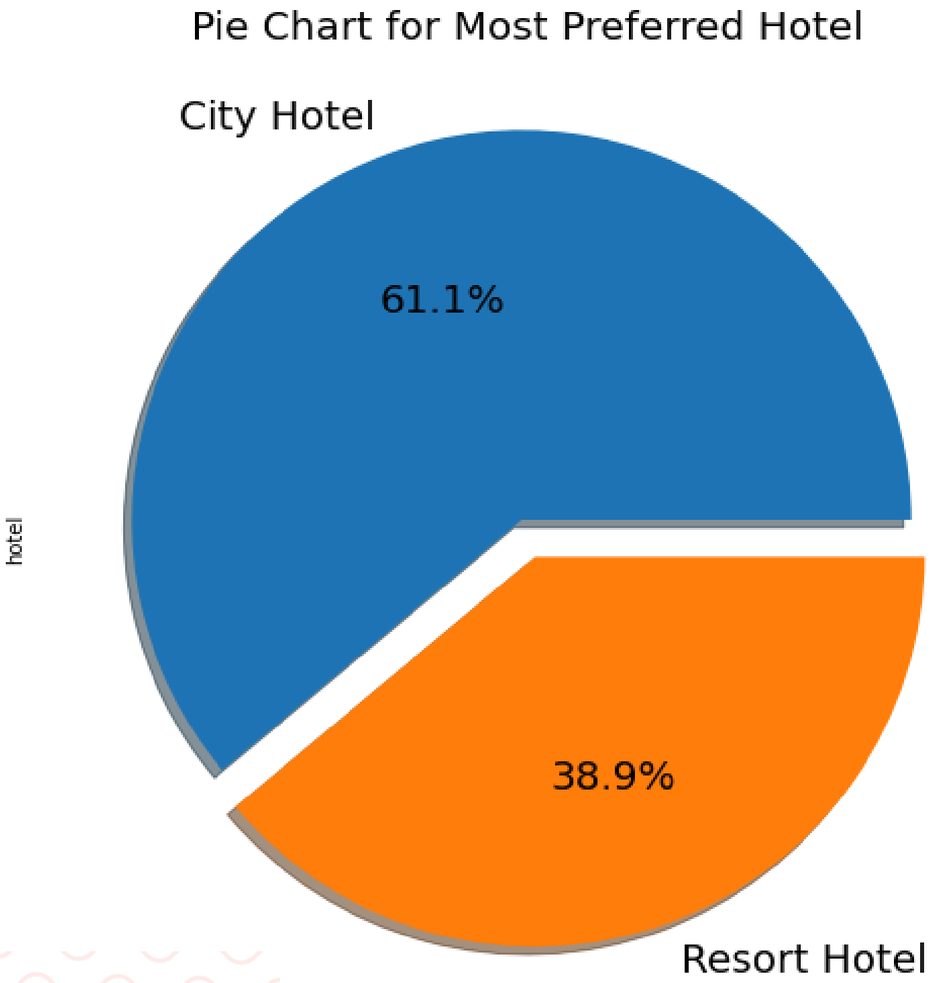
Data Summary

- This **data set** contains a single file which compares various **booking information** between **two hotels**: **City Hotel** and **Resort Hotel**. Includes information such as when the booking was made, **length of stay**, the number of **adults**, **children**, and/or **babies**, and the number of available **parking spaces**, among other things.
- The dataset contains a total of **119390** rows and **32** columns.
- All the columns are divided into three dtypes : **Object**, **float64** and **int64**.
- This dataset does have **duplicated values** as well as **null values**. There are total of **31994 duplicate values** and **four columns** have **missing values/ null values**.
- The **maximum** number of **missing values** are from **'Company'** column then followed by 'Agent', 'Country' and 'Children' columns. The **'Children'** column consists of only **4 null values**, while **'Company'** column consists of **112593 null values**.

Points for Discussion

- Top Most Preferred Hotel & Hotel Rooms
- ADR (Average Daily Rate)
- Repeated Vs Non-Repeated Guests
- Requirement of Car Parking Space
- Most Preferred Meal
- Distribution Channel Vs ADR
- Top Booking Months & Year
- Optimal Stay Length
- Confirmation Vs Cancellation
- Mostly Arrived Customers/ Visitors
- Overall Stats
- Conclusion

Top Most Preferred Hotel

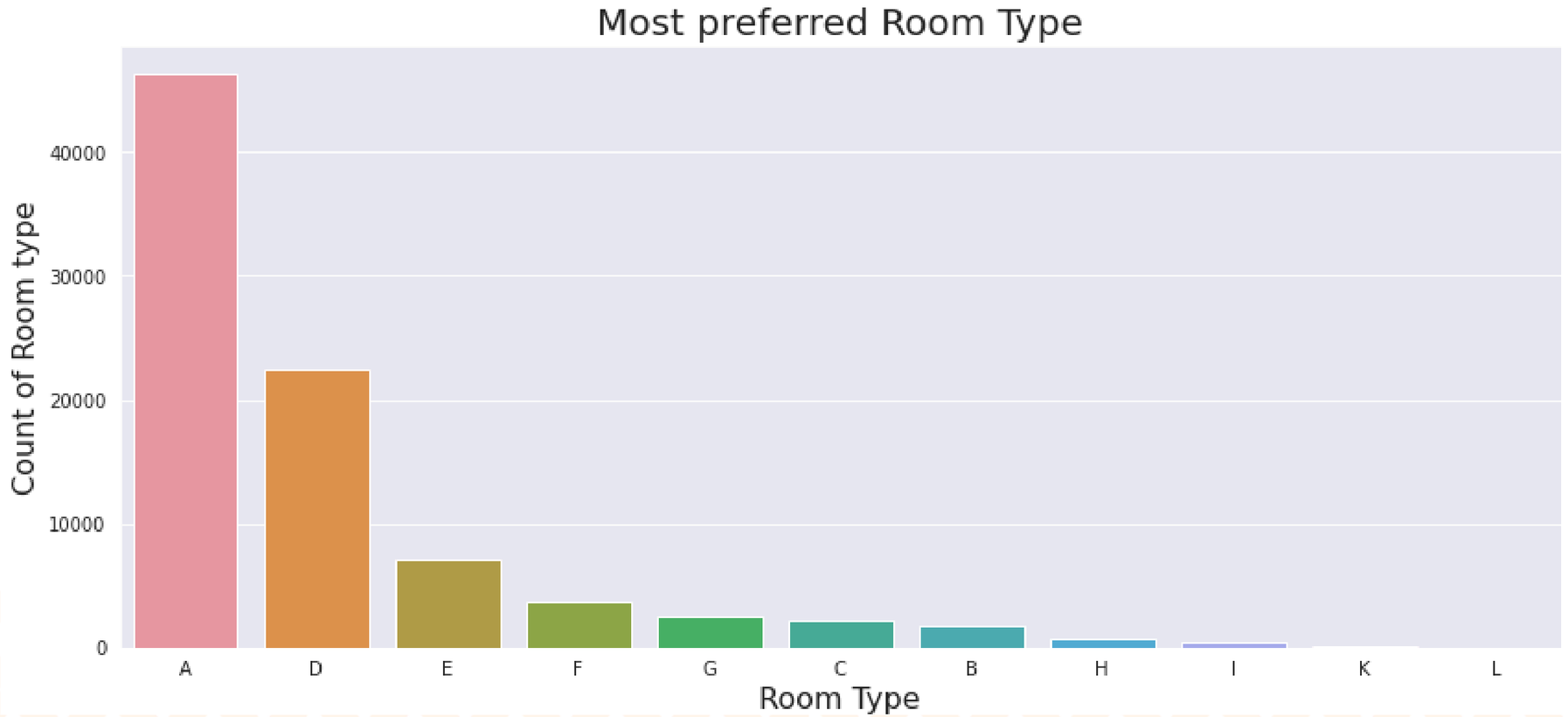


Insights found

From the chart, we got to know that **City Hotel** is **most preferred hotel** by the guests. Thus **City Hotel** has **maximum bookings**. **61.1% guests** are preferred **City Hotel**, while only **38.9% guests** have shown interest in **Resort Hotel.**

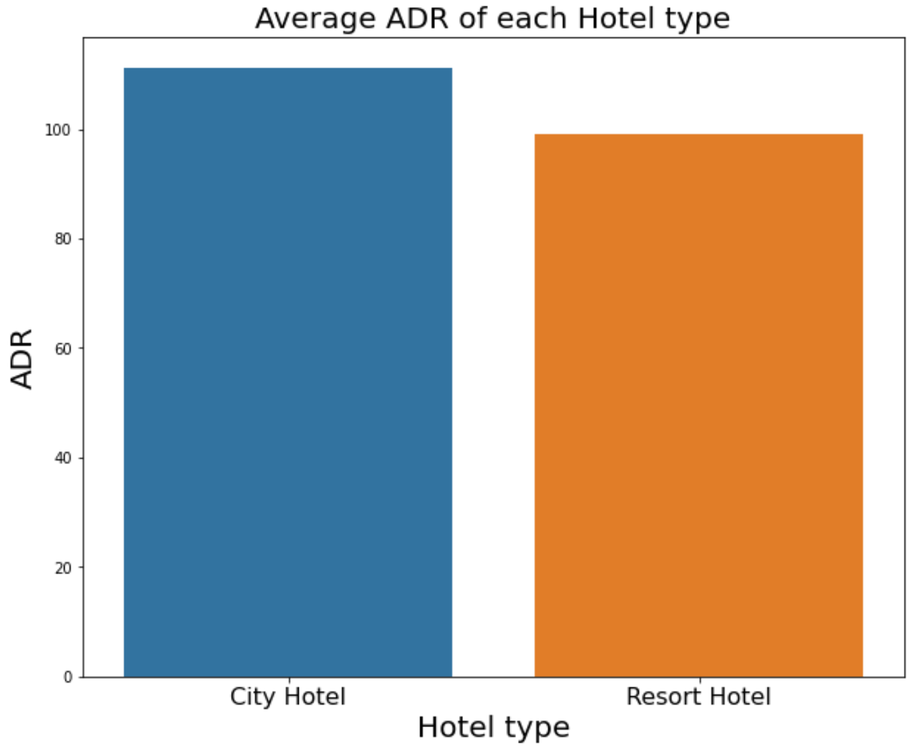
Most Preferred Hotel Rooms

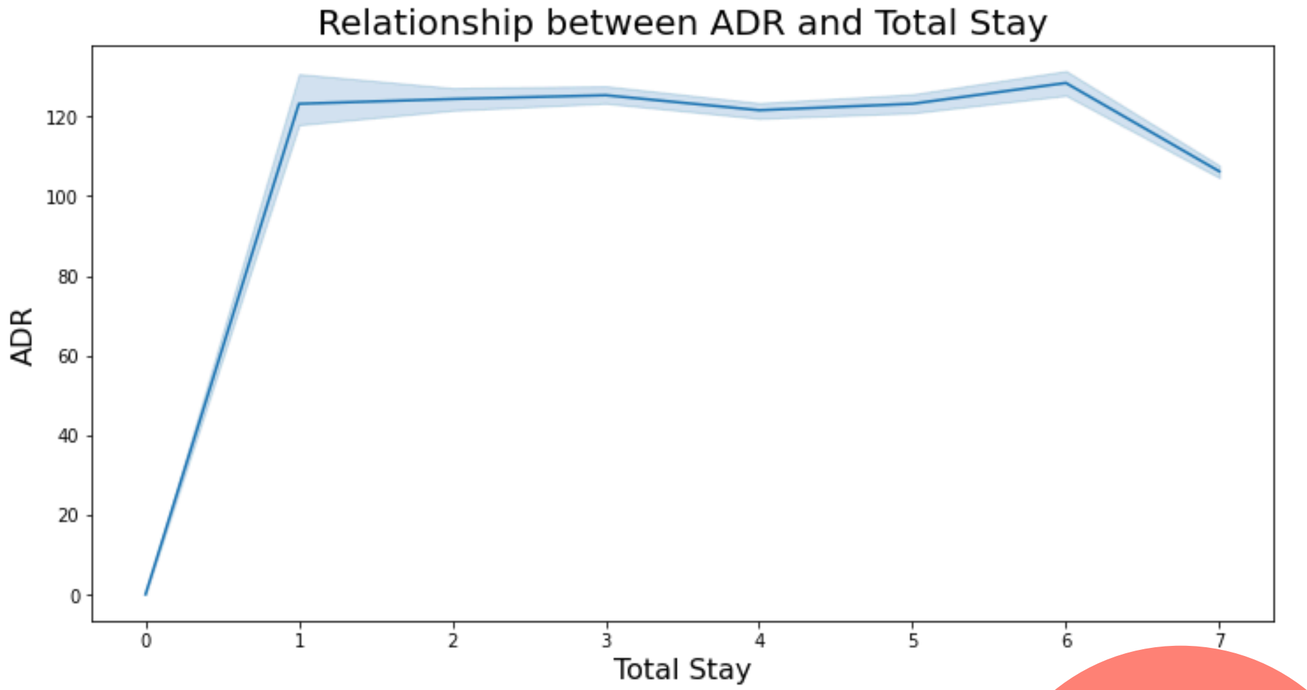
- It is found that the **most preferred Room** type is **'A'**. So, majority of the guests have **shown interest** in this **room type**.
- There are **positive impacts** because **'A'**, **'D'**, **'E'** is **more preferred** by **guest** due to **better services** offered in room type.



Average Daily Rate

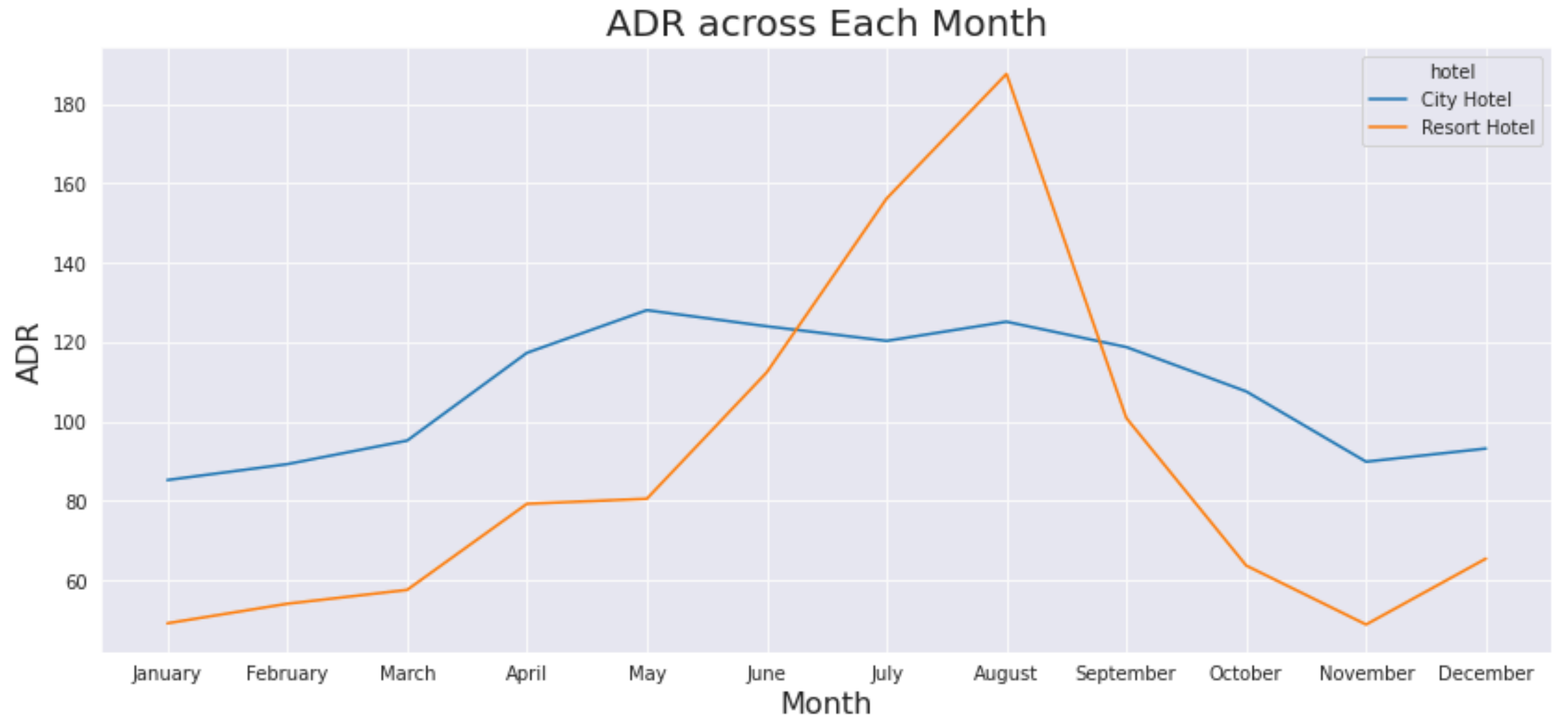
- **City Hotels** are generating **more revenues** than the **Resort Hotels**, because **City hotel** has the **highest ADR**. More the **ADR**, more will be the **revenue**.
- From the **line chart**, we have found that as the **total stay** increases the **ADR** is also getting **high**. So, **ADR** is directly **proportional** to **total stay**.





Average Daily Rate

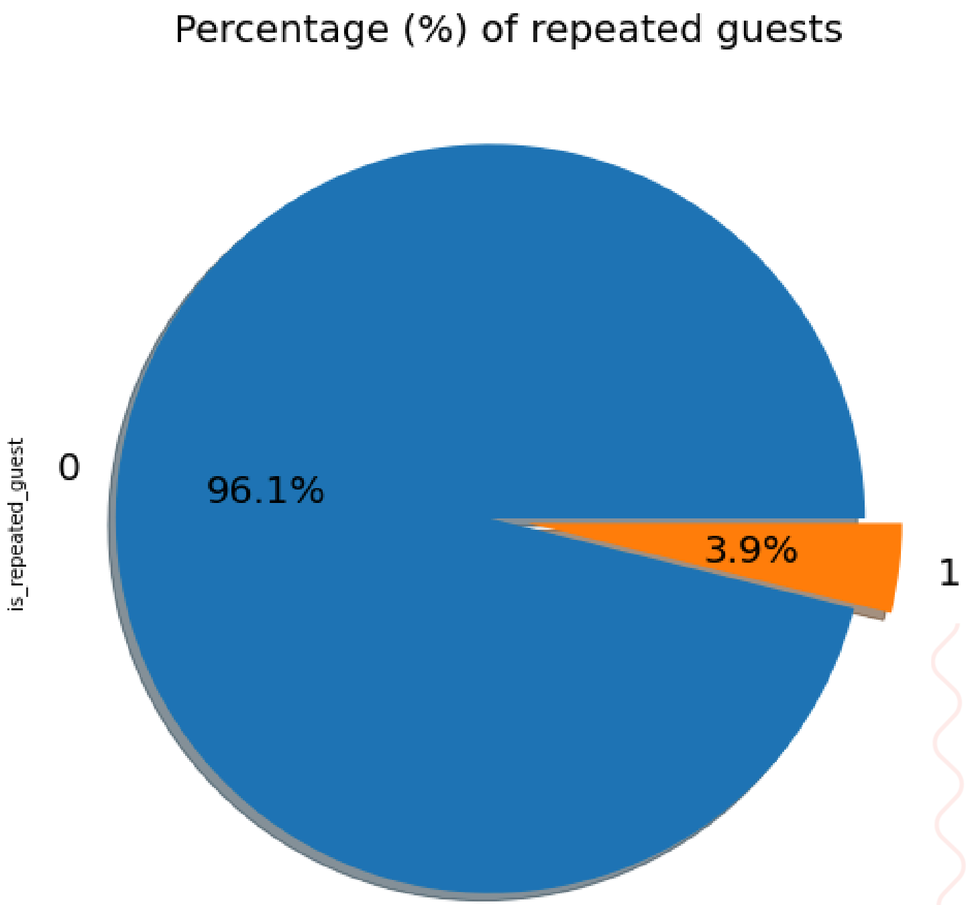
- ## ADR across months
  - For Resort Hotel, ADR is high in the months of June, July, August as compared to City Hotels. The reason may be that customers/people want to spent their summer vacation in Resort Hotels.



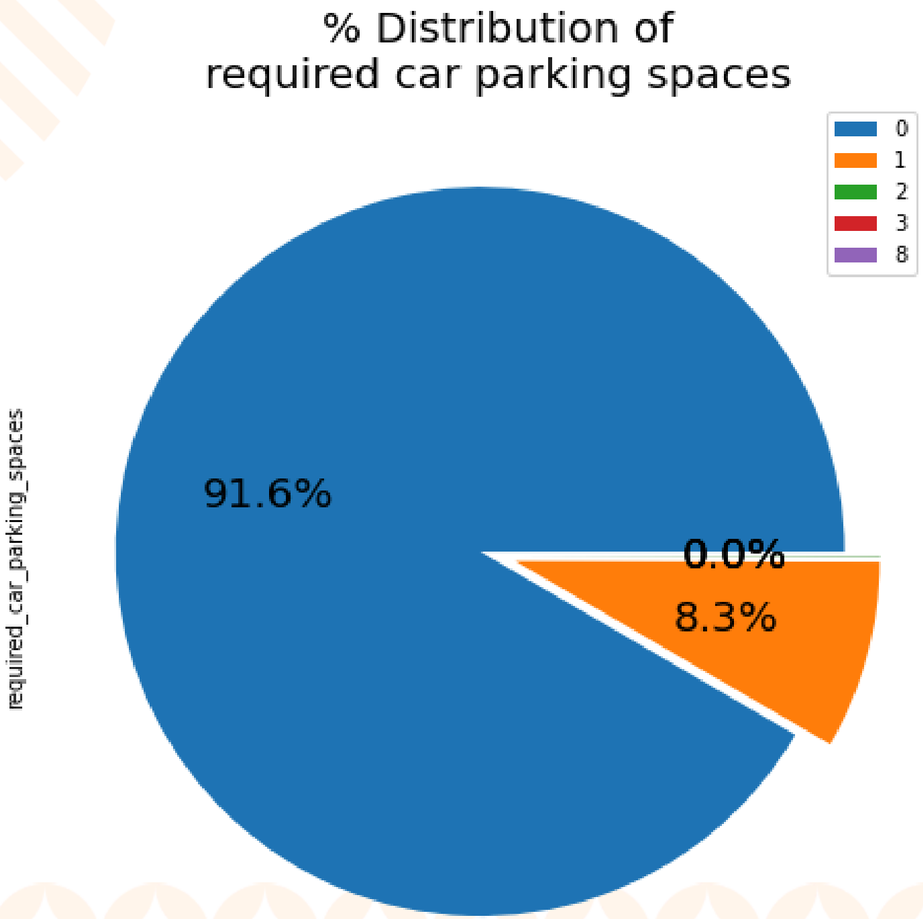
Repeated Vs Non-Repeated Guests

Insights found

- The pie chart show the **percentage** of **repeated guests** or **not** (where **0** is **not repeated guest** and **1** is **repeated guest**)
- **Repeated guests** are very few which is only **3.9%** while **96.1%** guests are **not returning** to the same hotel.
- The **guests management** should take **feedbacks** from guests and try to **improve** the **services**.



Requirement of Car Parking Space



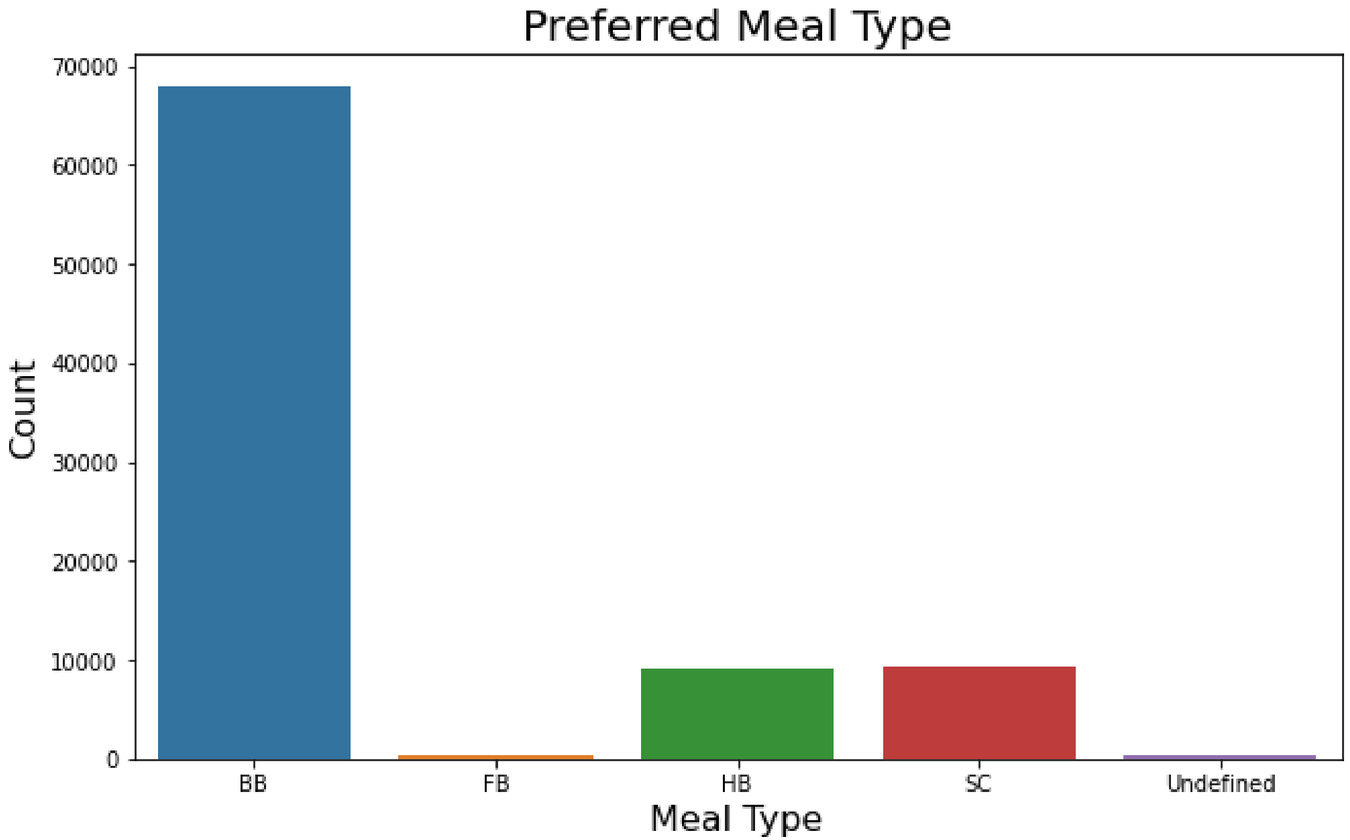
Insights found

- This chart shows that **91.6%** guests did **not required** the **parking space**. Only **8.3%** guests **required** the **parking space.**
- The **demand** for car parking area is **less**. It can be said that hotels need to **work less** on car parking spaces as only **1 car parking space** was required by **8.3%** of guests.

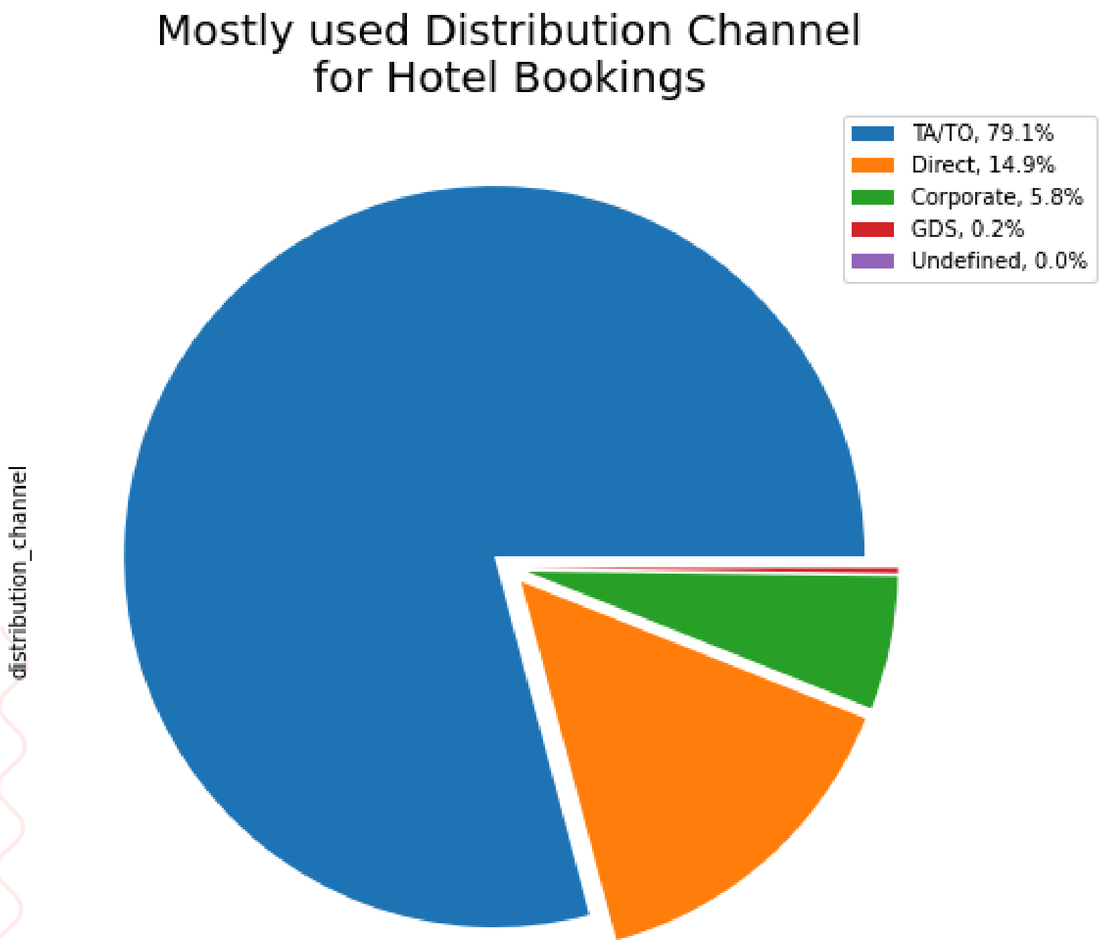
Most Preferred Meal

Insights found

The **most preferred meal** type by the guests is **BB** (**Bed and Breakfast**) while **HB** (**Half Board**) and **SC** (**Self Catering**) are equally preferred.



Maximum used Distribution Channel

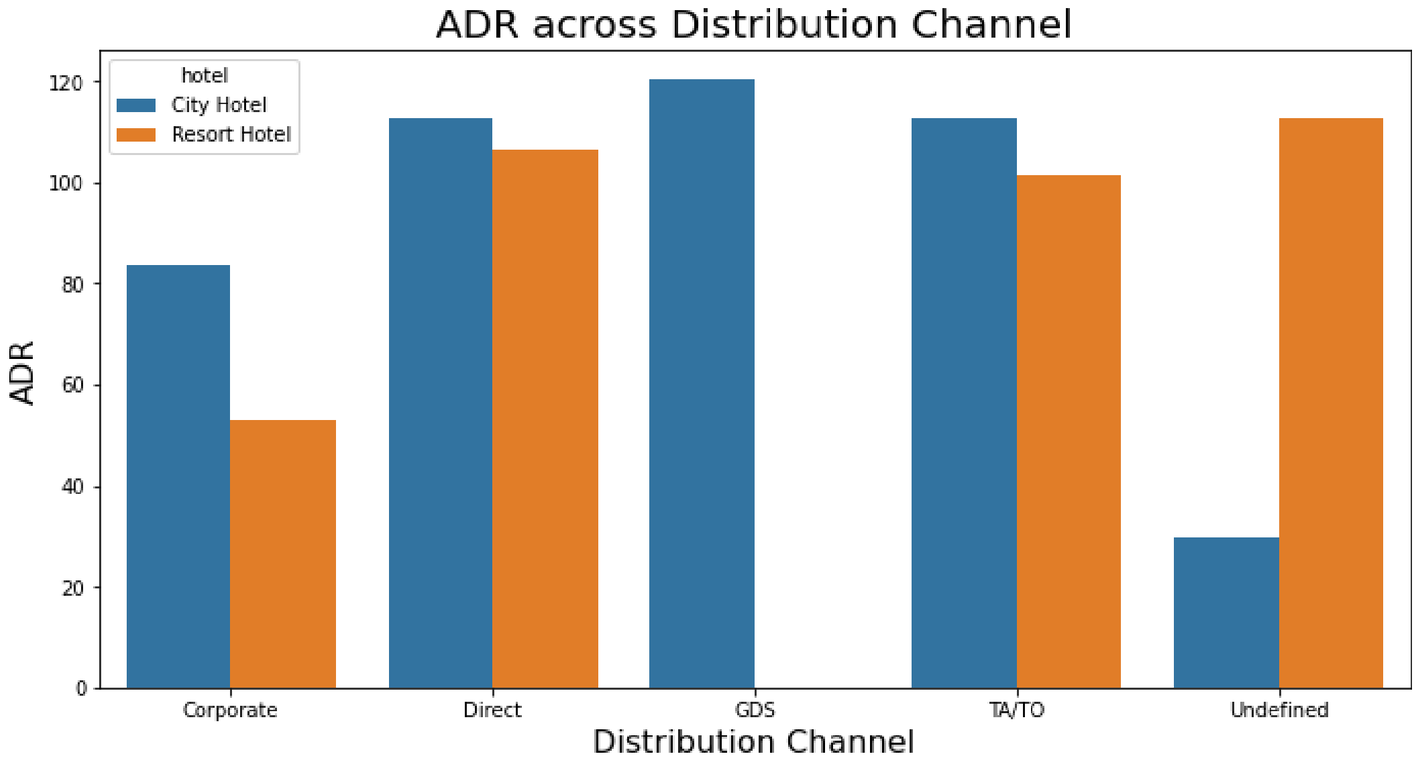


Insights found

'TA/TO' has been **mostly** (**79.1%**) **used** for **booking hotels**. **Direct** market segment of **14.9%**, **Corporates** market segment of **5.8%**, **GDS** market segment of only **0.2%** and rest **unidentified** are **0%**.

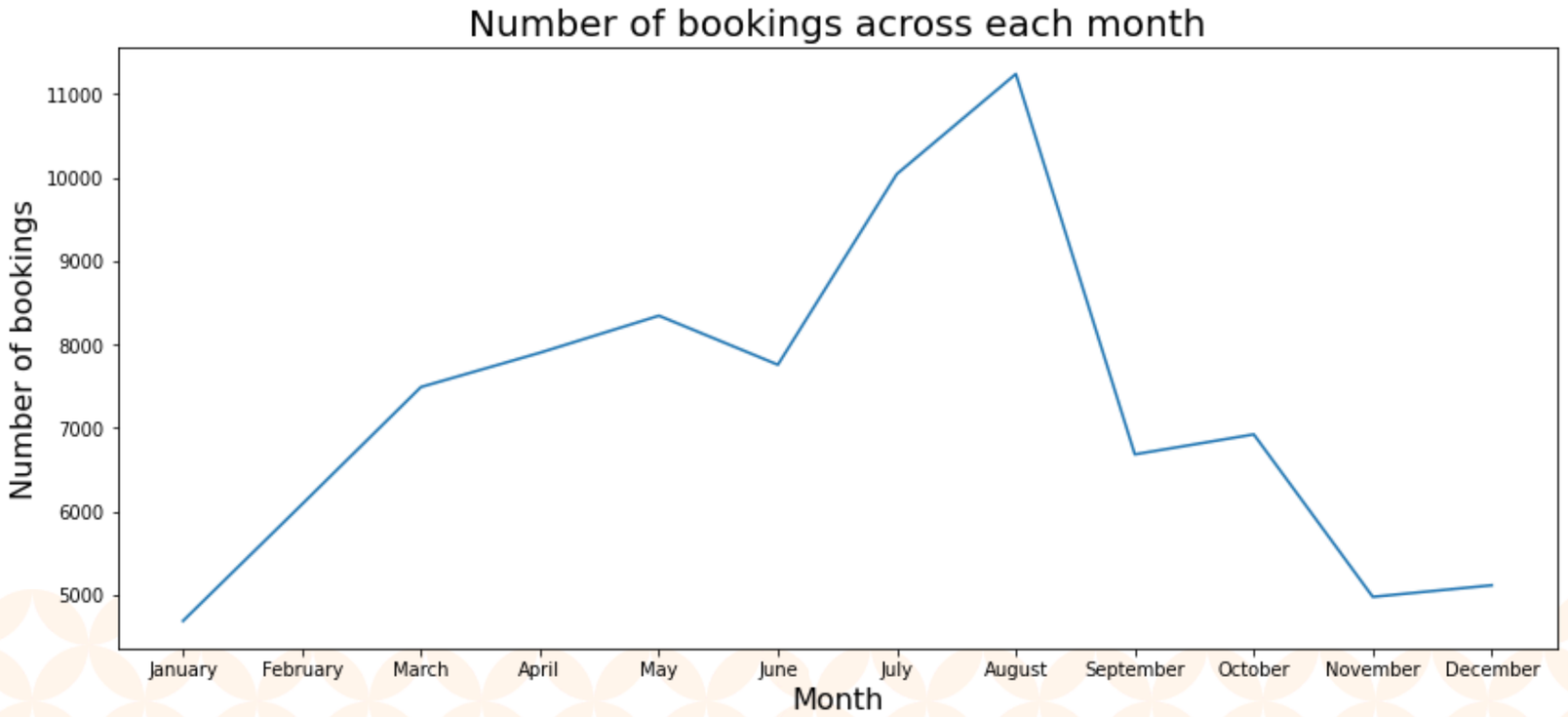
Distribution Channel Vs ADR

- **'Direct'** and **'TA/TO'** have almost **equally contribution** in **ADR** in both type of hotels. While, **GDS** has **highly contributed** in **ADR** in **'City Hotel'** type. **GDS** needs to **increase Resort Hotel** bookings.



Top Booking Months

- From this graph, we can say that **July** and **August** months had the **most Bookings**. As, **July** and **August** generally surrounds in and near the **summer vacation**.
- Hotels should be **well prepared** for the month of **July** and **August** as **maximum bookings** takes place for this **month**.

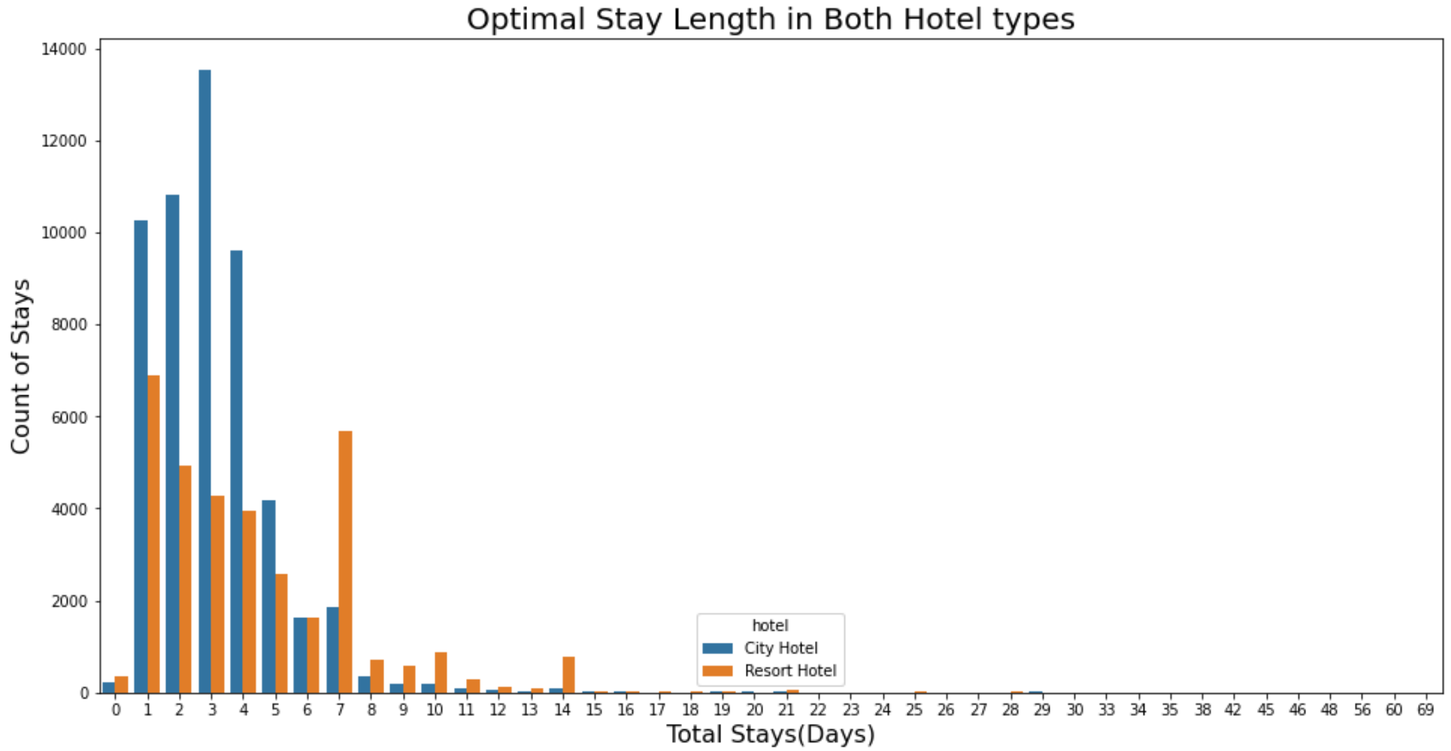


Top Booking Year

- It can be summarised that in the year **2016** both the hotel saw a **massive increase** in their **bookings** and by far the year **2016** is the year of the **highest bookings** of **both hotel**. In **2016** and **2017** the **City hotel** is having the **highest** number of **bookings** but in **2015** the **Resort hotel** is having the **highest** number of **bookings**.

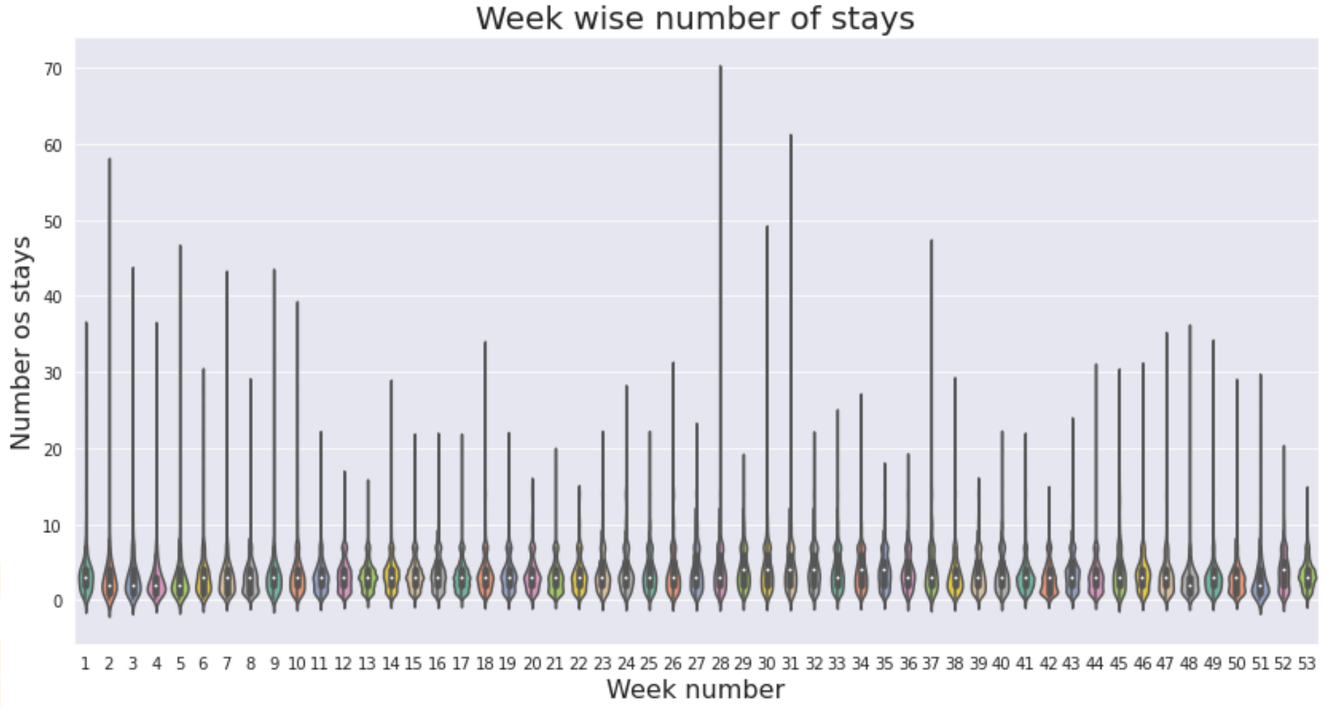
Optimal Stay Length

- We have found that the **Optimal stay** in both the type hotel is less than **7 days**. So, after that **staying numbers** have **declined** drastically.
- Customers usually **prefers** a **one week stay** in a hotel. So, hotels **need to work** efficiently in these **seven days** so that customers would **return** to the **same hotel** again.



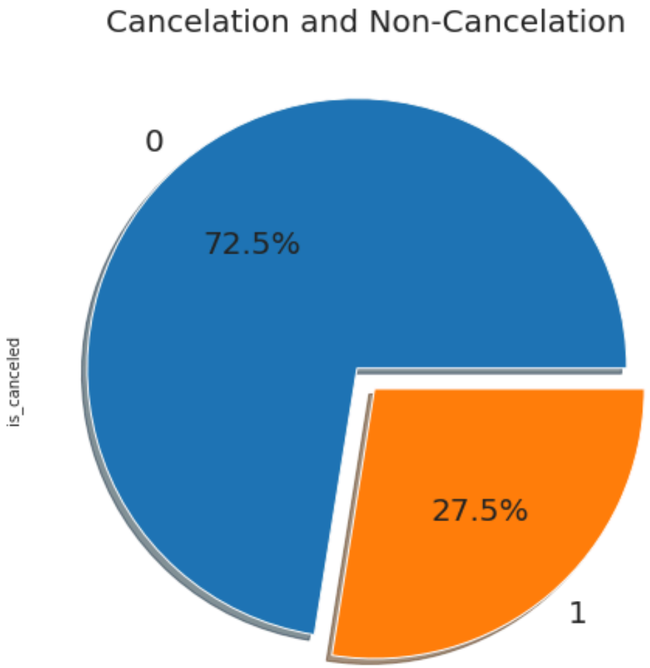
Optimal Stay Length

- **Week Wise Number of Stay**
  - From the week **28 to 31**, it has shown the **highest days** of **stay** whereas from the week **1 to 11** has shown a very steady trend in the **number of stays** and also the week **18 to 22** has shown the **least number of stays** by the visitors in aggregate of all **3 years 2015**, **2016** and **2017**.



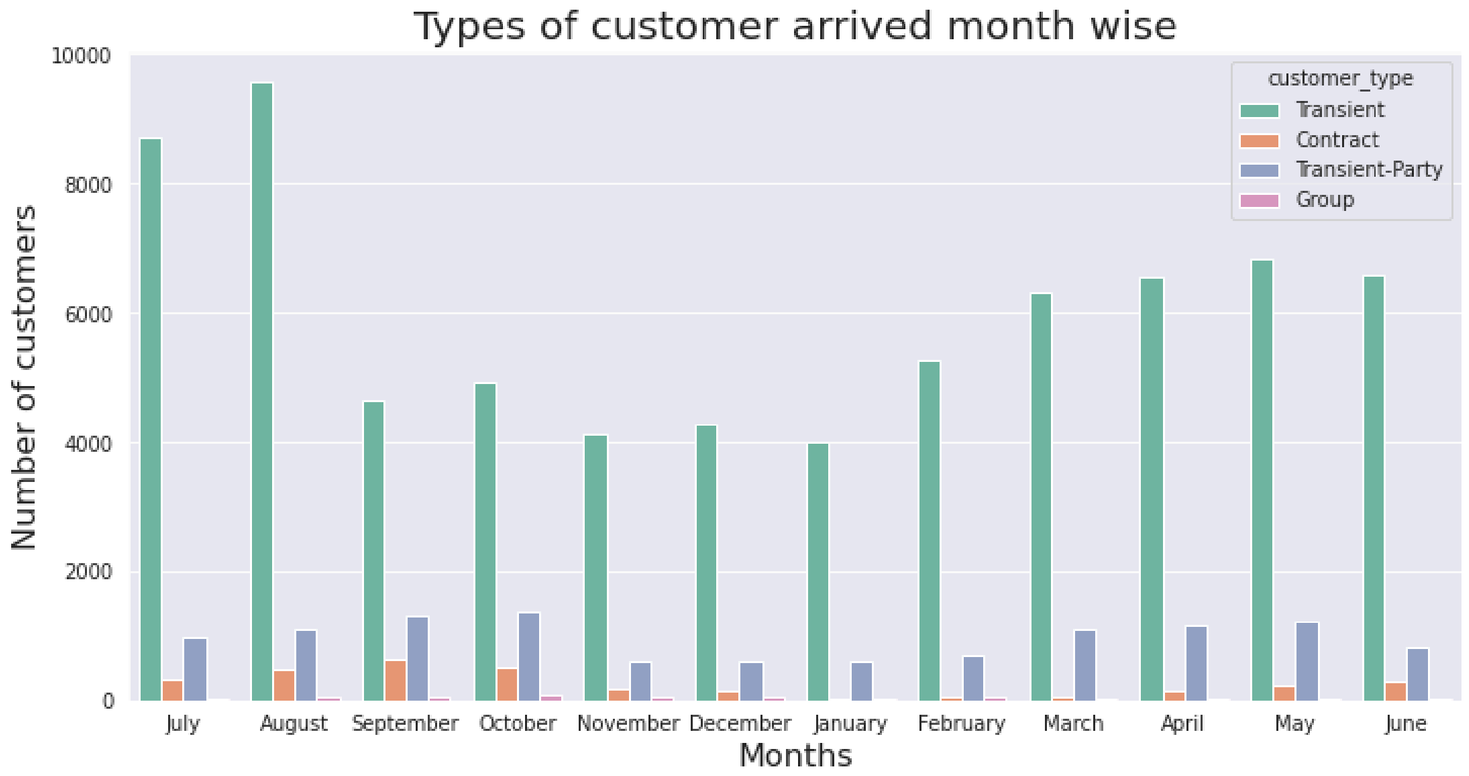
Confirmation Vs Cancellation

- More than **1/4th** of the **overall bookings** i.e. approx **27.5%** of the tickets was got **canceled**.
- We can clearly deduce from the 2nd graph that the **City hotel** is having **greater** number of **bookings** as compared to **Resort hotel**. But, the **cancelation percentage** is also **high** of the **City Hotel**.



Mostly Arrived Customers/ Visitors

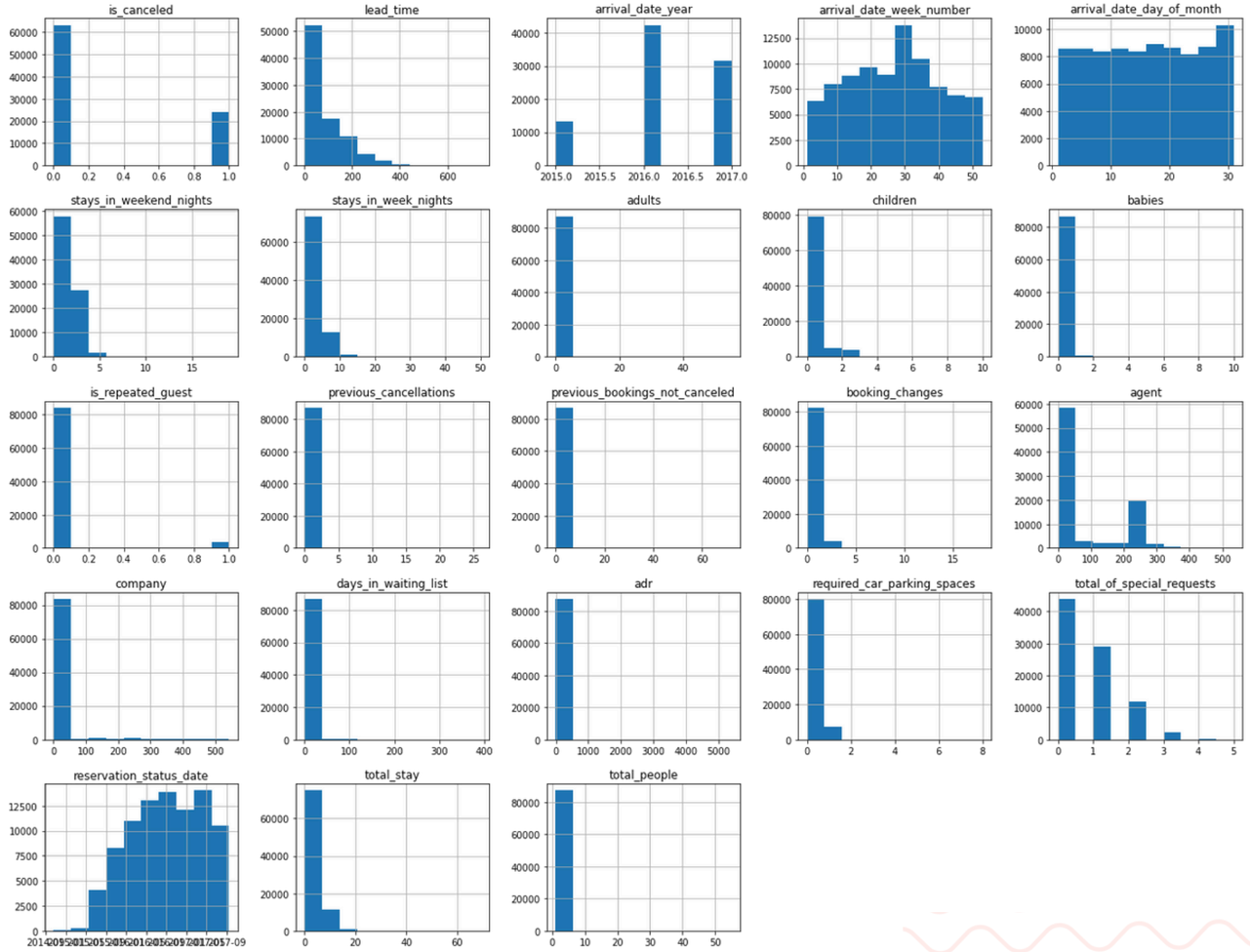
- It can be summarised that the **Transient** type of **customers** visit the **most** whereas the visitors who are in group comes in the category of **least visitors**.



Overall Stats

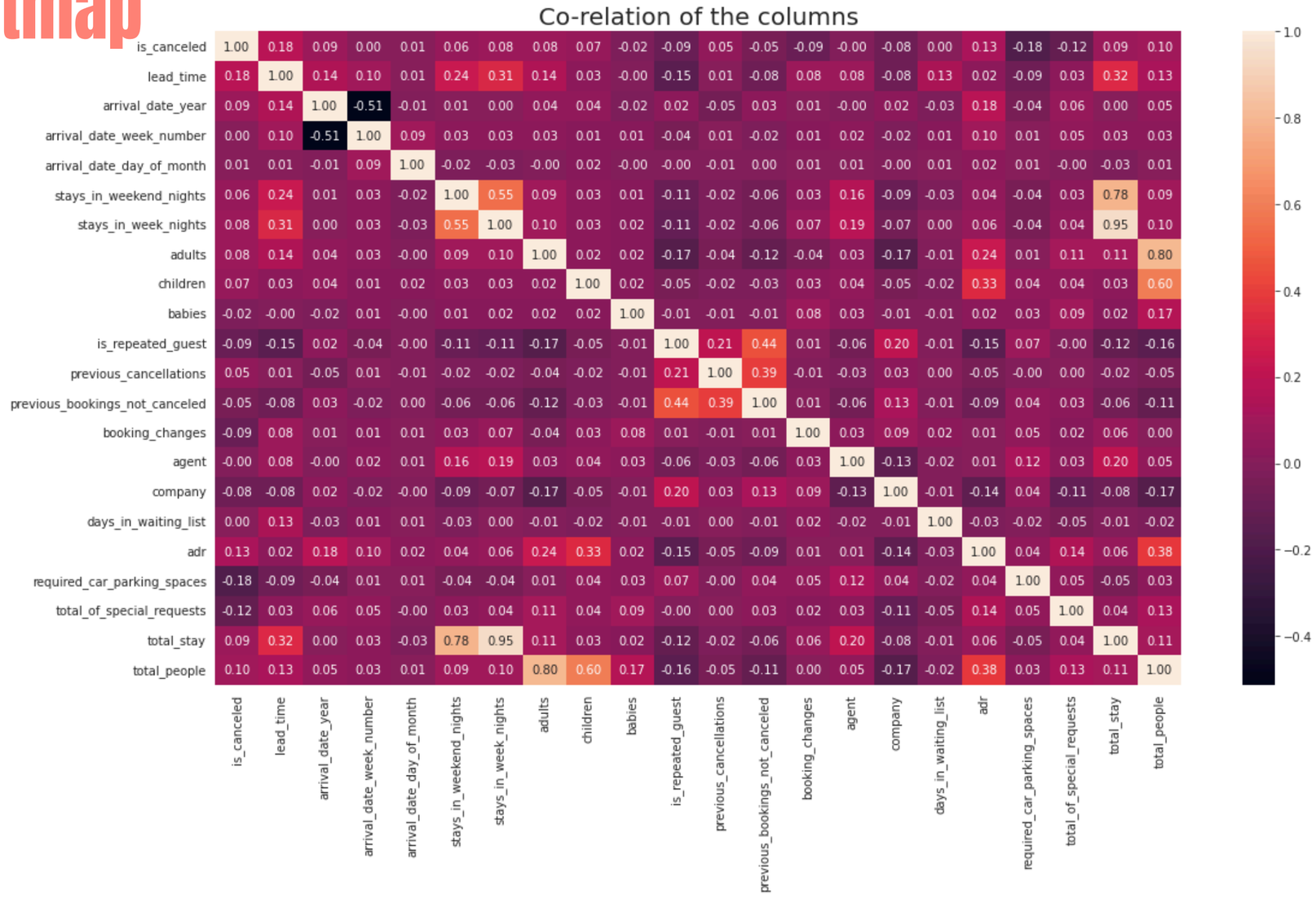
Insights found

- **Maximum** guest came in the year **2016**.
- **Maximum** arrival **week number** is **30**.
- **Maximum** arrival happens in the **last** of the **month**.
- **Maximum** guests comes with **no children**.
- There is very **less requirement** of **Car parking spaces**.



Overall Stats

- Correlation Heatmap



Overall Stats

Insights found

- ### From Heatmap

  - **is_canceled** and **total_stay** are **negatively correlated**. This means customers are unlikely to **cancel** their **bookings** if they don't get the **same room** as per **reserved room**.
  - **lead_time** and **total_stay** is **positively correlated**. This means more **the stay** of customer is, more will be the **lead time**.
  - **adults**, **childrens** and **babies** are **correlated** to each other. This indicates more the **people**, more will be **ADR**.
  - **is_repeated** guest and previous bookings **not canceled** have a **strong correlation**. This may be due to the reason that **repeated guests** are not more interested to **cancel** their **bookings**.

Conclusion

- **City hotels** are the **most preferred hotel** type by the guests. So, we can say that **City hotels** are the **busiest hotel** in **comparison** to the **resort hotel**.
- The average **ADR** of **city hotels** is **higher** as compared to the resort hotels. So, it can be said that these **City hotels** are generating **more revenue** than the **resort hotels**.
- The **total stay** of guests is directly **proportional** to the **adr**. So, **higher** the **days of stay**, the **higher** will be **ADR** and **revenue** as well.
- The **percentage** of **repeated guests** is **very low**. Only **3.9%** people had **revisited** the hotels. Rest **96.1%** were **new guests**. So, **retention rate** is much **low**.
- The **percentage** of required **car parking spaces** is very **low**. This means less car parking spaces **don't affect** the business much. Most of the customers (**91.6%**) do **not require** car parking spaces.
- Among different types of meals, **BB (Bed & Breakfast)** is the **most preferred** type of **meal** by the guests. So, guests love to opt for this meal type.

Conclusion

- **'Direct'** and **'TA/TO'** have almost **equally contribution** in **ADR** in both type of hotels. While, **GDS** has **highly contributed** in **ADR** in **'City Hotel'** type.
- **Optimal stay length** in both the hotel types (City and Resort Hotel) is less than **7 days**. Usually people stay for a week. So, **after 1 week**, the **optimal stay length declined** drastically.
- **Most number** of **bookings** have taken place in the month of **July** and **August**. July and August are the **favourite months** of guests to **visit** different places.
- The **mostly** used **distribution channel** for booking is **'TA/TO'**. **79.1% bookings** were made through **TA/TO** (**travel agents/ tour operators**).
- While calculating **ADR** across **different month**, it is found that for **Resort hotel**, **ADR** is **high** in the months of **June**, **July**, **August** as compared to **City Hotels**.
- Almost **1/4th** of the total bookings is **canceled**. Approx, **27.5% bookings** have got **canceled** out of all the **bookings**.
- Majority of the guests have **shown interest** in the **room type 'A'**. Room type 'A' is the **most preferred room** type.

Thank You