

Executive Summary

The purpose of this data analysis is to explore and understand the factors for satisfaction of airline passengers. This analysis involves comparison of different demographics of passengers like age, gender, class of travelling, type of travelling, type of passengers with overall passenger's satisfaction. The insights extracted from the analysis provide important information for improving passengers satisfaction and helpful in making correct data driven decisions.

Introduction

Airline industry plays an important role in global transportation. It connects the people and passengers worldwide. Passenger satisfaction is very important in such competitive environment. Passenger satisfaction not only a measure of quality of service but also important for business success. Airlines which prioritize customer satisfaction and invest in this are more successful.

The dataset which is used in this analysis is consists on the ratings of various customer experiences and other demographics. Passenger's demographics are gender, type of travel, class and type of customer etc. Some other rating factors for measuring overall satisfaction of passengers are ease of online bookings, check in services, online boarding, on board service, seat comfort, cleanliness and food and drink. Detailed analysis of the dataset has been done using python and valuable insights have been extracted. Each categorical variable has been compared with overall passenger's satisfaction. The analysis of this dataset provides valuable information about different aspects of passenger satisfaction, and airline management use this information for decision making and successfully run their operations while attaining customer satisfaction.

Objectives

Objectives of this analysis are

- To identify important factors those have impact on passenger's satisfaction.
- Extract the relation between different demographics of passengers and satisfaction.
- Extract actionable insights for airlines to enhance overall passenger experience and satisfaction.

Data Analysis Process / Approach

Data Analysis is done using python in Google Colab, for this first import important python libraries in Google colab, upload data and analysis has been performed.

Exploratory Data Analysis

In first step of exploration shape of data has been explored and found that data has 24 columns and 1229880 rows. Then name of the columns and their data type has been discovered for the better understanding. The names of the columns are ID, Gender, Age, Customer_Type, Type_of_Travel, Class, Flight_Distance, Departure_Delay, Arrival_Delay, Departure_and_Arrival_Time_Convenience, Ease_of_Online_Booking, Checkin_Service, Online_Boarding, Gate_Location, Onboard_Service, Seat_Comfort, Leg_Room_Service, Cleanliness, Food_and_Drink, Inflight_Service, Inflight_Wifi_Service, Inflight_Entertainment, Baggage_Handling and Satisfaction.

After knowing the columns name and their data types move towards data cleaning steps. It was discovered that data has 393 null values in Arrival_Delay column. These null values have been eliminated and a new data frame has been established with the name of df_2. This data set has 24 columns and 129487 rows/observations. All statistics of data has been explored using python describe command and it shows all possible stats like maximum and minimum value of each column, mean and count.

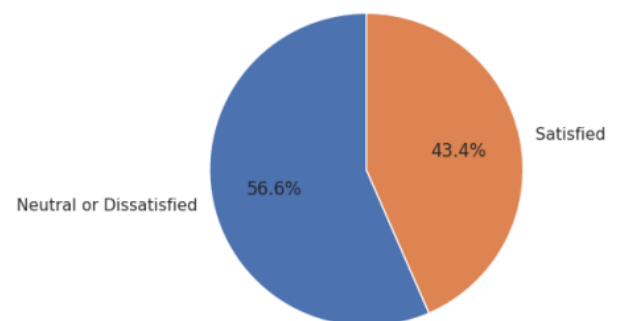
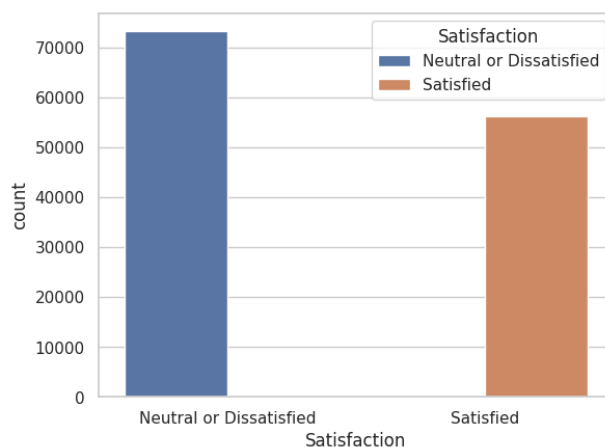
1. Airline Passenger's Satisfaction

Total number of passengers, total satisfied and neutral or dissatisfied passengers have been calculated and visualized in this step and the results are:

Total Number of Passengers : 129487

Satisfied count : 56262

Neutral or Dissatisfied count : 73225



These statistics shows that overall more than 50% passengers of airlines are not satisfied. The industry has to work on this important aspect and improve their services. Moreover, they have to analyze the factors which have higher impact on satisfaction. Research and analysis have to be done to find out the ways to increase satisfaction level.

2. Distribution of Passengers by Gender

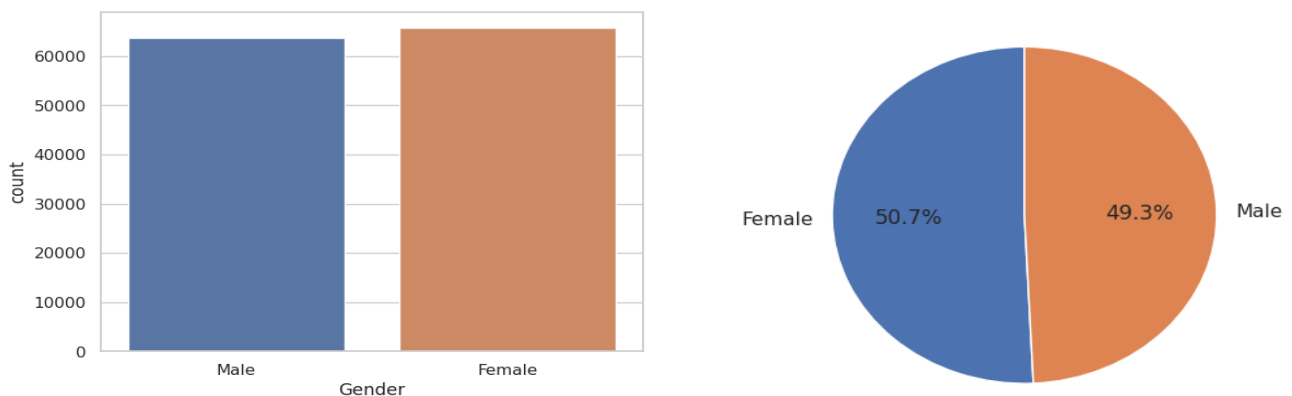
- Is there any relation between gender and satisfaction?

First count of male and female passengers have been done and for better understanding visualizations are also created which shows count and percentage of male and female.

Male count : 63784

Female count : 65703

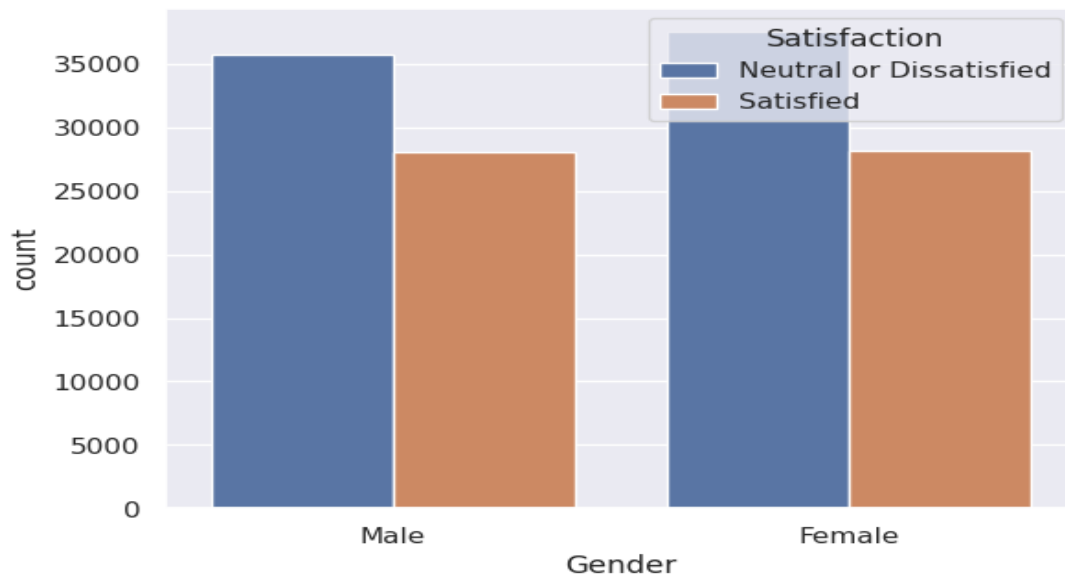
The graphical presentation of passengers on the basis of gender is given below



It shows that there is no significant difference in overall distribution of passengers on the basis of gender.

Relation between Gender and Satisfaction

Relation between Satisfaction and gender has been drawn and the result shows that there is no impact of gender on satisfaction. Both male and female are equally satisfied. The graphical presentation is as under.



It shows that there is no significant difference between the satisfaction level of male and females. However, it reflects that Neutral or Dissatisfied are more in numbers as compare to satisfied in both genders.

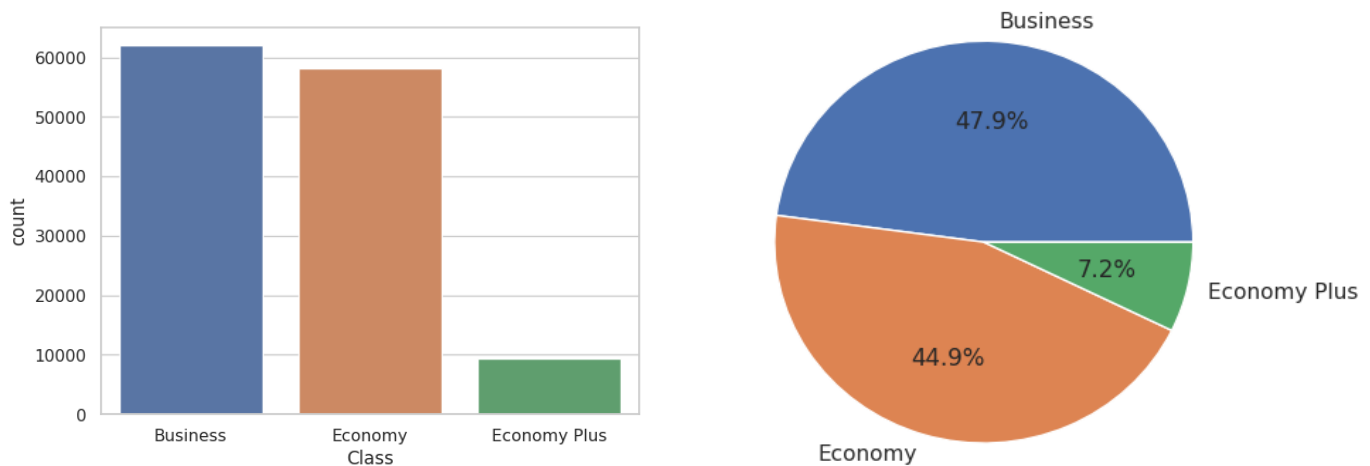
3. Distribution of Passengers by Class

- Does the travelling class impact the satisfaction?

There are three classes of passengers in the dataset are business, economy and economy plus. First count of passengers on the basis of class has been done and the counts are

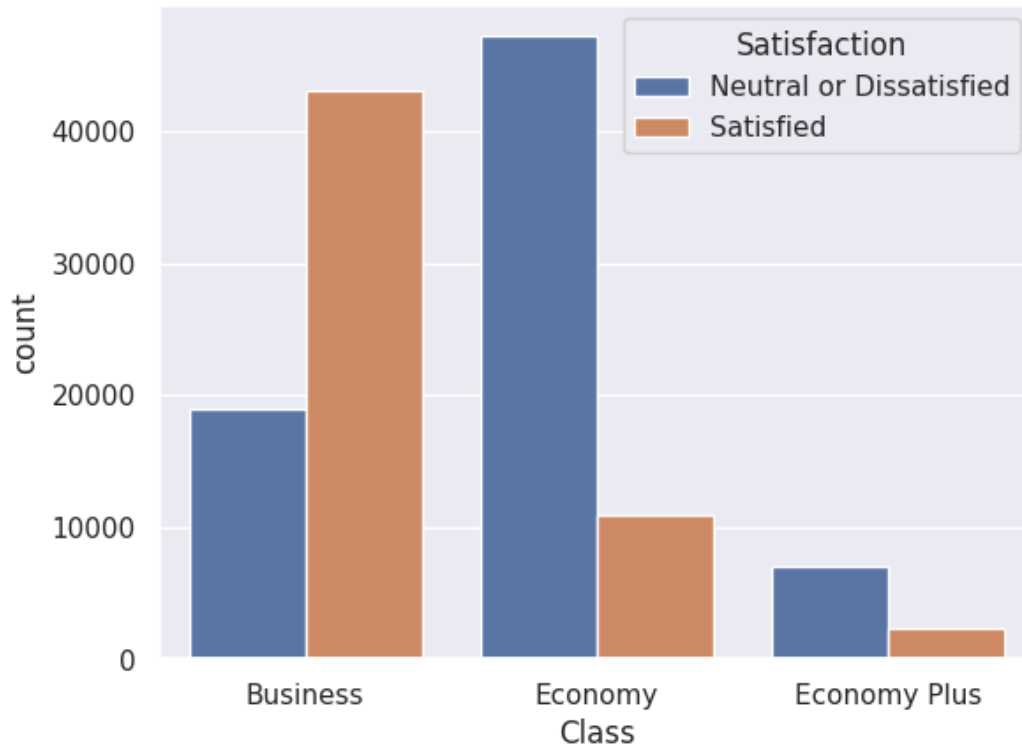
Total number in Business Class : 61990
 Total number in Economy Class : 58117
 Total number in Economy Plus Class: 9380

The graphical presentation of counts and percentages are shown below



It shows that passengers travelling in business class are high in numbers as compare to economy and economy plus, while economy plus class has least number of passengers. It also shows that there is no significant difference between the percentages of passengers travelling in business and economy class.

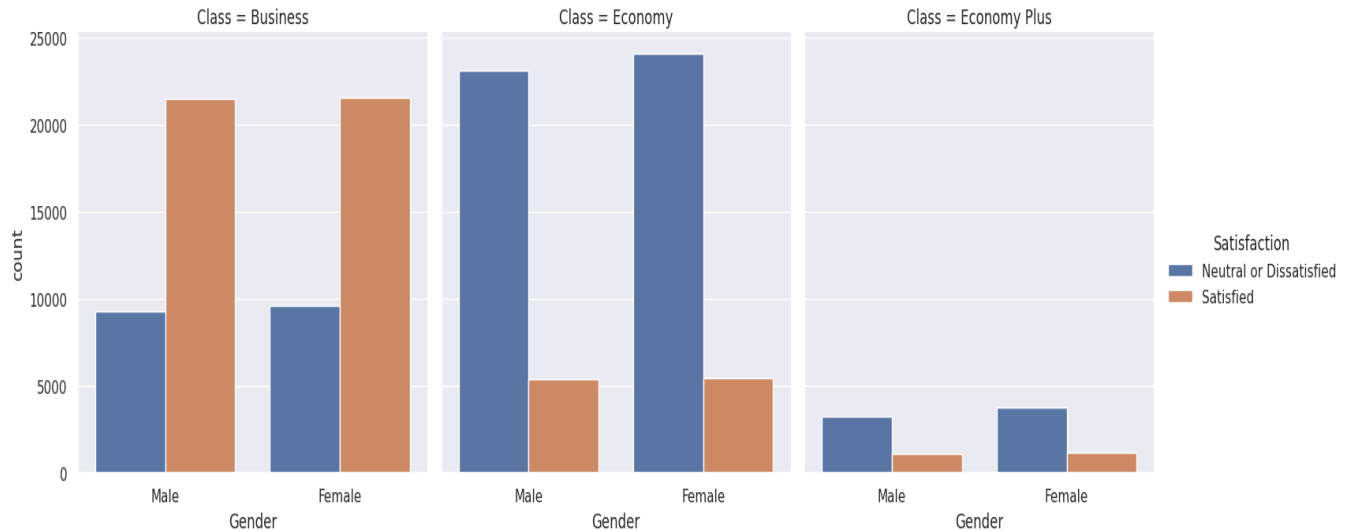
Impact of Class on Satisfaction



It reflects that the number of passengers travelling in business class are more satisfied than economy and economy plus which means that class has an impact on satisfaction. Economy class has the highest number of neutral or dissatisfied customers.

Comparison of Class and Gender of Passengers with respect to Satisfaction

In previous step of analysis satisfaction with respect to gender has been extracted. Now to make analysis more detailed and result oriented gender and class have been compared with Satisfaction.



It shows that there is no significant difference between the satisfaction level of male and female in all classes.

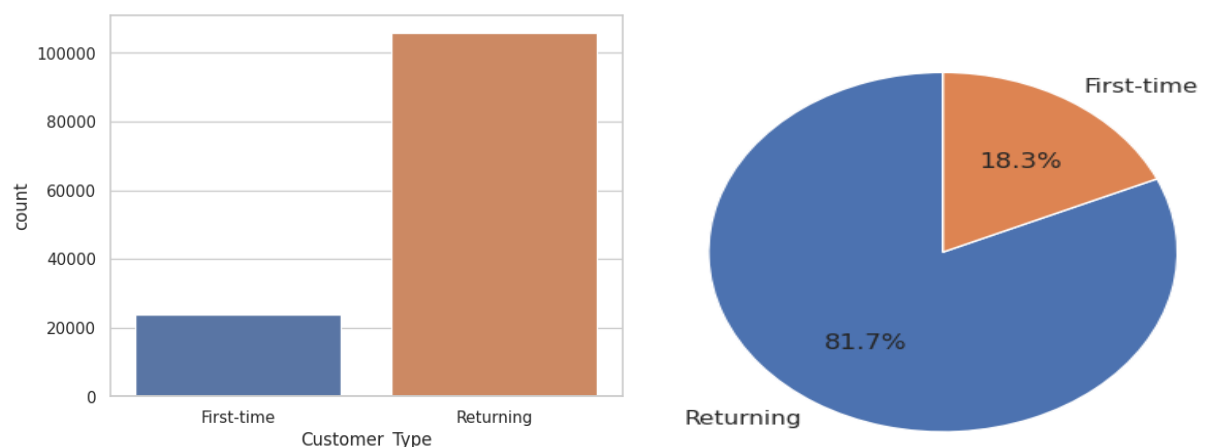
4. Distribution of Passengers by Customer Type

- Is there a significant relation between customer type and satisfaction in distribution of passengers?

Customer Type has been classified in two classes either passengers are travelling first time or returning from a journey. First number of passengers in each customer type has been calculated the results are

First-time count : 23714
Returning count : 105773

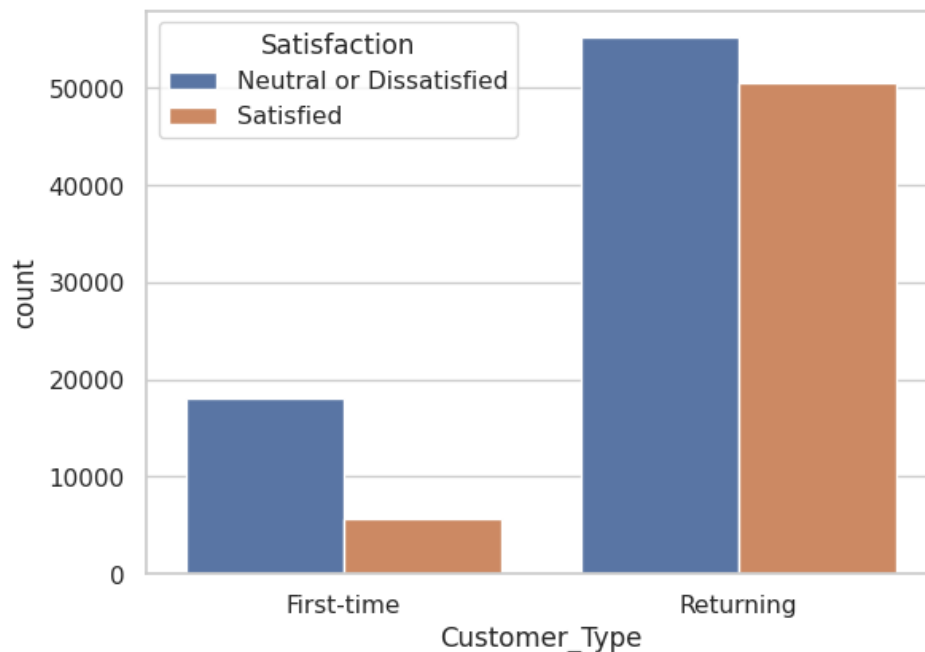
Presentation of passengers on the basis of customer type has been done and the results are as below:



It shows that in the survey more passengers are returning from a journey and only 18.3% among them are first time travelling.

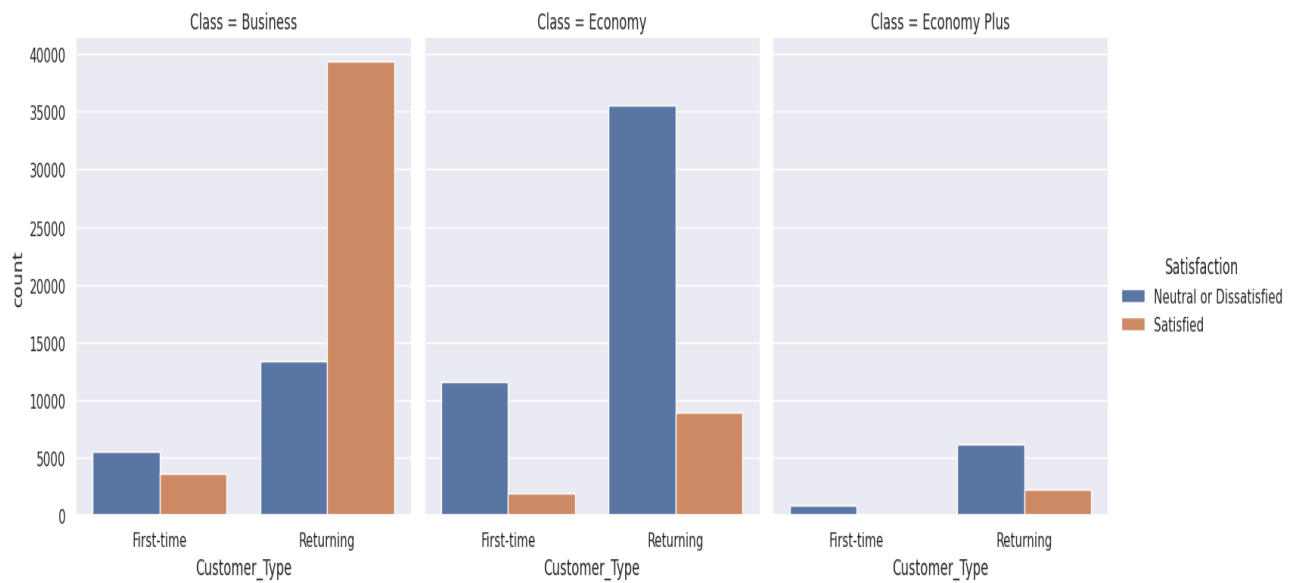
Relation Between Customer Type and Satisfaction

A comparison of customer type with satisfaction has been drawn and it shows that returning customers are more satisfied than first time travelling customers. It seems that there is some lack of communication or some factors in understanding protocols are directly proportional to satisfaction.



Comparison of Customer type and Class to Satisfaction

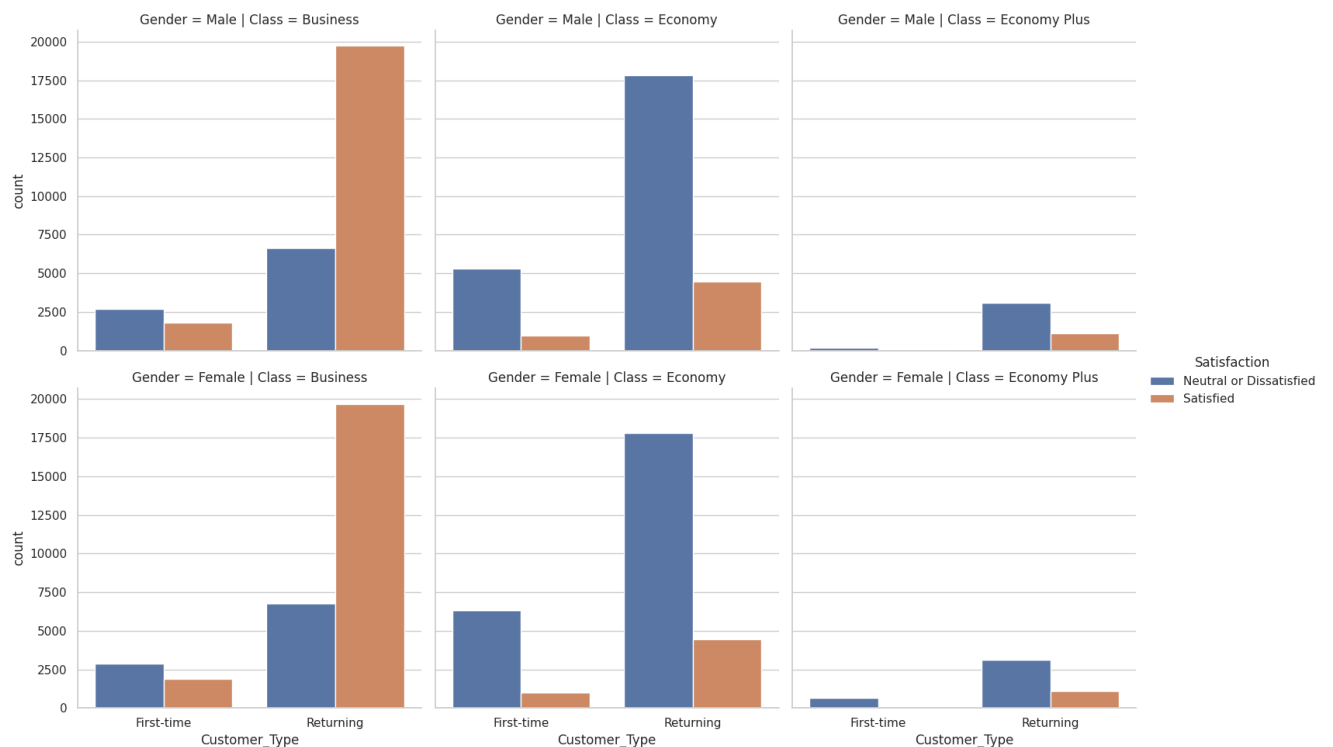
Customer type and Class (travelling class like Business, economy and economy plus) have been compared with Satisfaction. The result shows that returning customers of business class are more satisfied while economy class returning customers are not less satisfied. It also reflect that business class has more number of satisfied in all types of customers.



Comparison of Customer type, Class and Gender to Satisfaction

Detailed analysis has been done by involving all previous variables which are Customer Type, Class and Gender.

The comparison is given below:



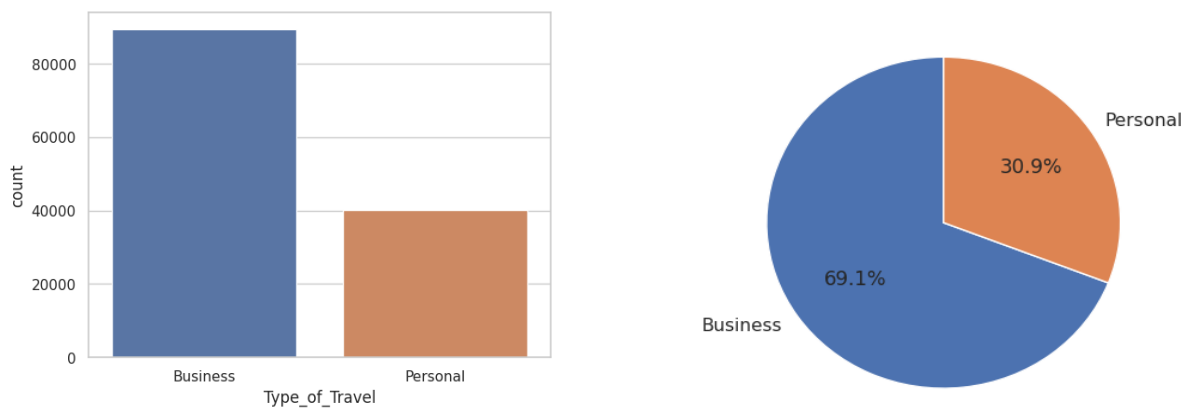
5. Distribution of Passengers by Type of travel.

There are two Types of travel in dataset which are personal and business. First we calculate the total number of passengers in each type of travel.

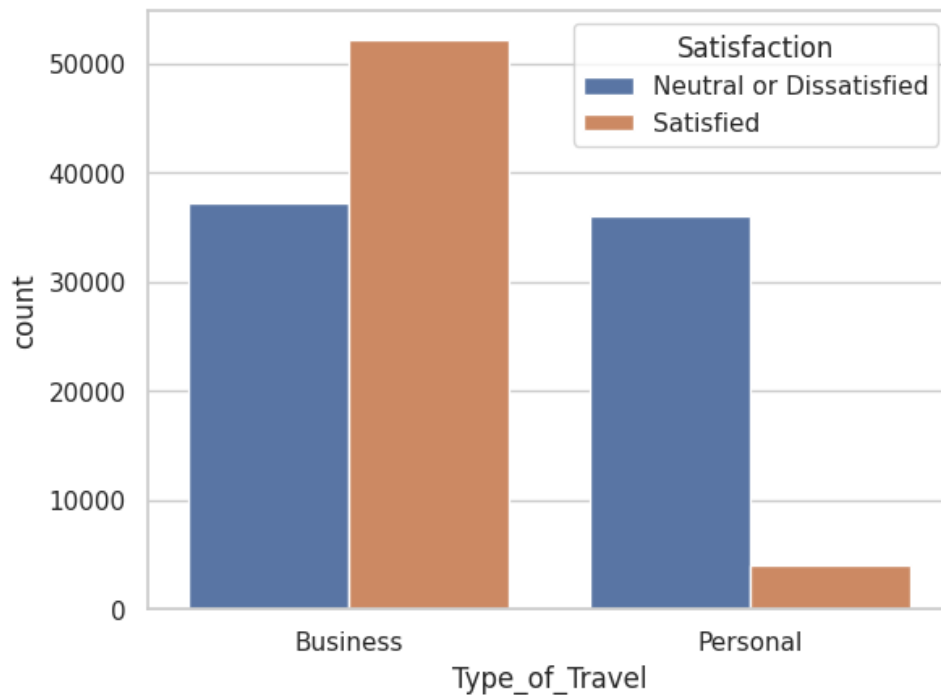
Business count : 89445

Personal count : 40042

Graphical presentation of count and percentage of type of travel is following. It shows that 69% passengers are travelling for business purposes while 31% are for personal.



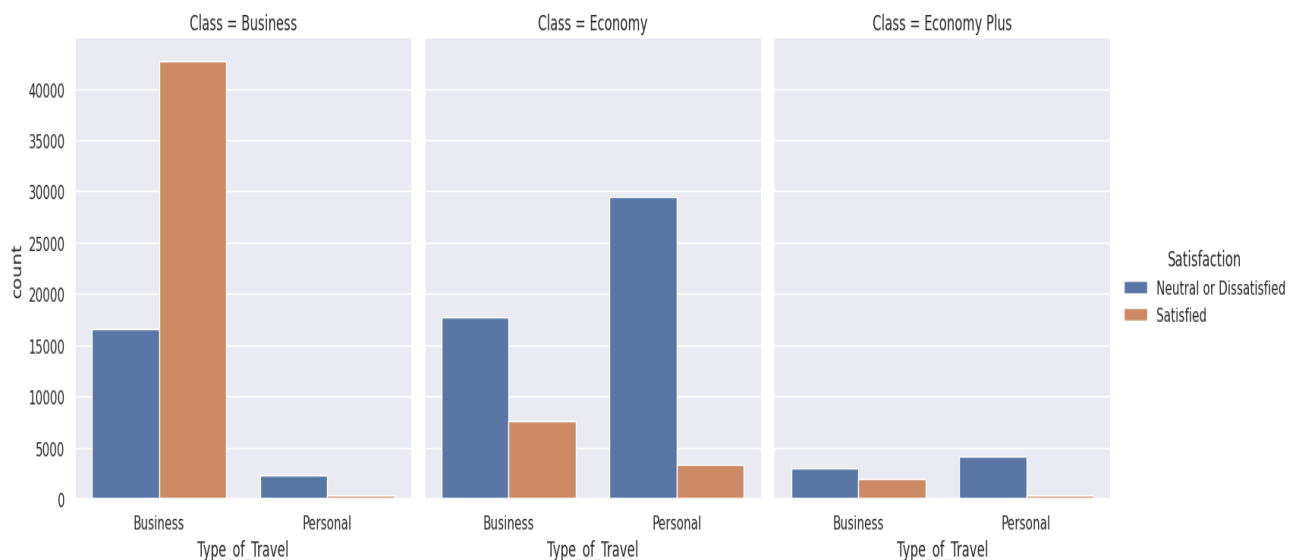
Comparison between type of travel and satisfaction



Above comparison shows that Business type of travel passengers are more satisfied as compare to personal type of travel.

Comparison of Type of Travel and Class to Satisfaction

For make it analysis more in details Travel class also included with travel type and satisfaction and a graph has been drawn

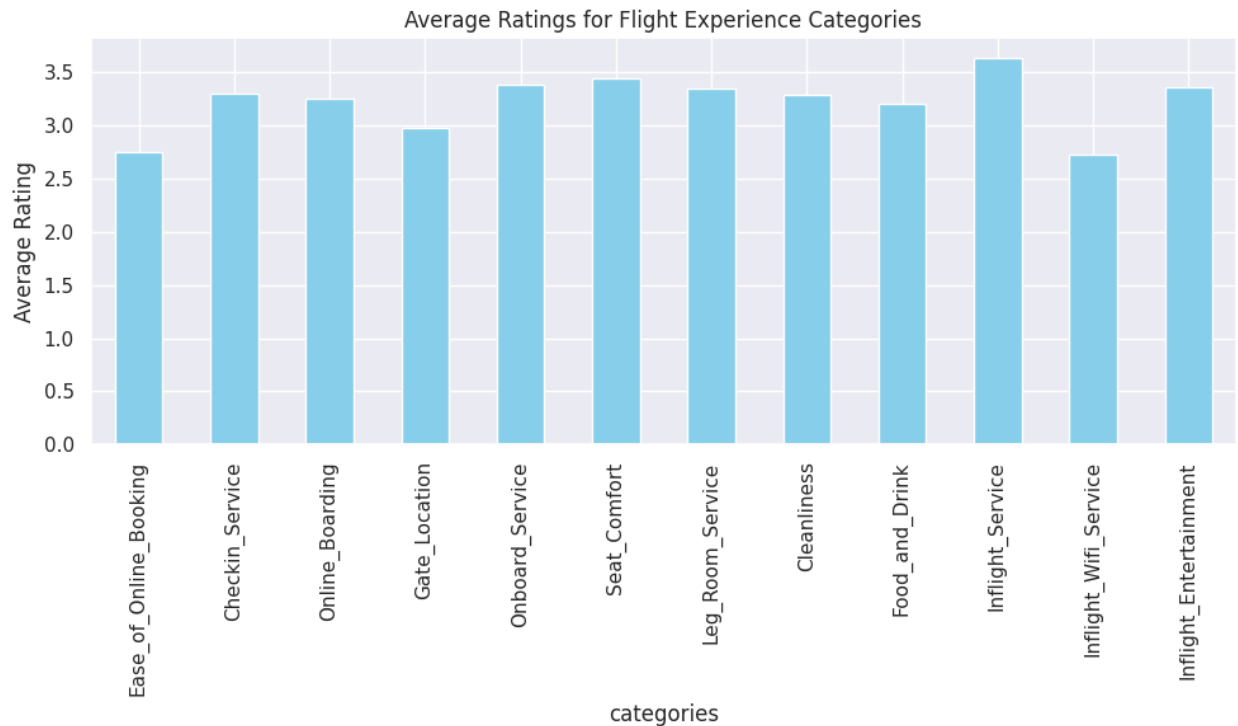


Previously we have observed that business class passengers are more satisfied than the economy and economy plus class. However, by comparing type of travel with class it has been observed that passengers who have the business type of travel are more satisfied among the business class passengers while personal type of travel passengers are not satisfied with business class.

6. Average Ratings of Experience Flight Categories

A satisfaction column in dataset describes the overall customer satisfaction. This satisfaction column consists upon the results of the columns in which passenger rating different services. These rating columns are Ease_of_Online_Booking, Checkin_Service, Online_Boarding, Gate_Location, Onboard_Service, Seat_Comfort, Leg_Room_Service, Cleanliness, Food_and_Drink, Inflight_Service, Inflight_Wifi_Service, Inflight_Entertainment,

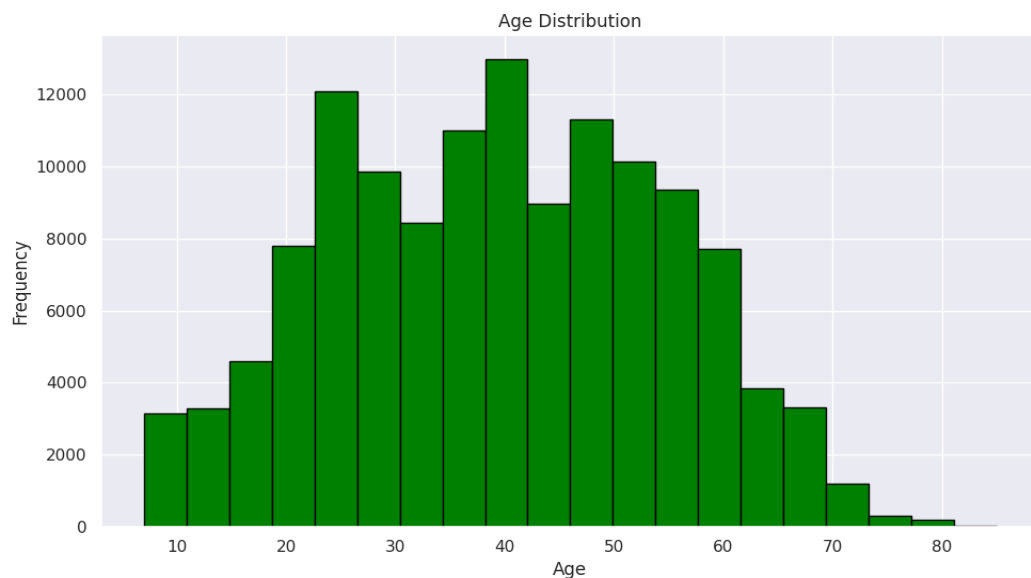
Baggage_Handling. To calculate their contribution in overall satisfaction score the average score of each column has been compared with Satisfaction and the results are as under



The results showed that Ease of online booking and in-flight Wifi service have the lowest average score. It means these services need improvement and by improving these services airlines can enhance the overall satisfaction of their customers.

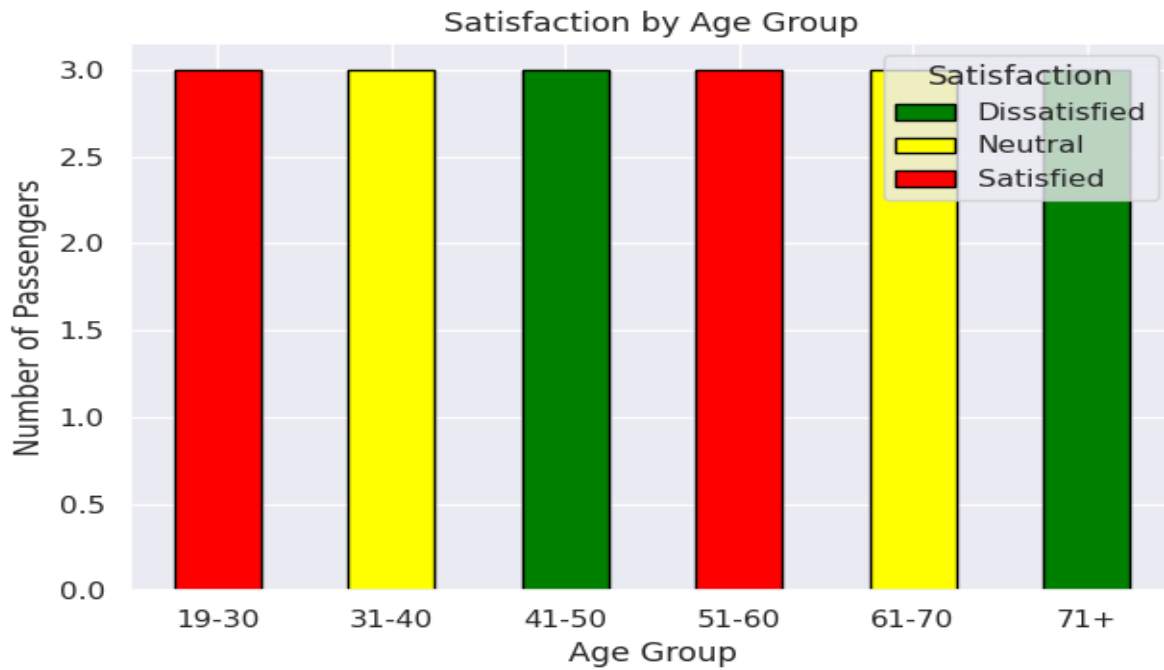
7. Age Distribution

Passengers are of different ages in the dataset and to understand the distribution among ages a histogram has been drawn using python.



It has been observed that most of the passengers are 40 year old. This data will assist the airlines in decision making when they are looking to address the factors related to satisfaction.

Satisfaction by Age Group



Recommendations

- Address the factors that cause lower satisfaction level in economy and economy plus class.
- Explore opportunities to enhance the services in these classes.
- Provide training to staff to improve customer service skills.
- Majority of the passengers fall in age group of 40-50, customize the services to meet the preferences of this age group.
- Customize the services for personal type of travel in business class.
- Passengers travelling in business class are satisfied, enhance services of business class for customer retention.
- Returning customer are more satisfied, implement strategies to encourage customer loyalty.
- Upgrade digital platform for online booking.
- Provide better wifi and communication facilities while travelling.
- Communicate delays and changes effectively.
- Stream line check-in and boarding process.
- Enhance in-flight entertainment options.