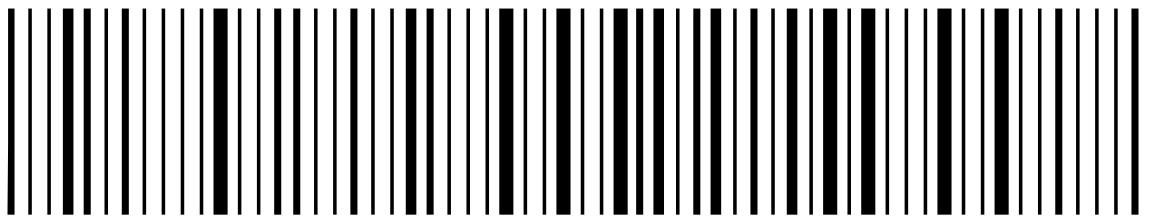
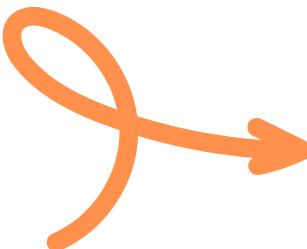




DSI 204 Probability Thinking

Airline Passenger Satisfaction





Data Resource



Airline Passenger Satisfaction



About Data & Variables

CUSTOMER DATA

ID

Unique passenger identifier

Gender

Gender of the passenger (Female/Male)

Age

Age of the passenger

Customer Type

Type of airline customer (First-time/Returning)

Type of Travel

Purpose of the flight (Business/Personal)

Class

Travel class in the airplane for the passenger seat

Flight Distance

Flight distance in miles

Departure and Arrival Time Convenience

Satisfaction level with the convenience of the flight departure and arrival times from 0 to 5

Departure Delay

Flight departure delay in minutes

Arrival Delay

Flight arrival delay in minute

Ease of Online Booking

Satisfaction level with the online booking experience from 0 - 5

Check-in Service

Satisfaction level with the check-in service from 0 - 5

Online Boarding

Satisfaction level with the online boarding experience from 0 - 5

SATISFACTION

FLIGHT INFORMATION

SATISFACTION



About Data & Variables

- Gate Location
- On-board Service
- Seat Comfort
- Leg Room Service
- Cleanliness
- Food and Drink
- In-flight Service
- In-flight Wifi Service
- In-flight Entertainment
- Baggage Handling
- Satisfaction

Satisfaction level from 0 - 5

Overall satisfaction level with the airline (Satisfied/Neutral or unsatisfied)

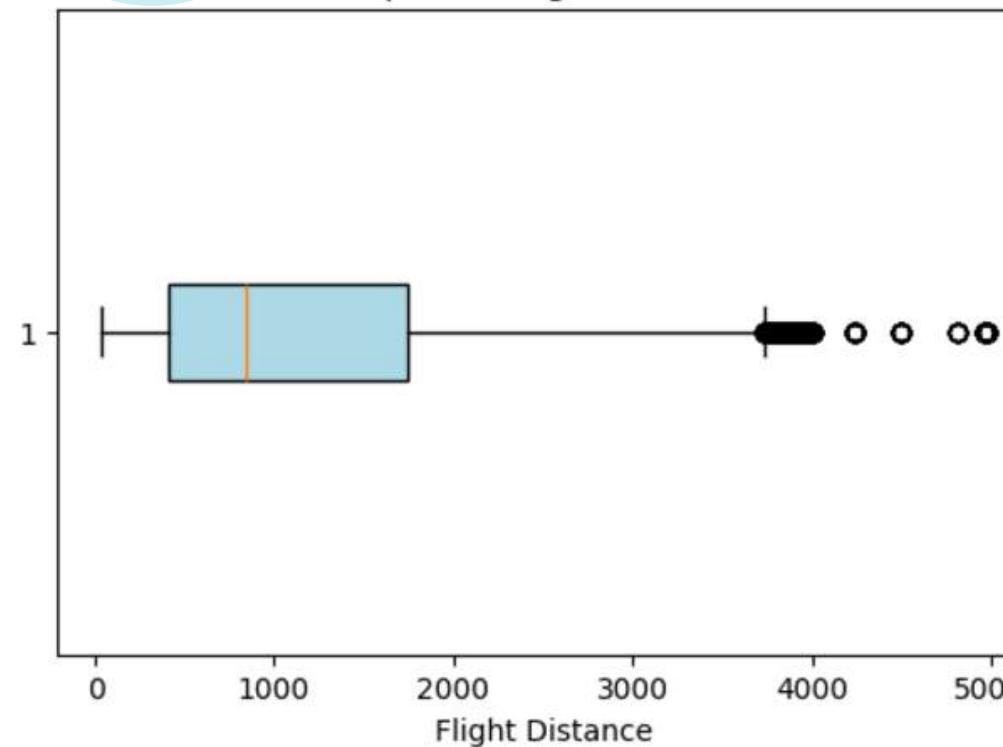


Data Cleaning

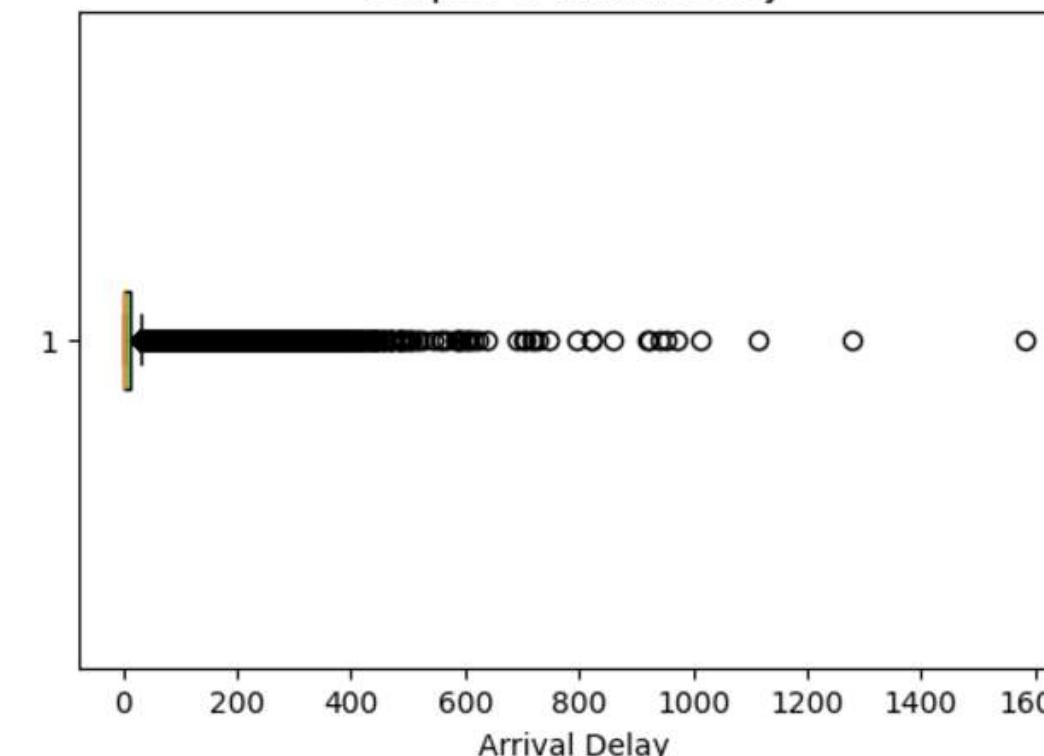
Before



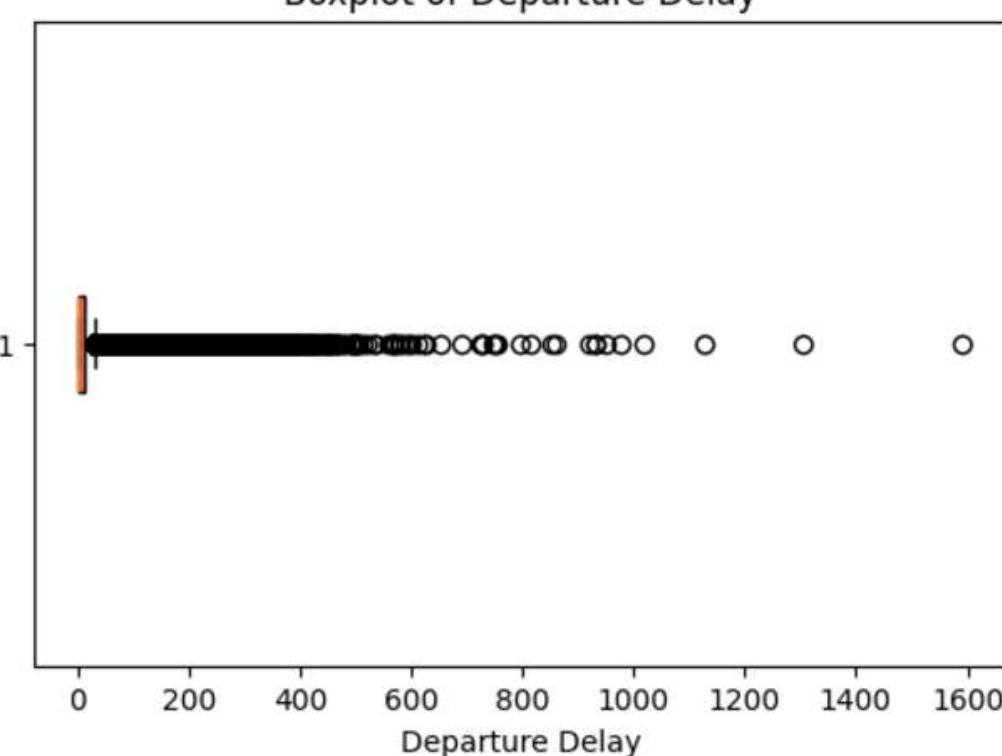
Boxplot of Flight Distance



Boxplot of Arrival Delay



Boxplot of Departure Delay



→ ✈ Arrivals

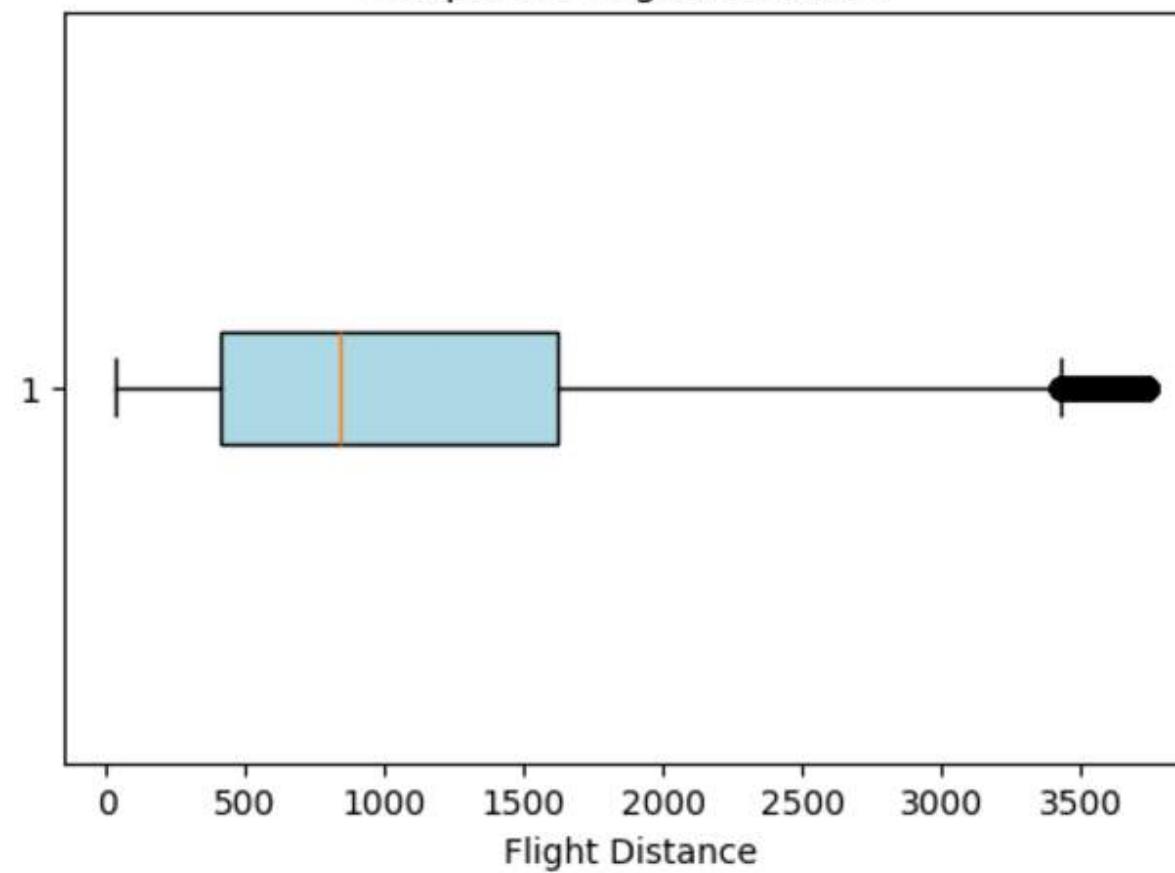
↑ ✈ Departures

Median replace outlier

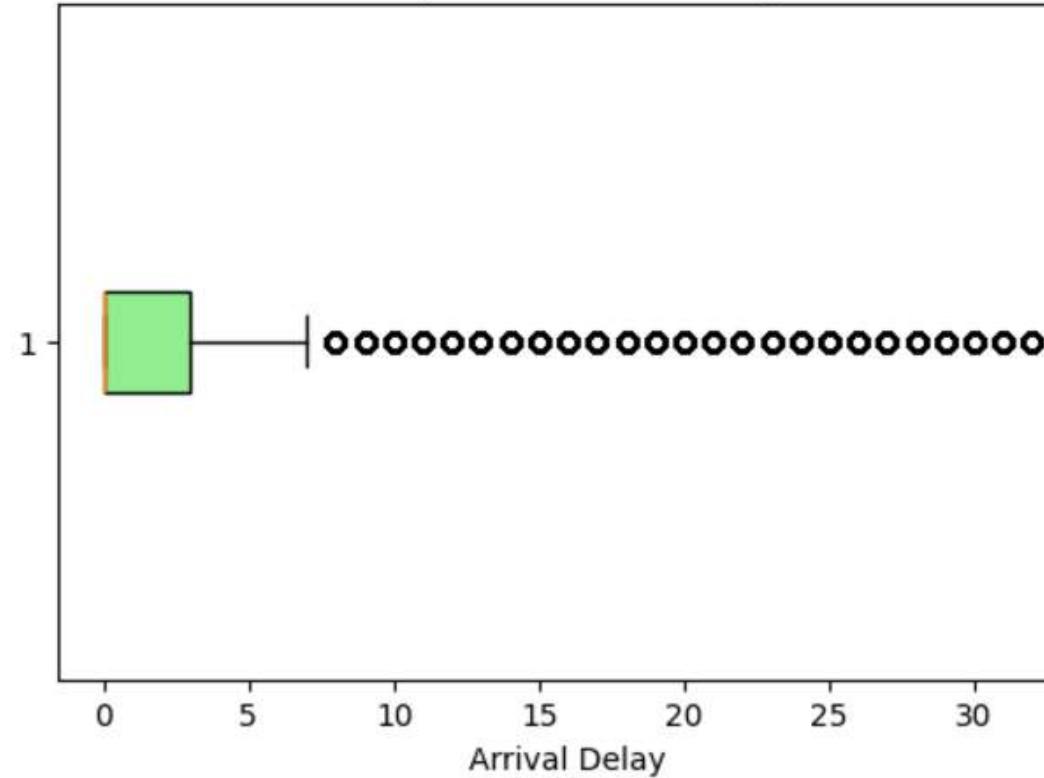
Data Cleaning

After

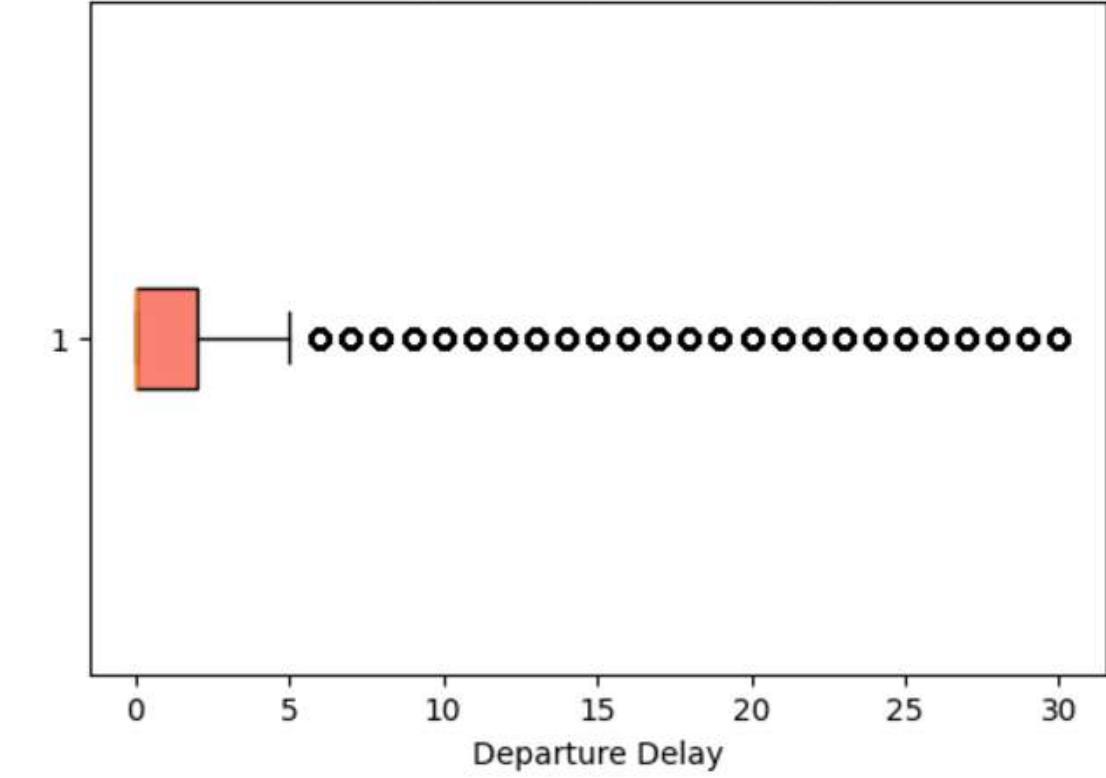
Boxplot of Flight Distance



Boxplot of Arrival Delay



Boxplot of Departure Delay



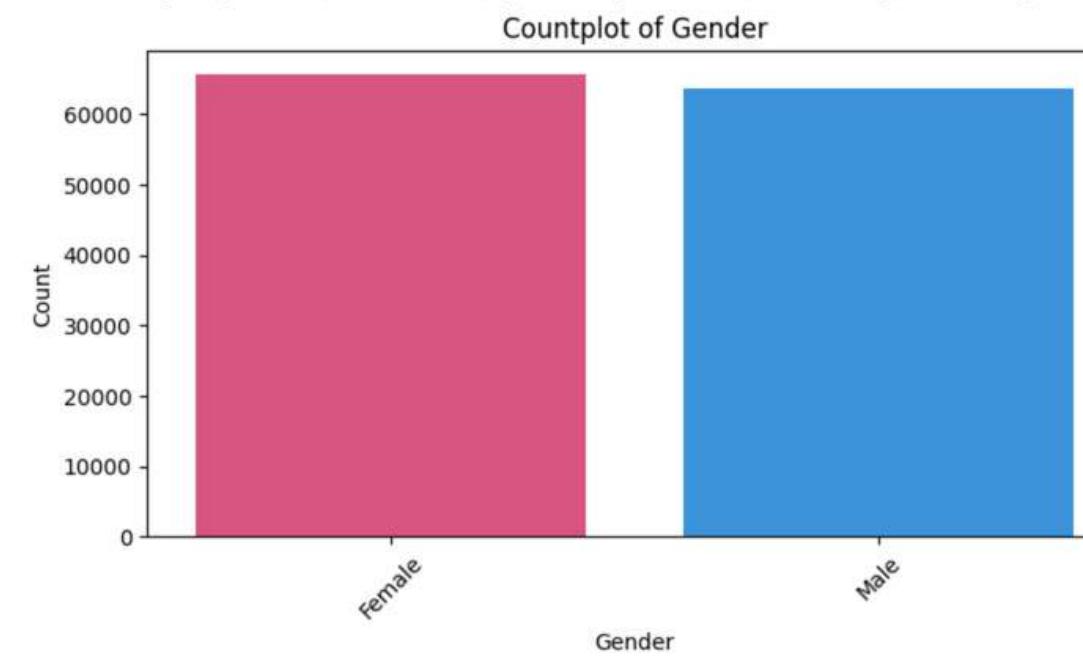
→ ✈ Arrivals

↑ ✈ Departures

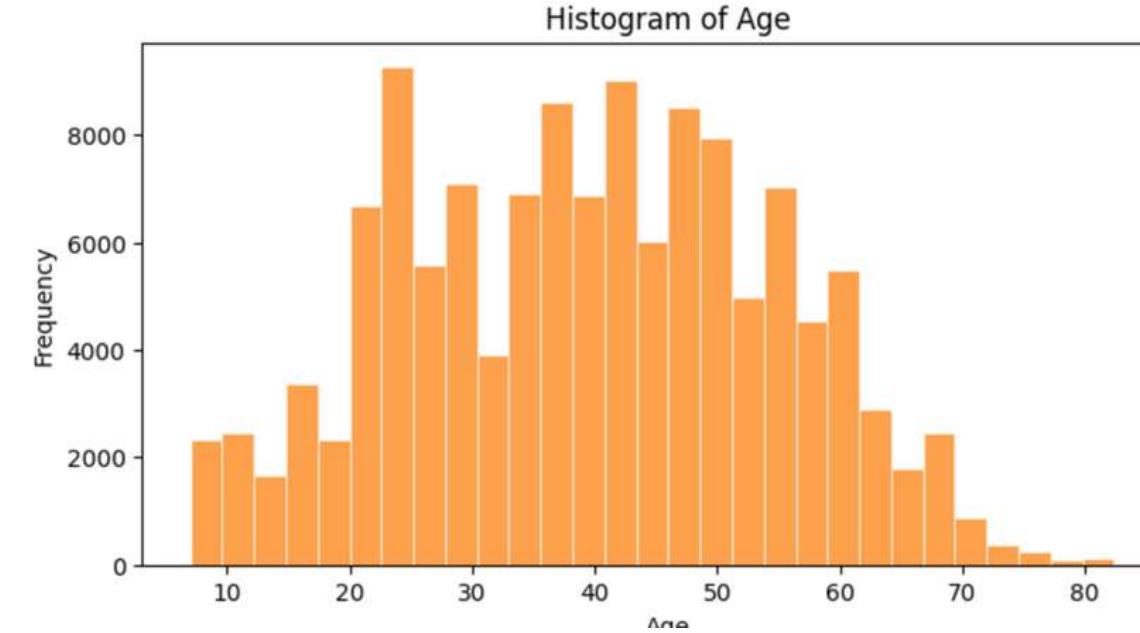
CUSTOMER DATA



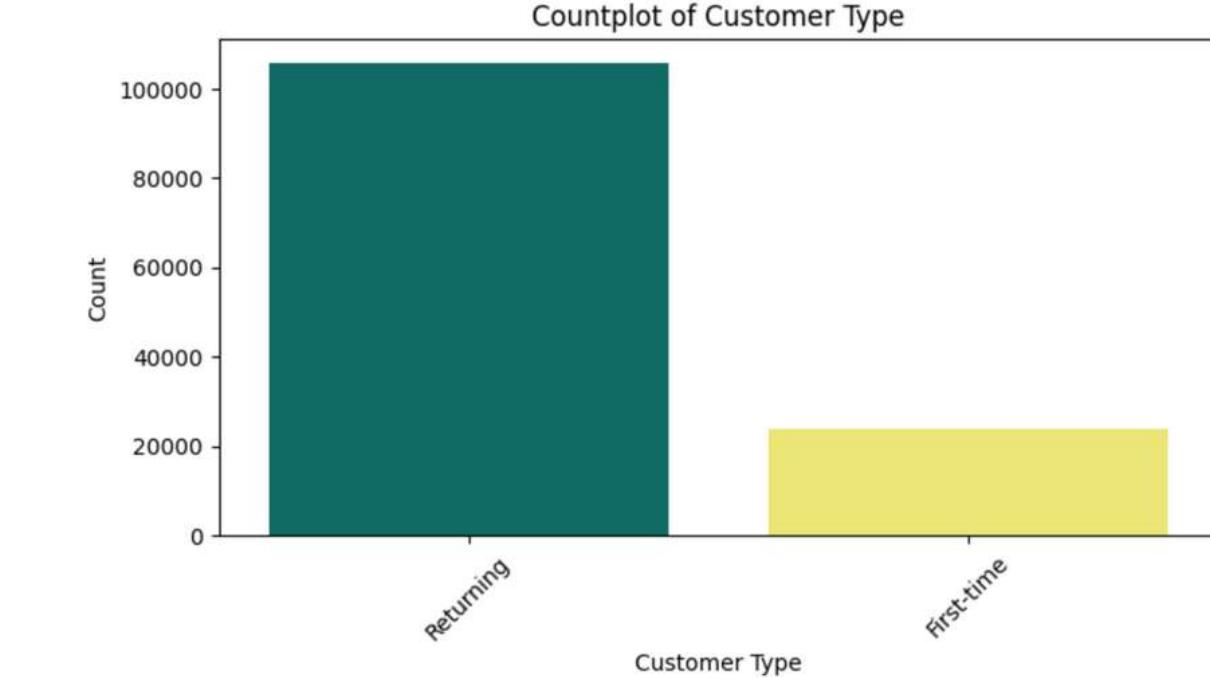
Gender



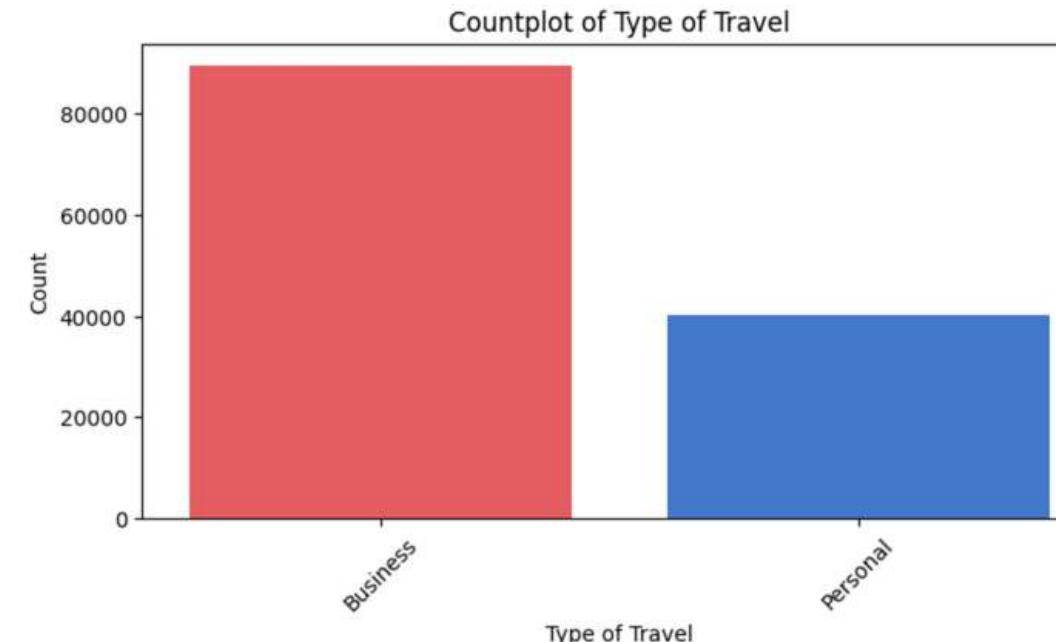
Age



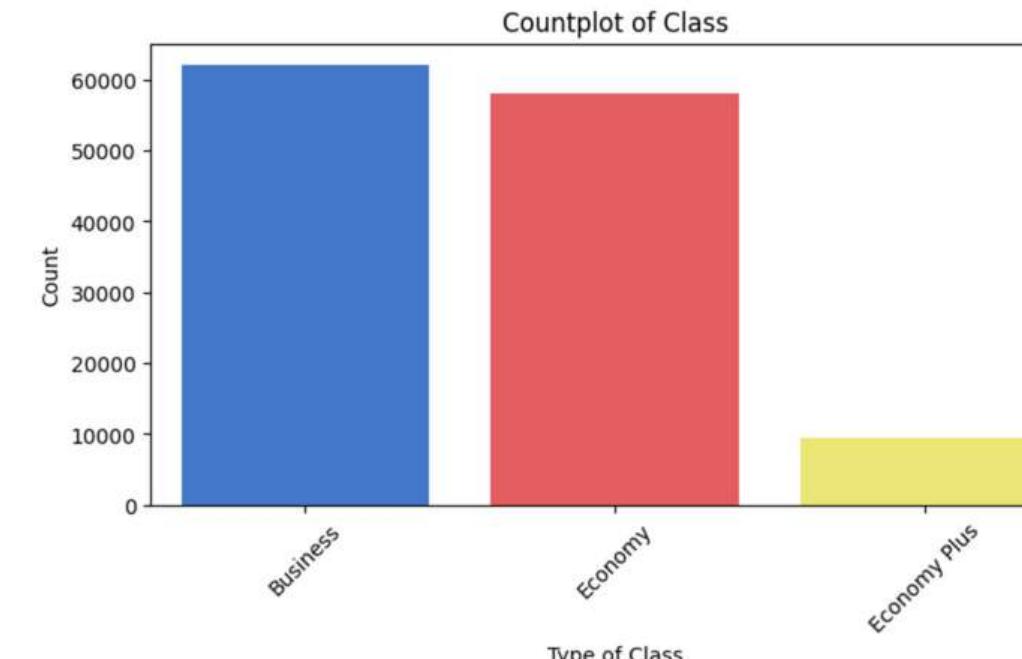
Customer Type



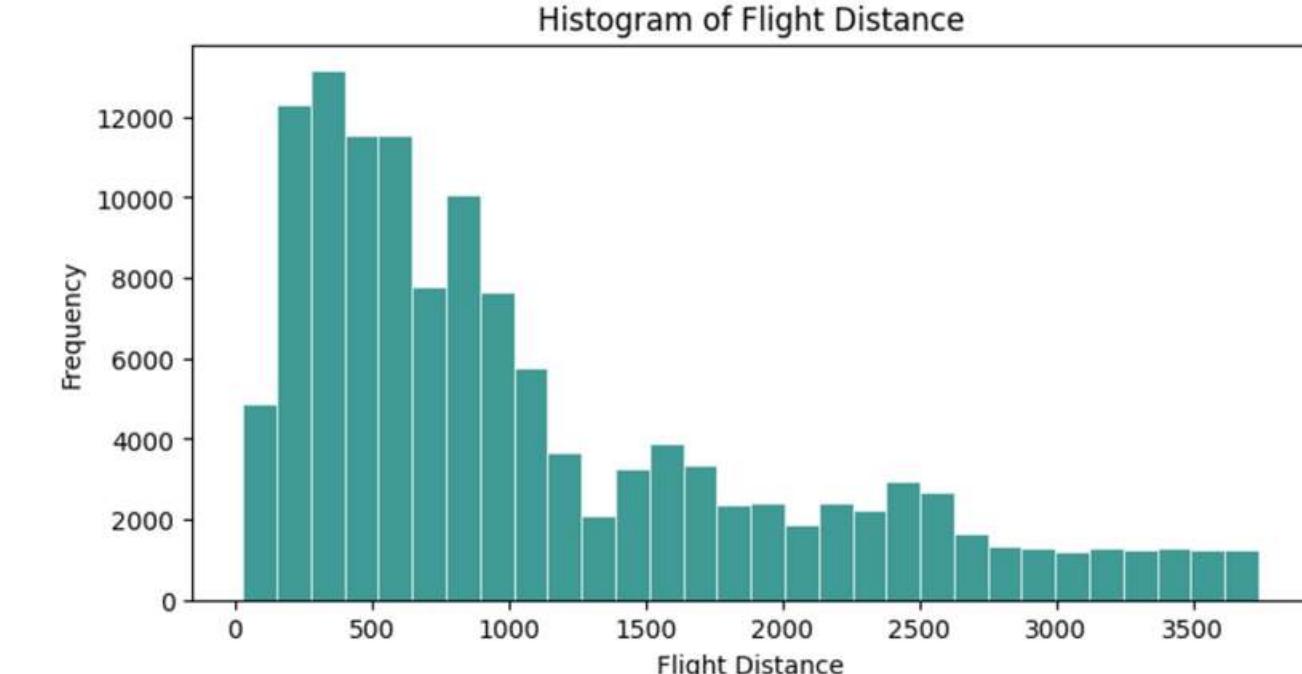
Travel Type



Class



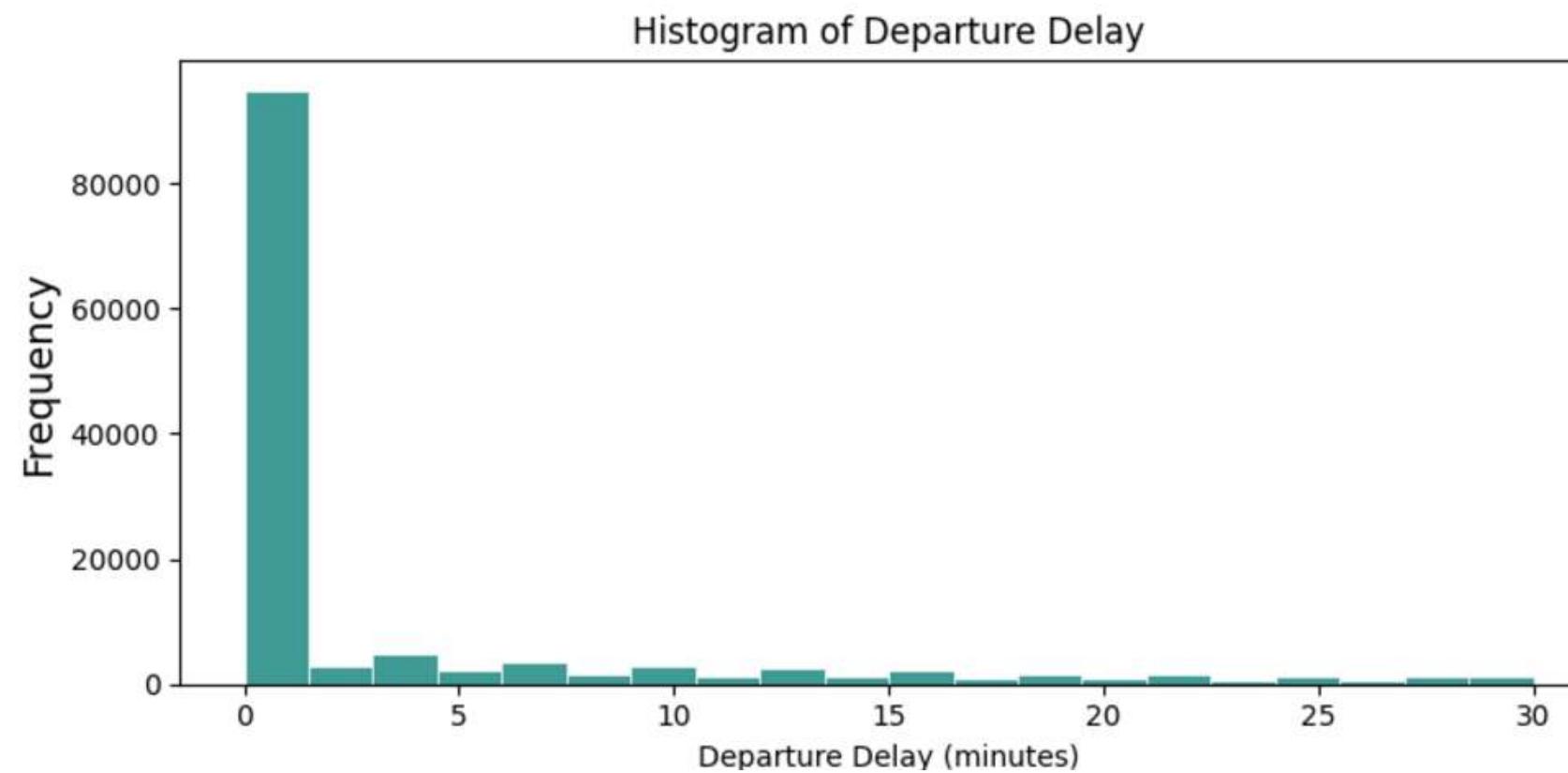
Flight Distance



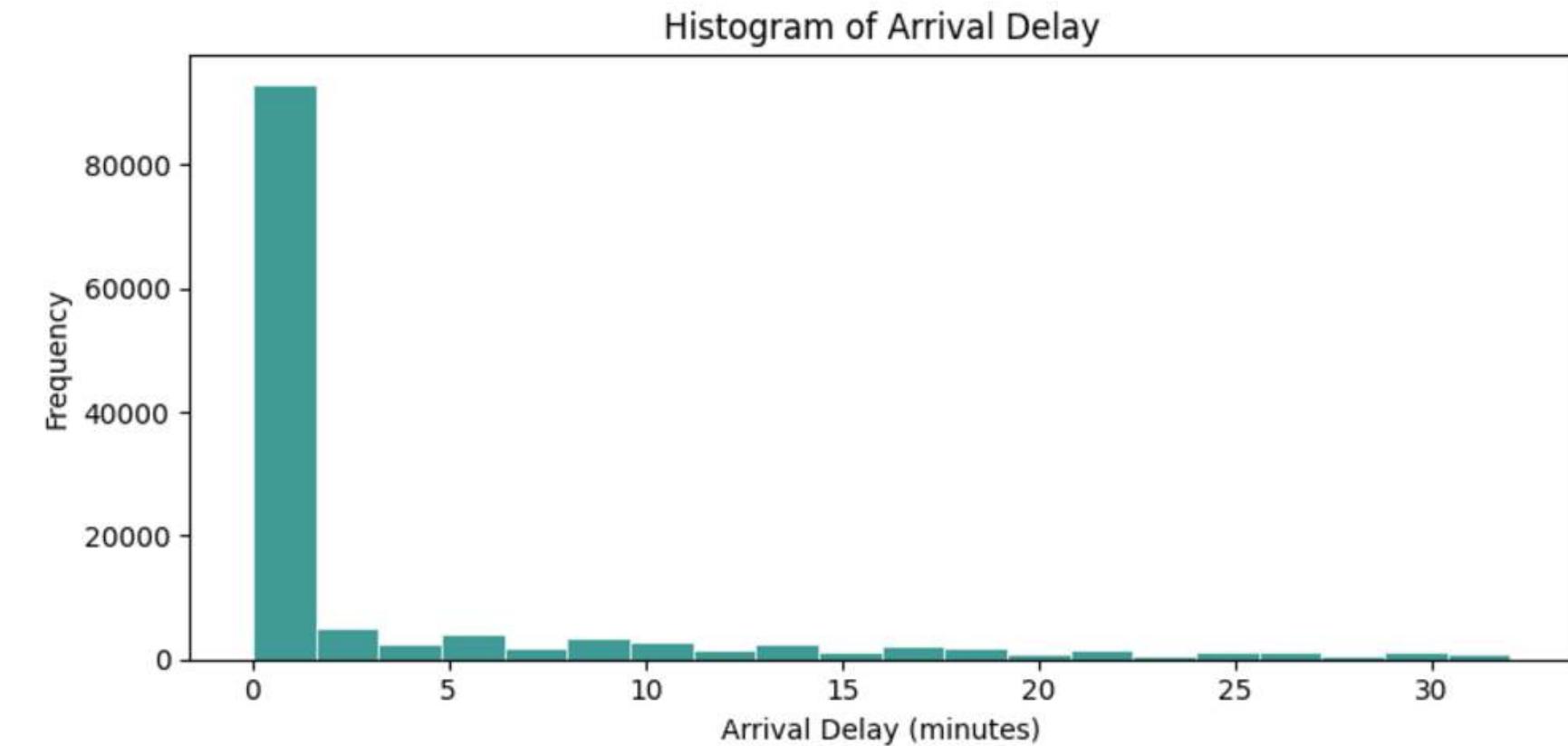
FLIGHT INFORMATION



Departure Delay



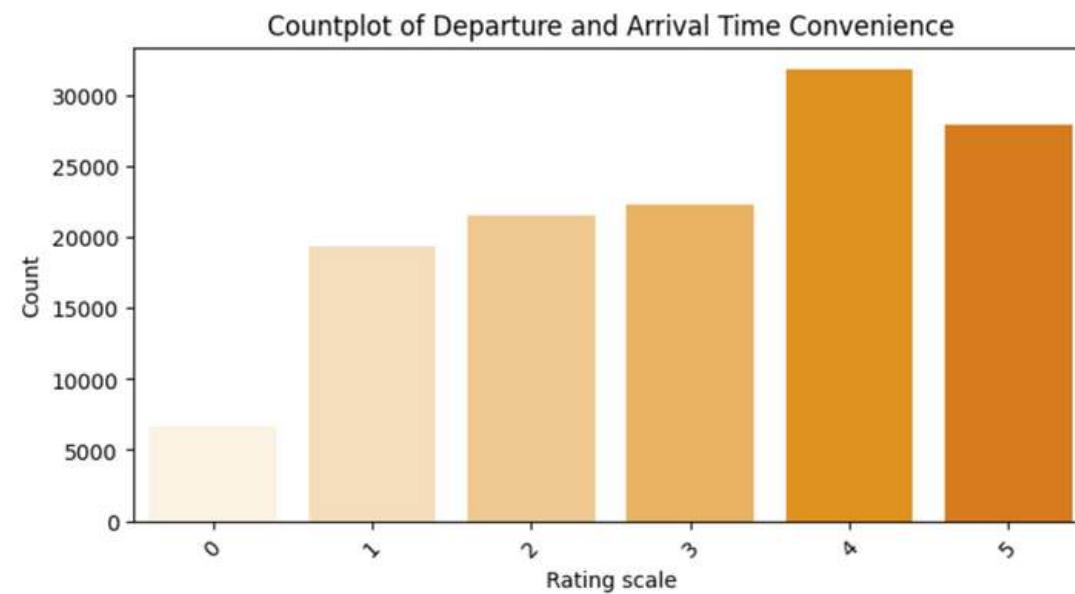
Arrival Delay



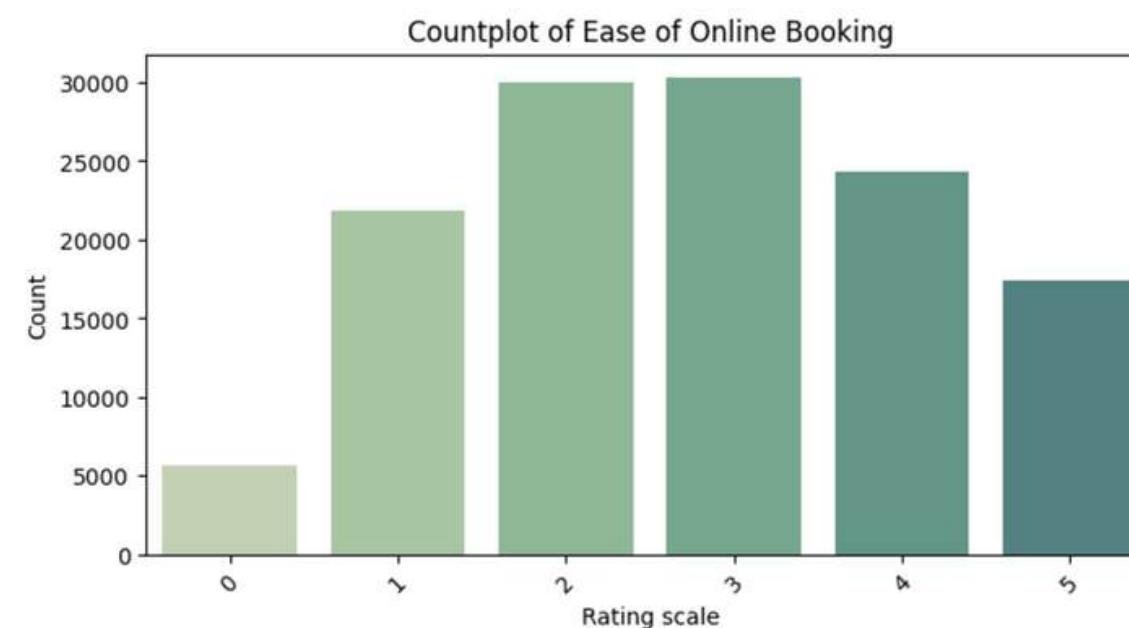
SATISFACTION



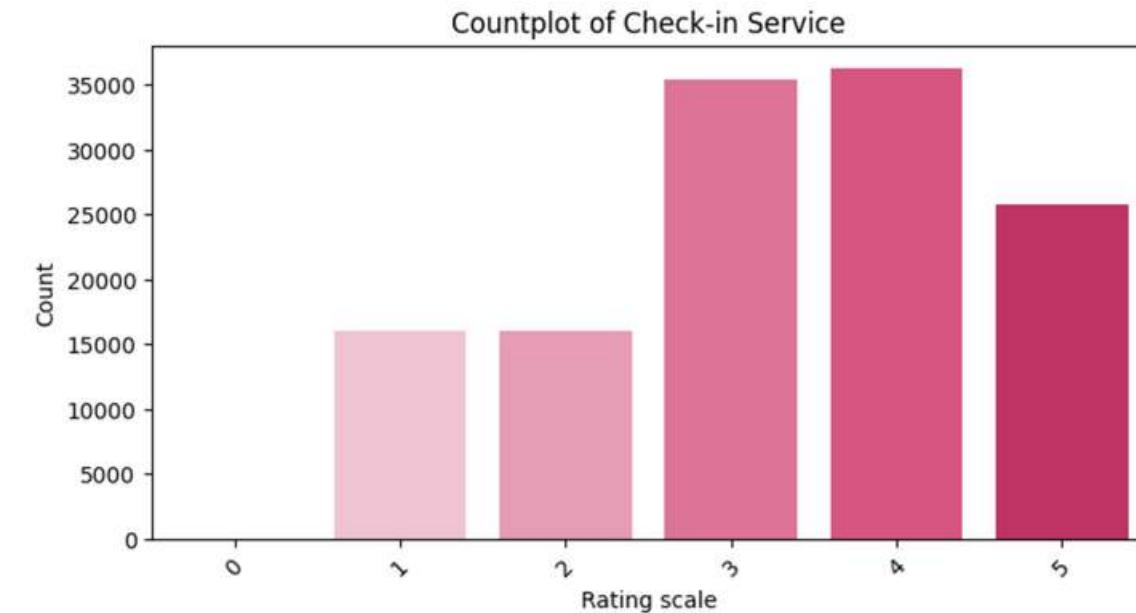
Departure and Arrival Time Convenience



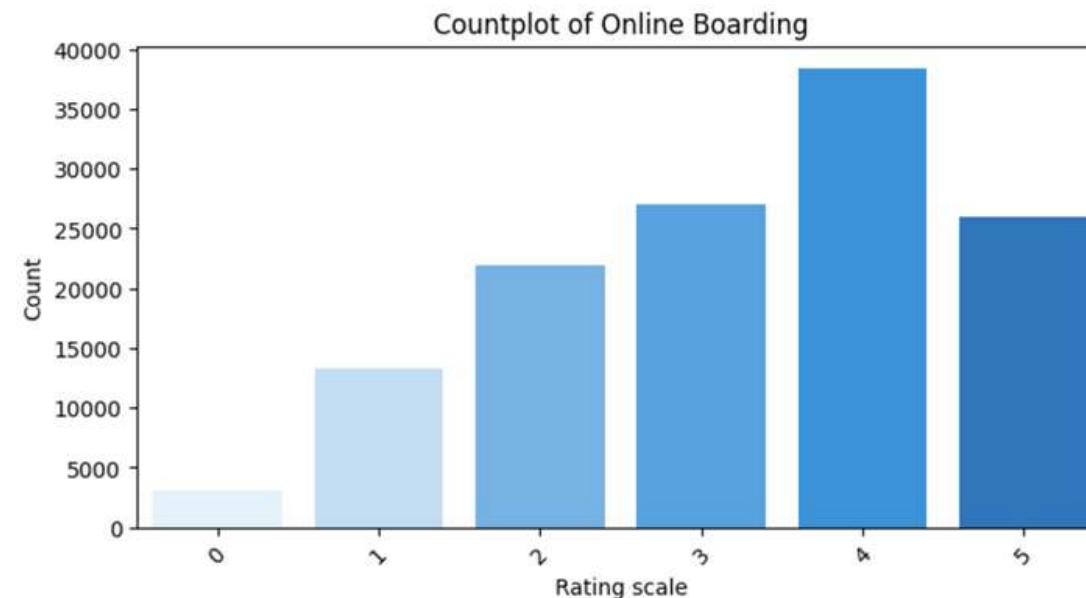
Ease of Online Booking



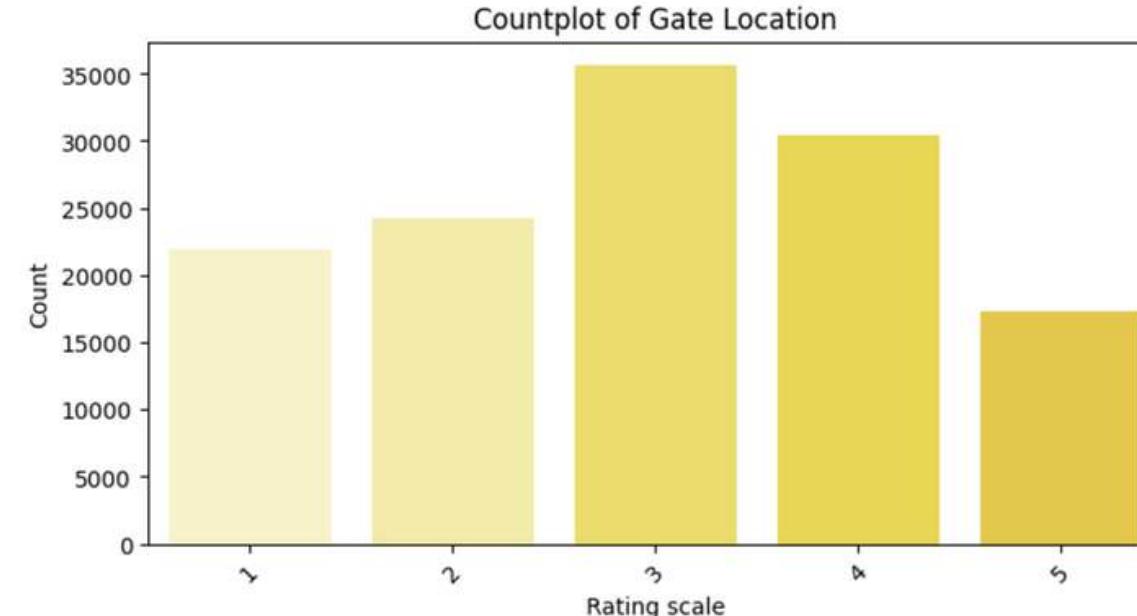
Check-in Service



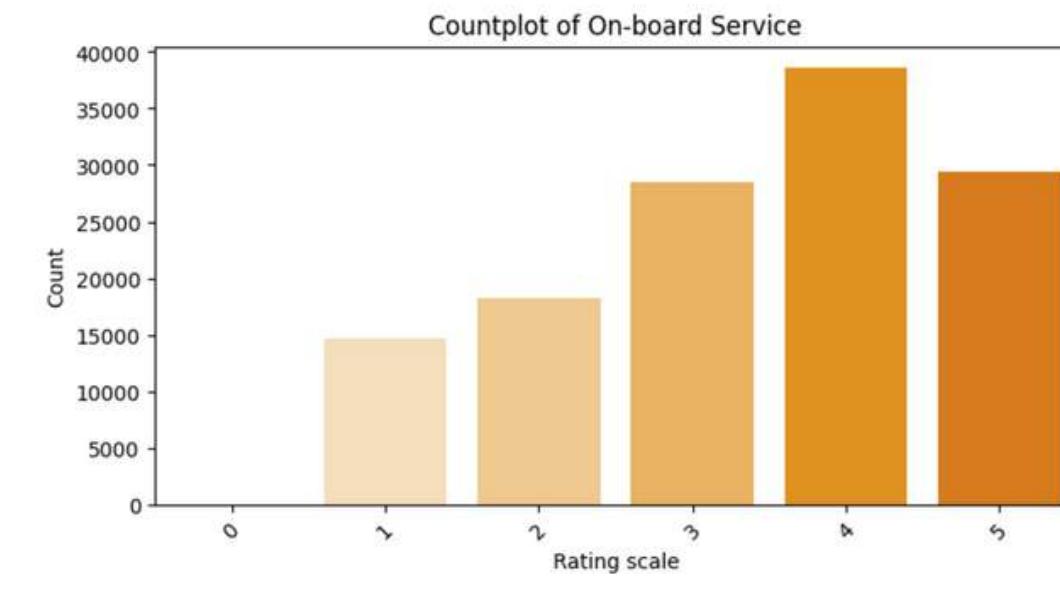
Online Boarding



Gate Location



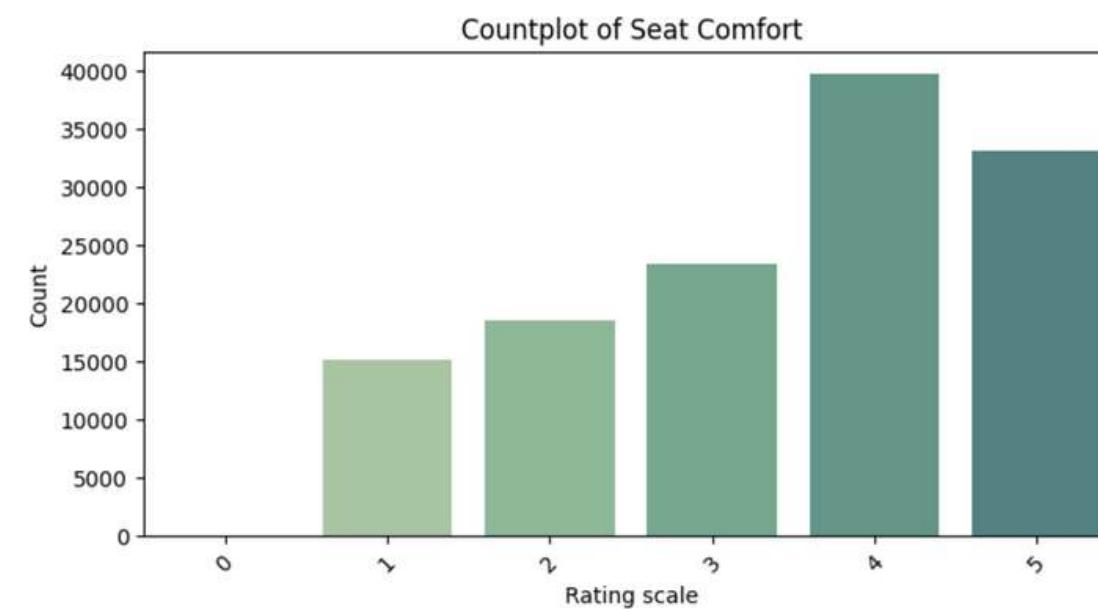
On-board Service



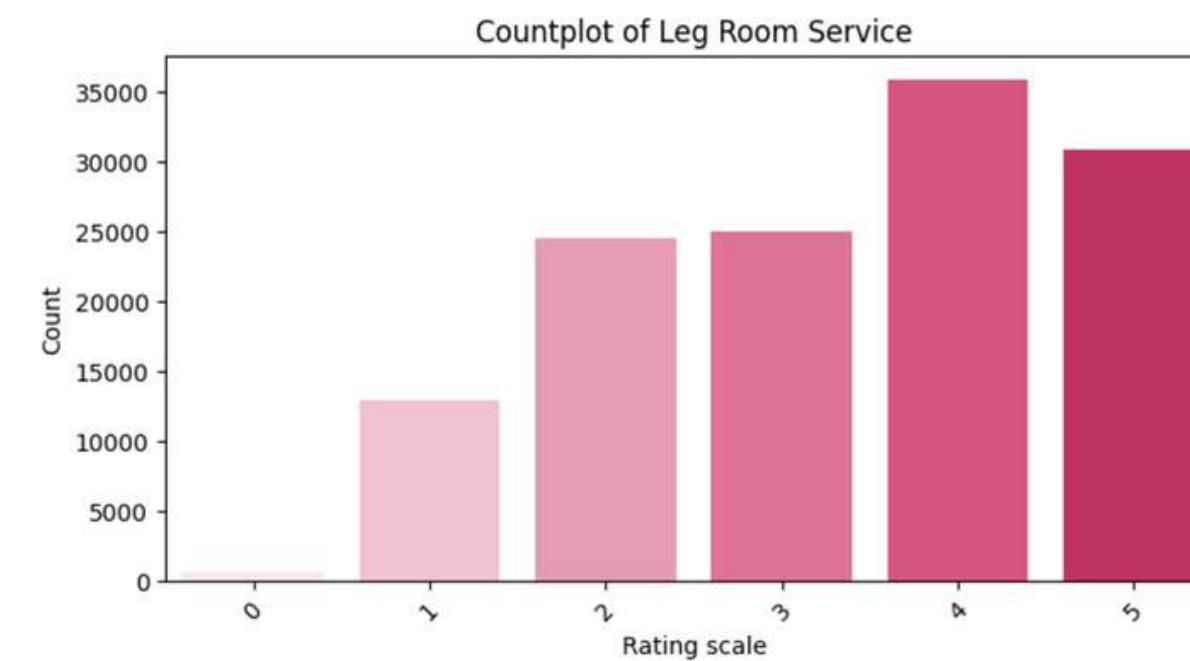
SATISFACTION



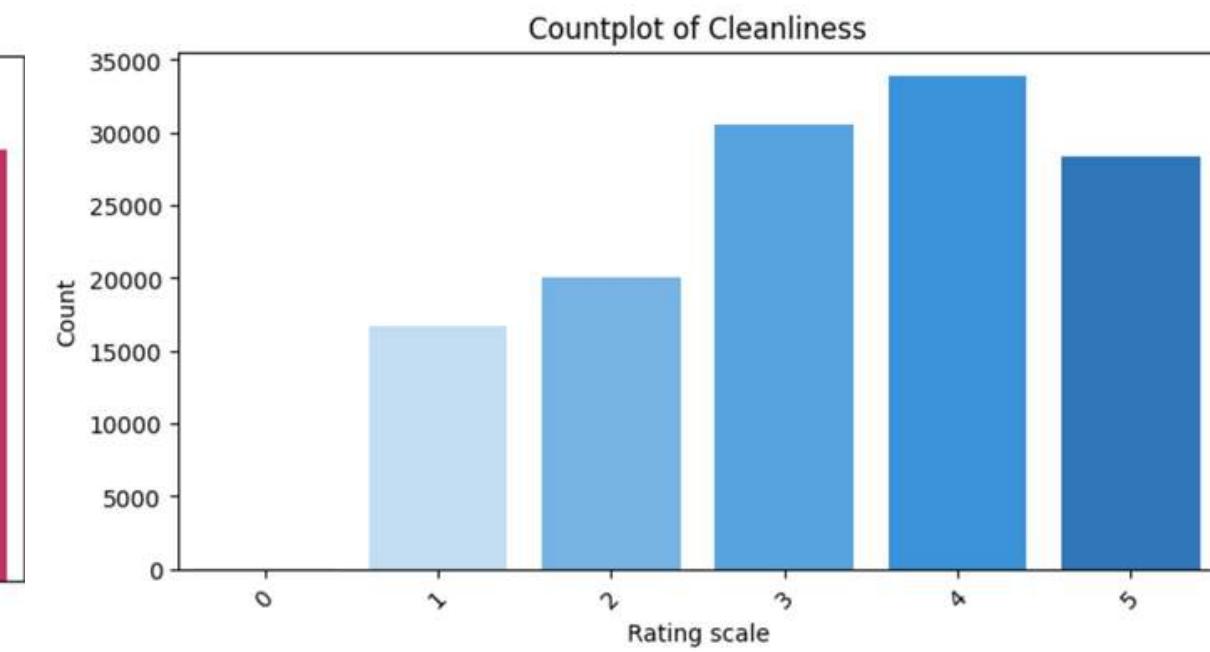
Seat Comfort



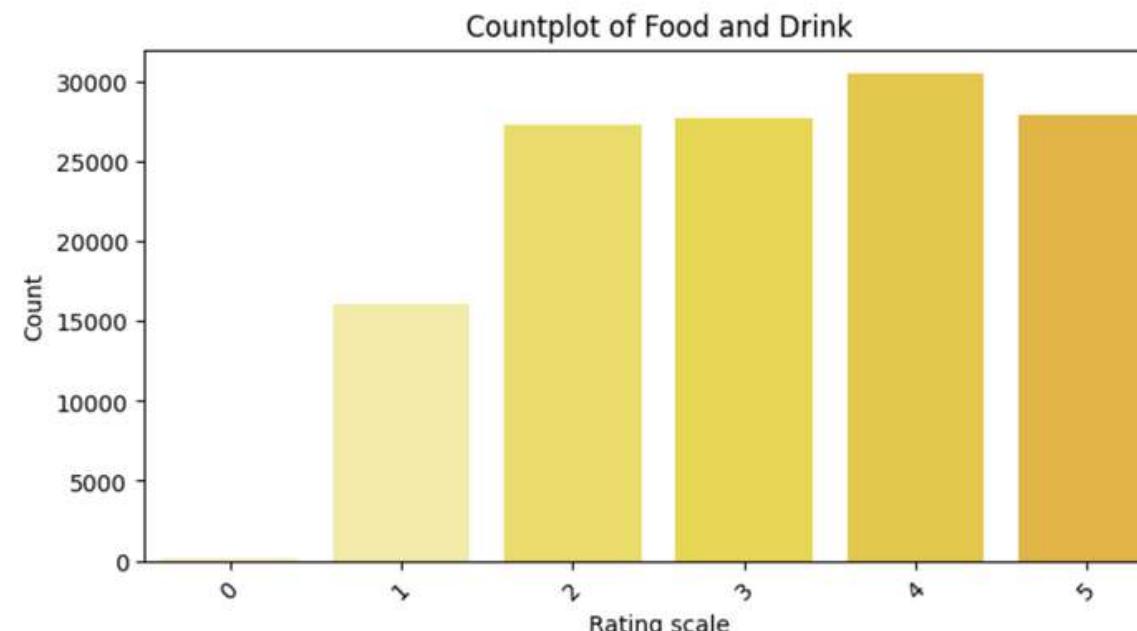
Leg Room Service



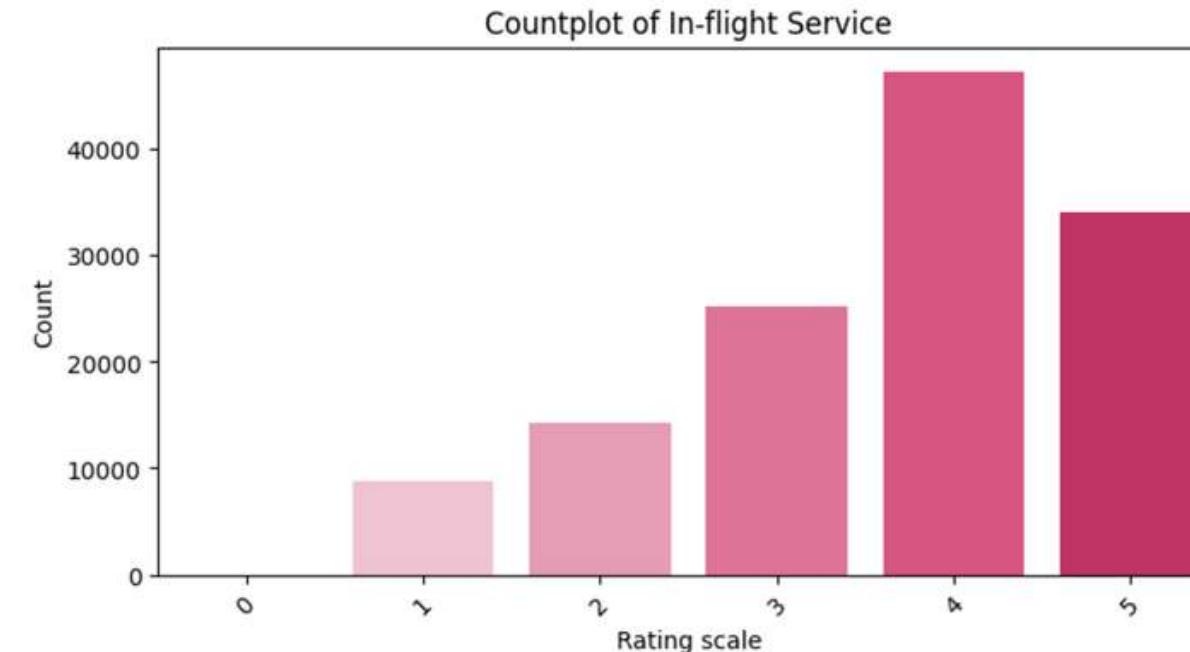
Cleanliness



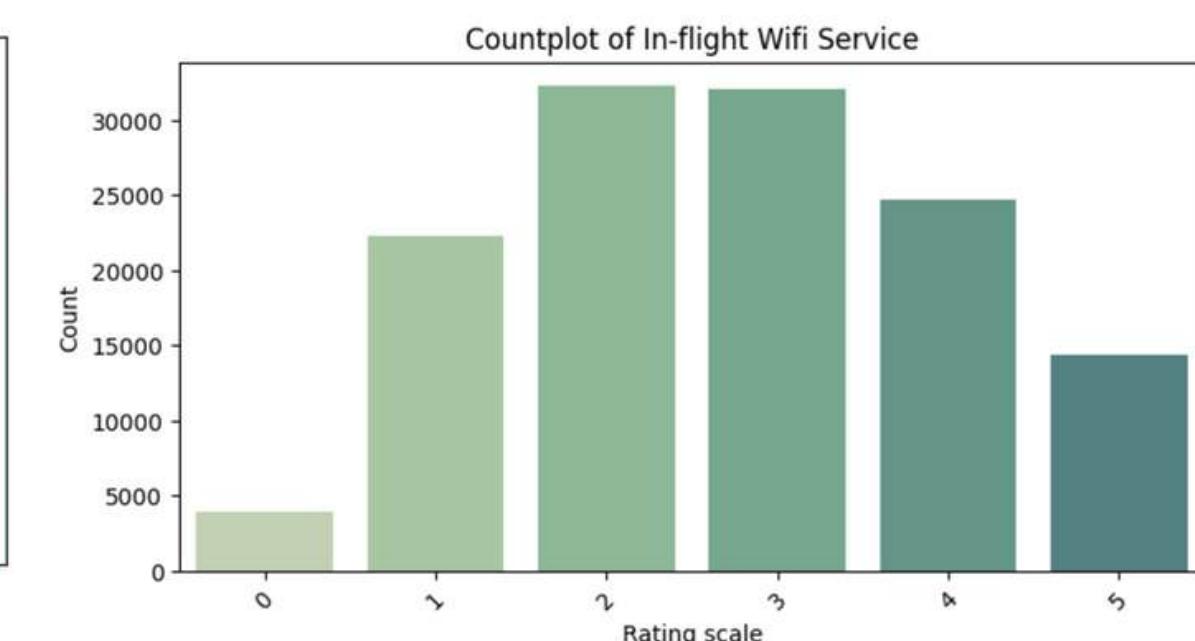
Food and Drink



In-flight Service



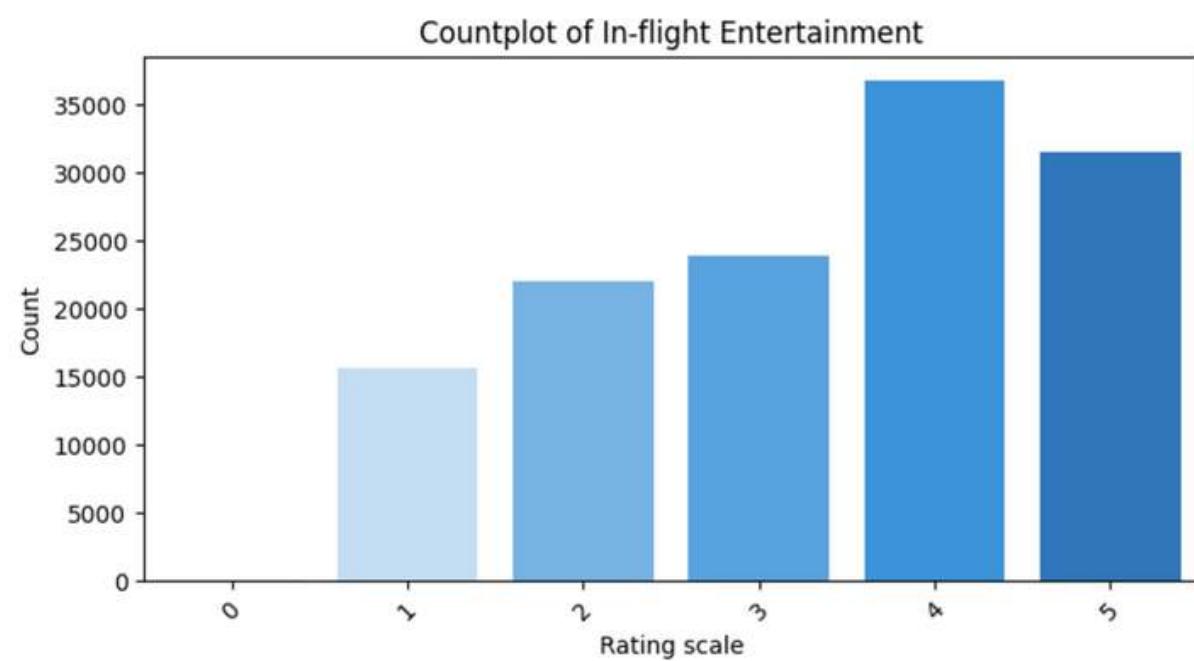
In-flight Wifi Service



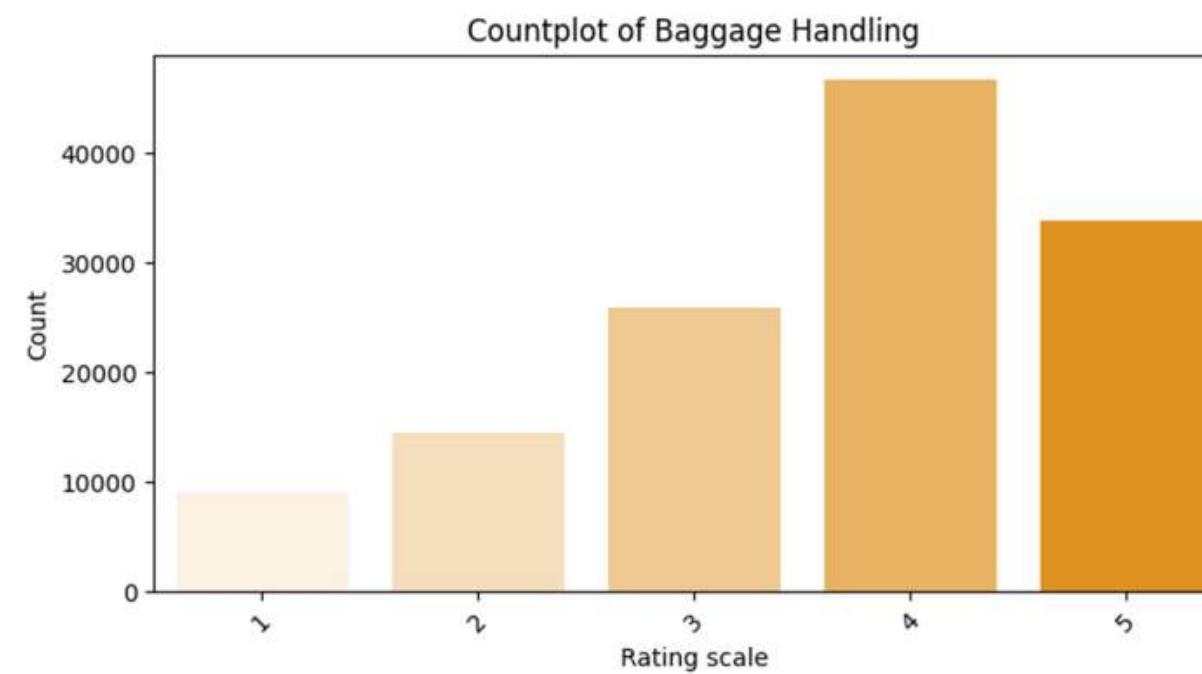
SATISFACTION



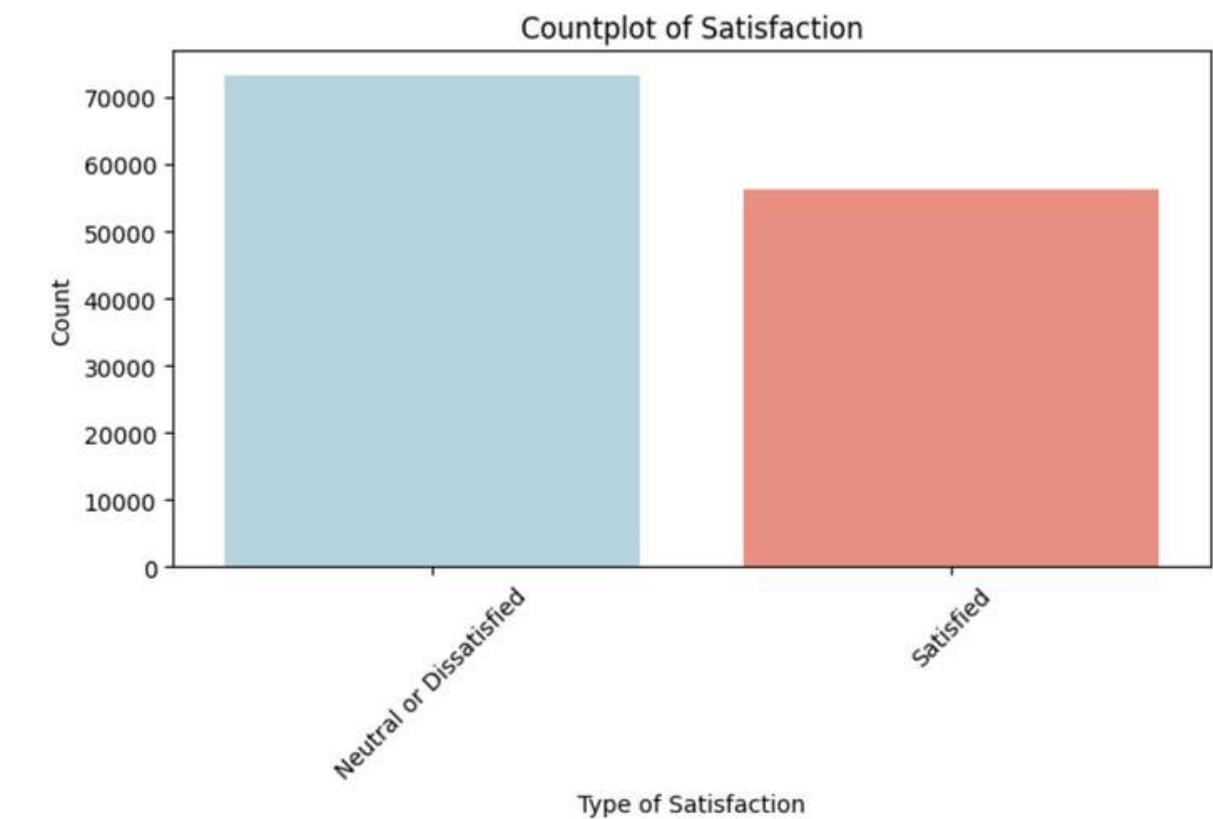
In-flight Entertainment



Baggage Handling



Satisfaction



Choose Feature



why?



Passenger's Satisfaction

DSI 204



Age Range



Customer Type



Type of travel



Class



Flight Distance



Hypothesis

$$H_0, H_1$$

Null Hypothesis (H0) – ตัวแปรและความพึ่งพาของผู้โดยสารไม่มีความสัมพันธ์

Alternative Hypothesis (H1) – มีความสัมพันธ์ระหว่างตัวแปรและความพึ่งพาของผู้โดยสาร

P-Value < 0.05 → Reject H0

Cramer's V

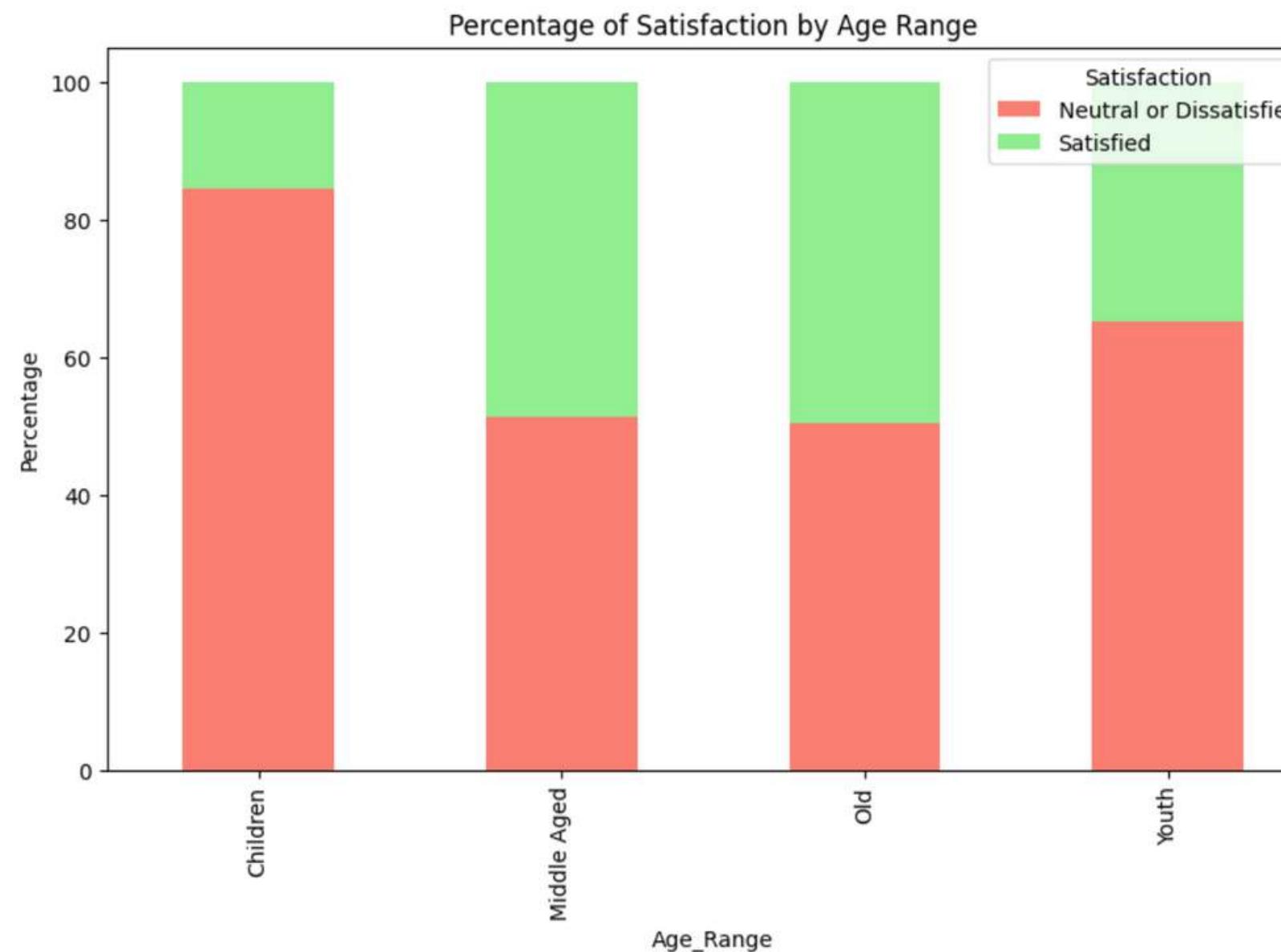
Interpretations for Cramér's V

df*	negligible	small	medium	large
1	0 < .10	.10 < .30	.30 < .50	.50 or more
2	0 < .07	.07 < .21	.21 < .35	.35 or more
3	0 < .06	.06 < .17	.17 < .29	.29 or more
4	0 < .05	.05 < .15	.15 < .25	.25 or more
5	0 < .05	.05 < .13	.13 < .22	.22 or more

$\sqrt{(\text{Chi-Square}/n)}$

$df = \min(\text{rows}-1, \text{columns}-1)$

Age Range VS Passenger's Satisfaction



	satisfied	dissatisfied
Children	1333	7256
Middle Aged	20185	21180
Old	23537	23831
Youth	11207	20958

Chi-Square Statistic: 4928.752151983876

P-Value: 0.0

Degrees of Freedom: 3

Expected Frequencies:

```
[[ 3731.91376741  4857.08623259]
 [17973.06007553 23391.93992447]
 [20581.35887   26786.64113   ]
 [13975.66728706 18189.33271294]]
```

Reject H0

The p-value is less than 0.05, indicating a significant result.

$\sqrt{4948.8 / 129487}$

Cramer's V 0.19549554578479492

weak
association

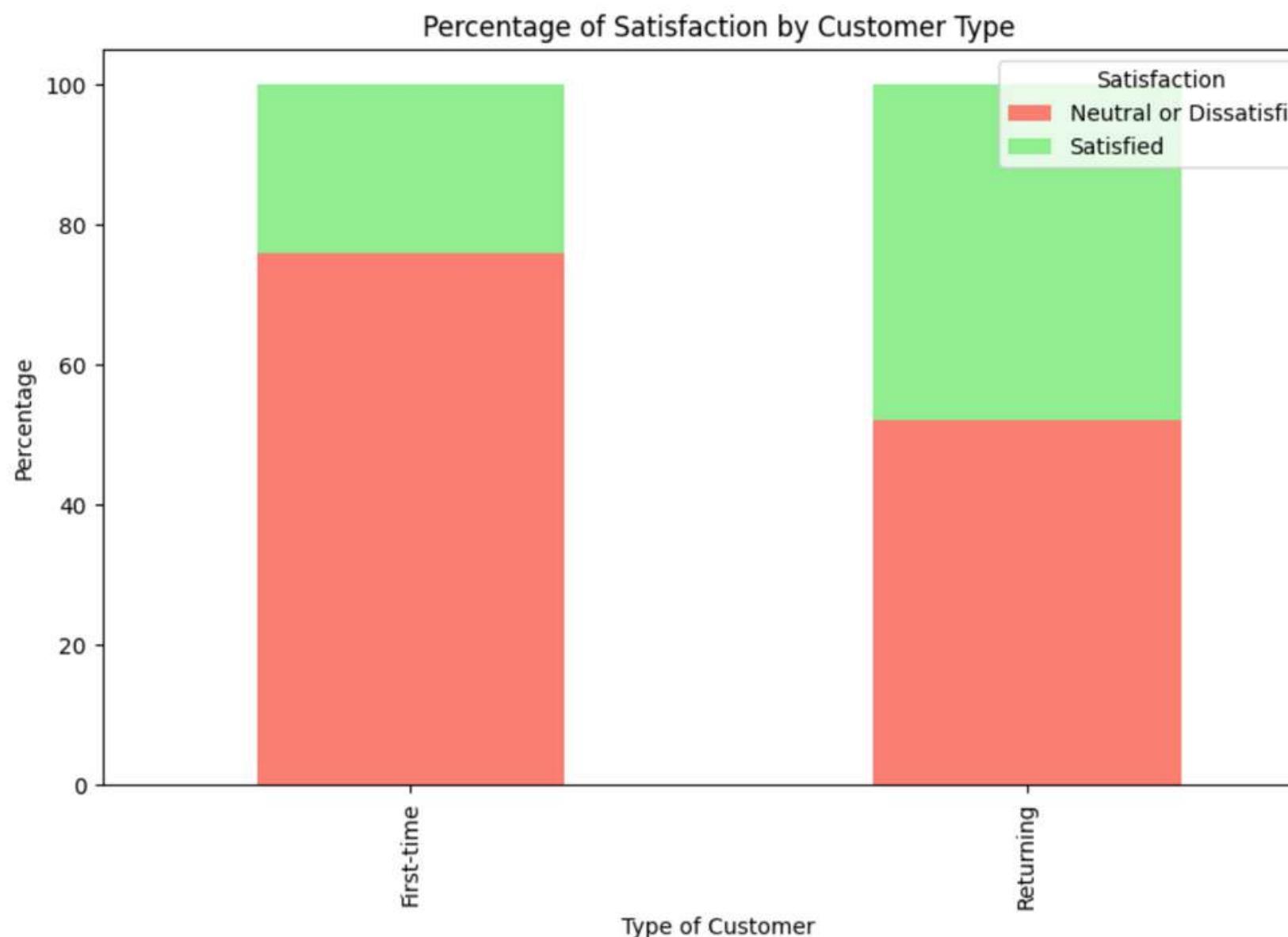
$df = \min(\text{rows}-1, \text{columns}-1) \rightarrow df = \min(3,1) \rightarrow df = 1$

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

Customer Type VS Passenger's Satisfaction



	satisfied	dissatisfied
Frist Time	5688	18026
Returning	50574	55199

Chi-Square Statistic: 4475.155050825033

P-Value: 0.0

Degrees of Freedom: 1

Expected Frequencies:

```
[[10303.71441149 13410.28558851]
 [45958.28558851 59814.71441149]]
```

The p-value is less than 0.05, indicating a significant result.

$\sqrt{4475.2 / 129487}$

Cramer's V 0.18590588587073817

$df = \min(\text{rows}-1, \text{columns}-1) \rightarrow df = \min(1,1) \rightarrow df = 1$

Reject H0

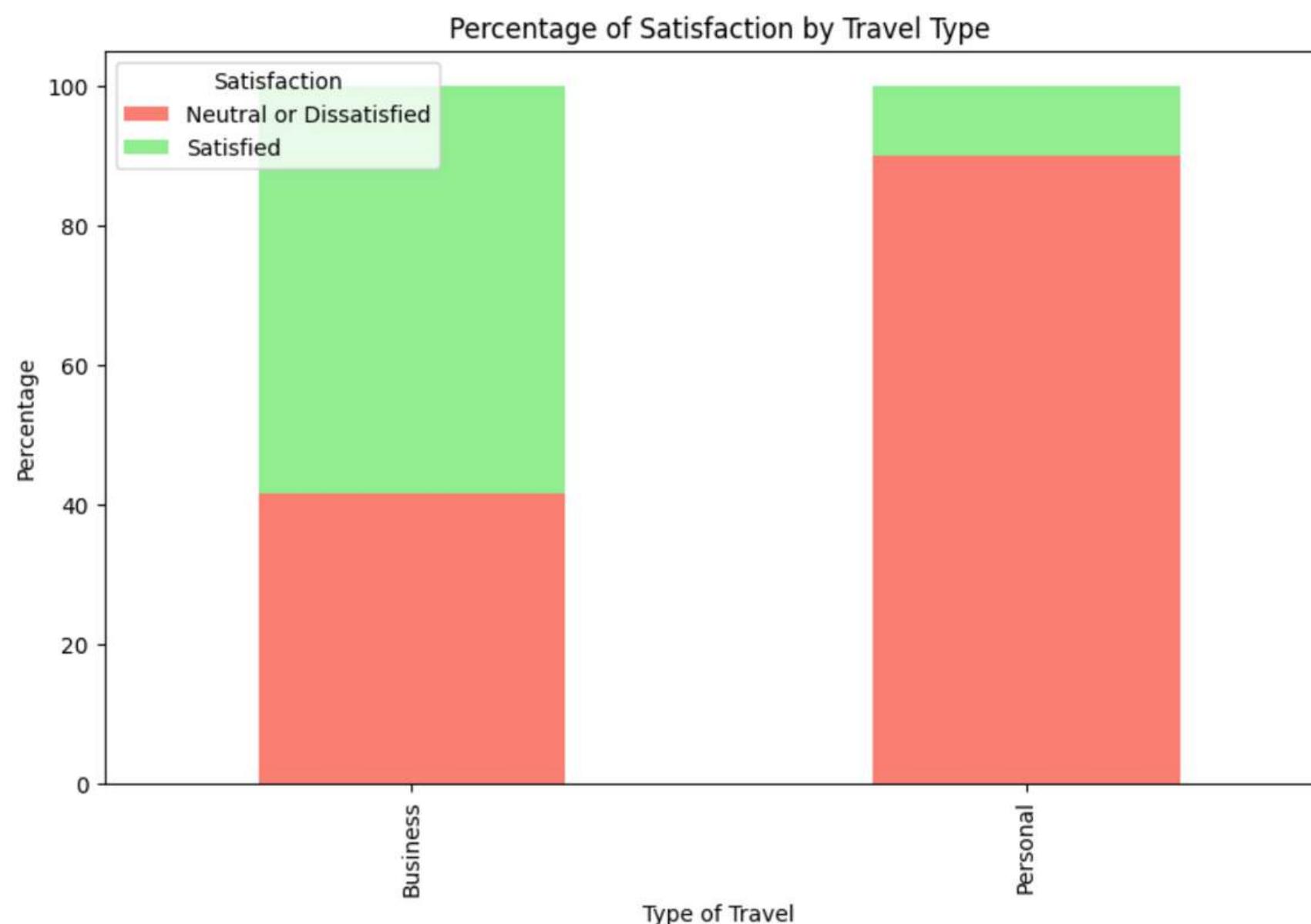
weak
association

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

Type of Travel VS Passenger's Satisfaction



	satisfied	dissatisfied
business	52207	37238
Personal	4055	35987

Chi-Square Statistic: 26195.139774671992

P-Value: 0.0

Degrees of Freedom: 1

Expected Frequencies:

[[38863.78238742 50581.21761258]

[17398.21761258 22643.78238742]]

Reject H0

The p-value is less than 0.05, indicating a significant result.

`sqrt(26195.1 / 129487)`

Cramer's V 0.44977669180801694

medium
association

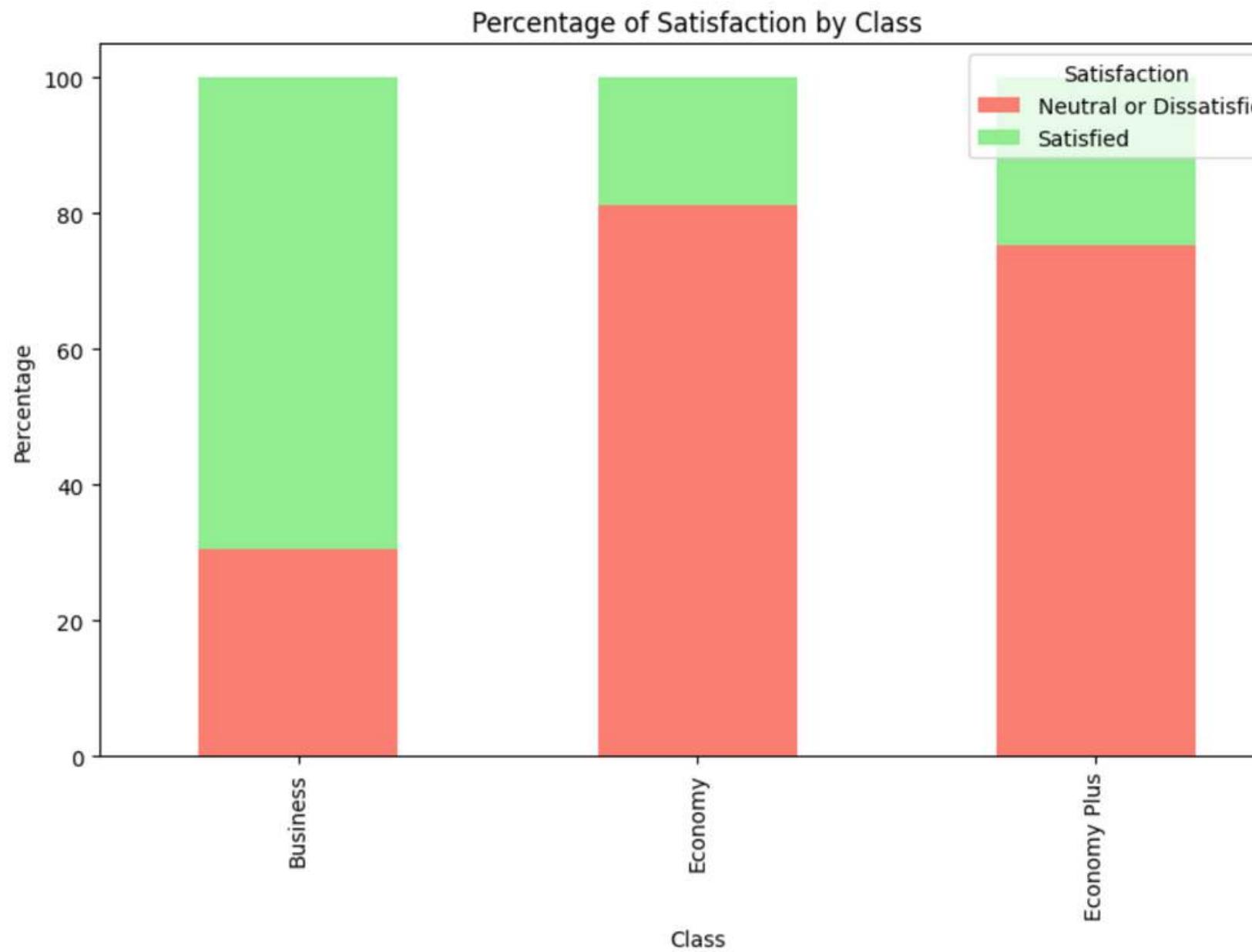
`df = min(rows-1, columns-1) -> df = min(1,1) -> df = 1`

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

Class VS Passenger's Satisfaction



	satisfied	dissatisfied
Business	43050	18940
Economy	10902	47215
Economy Plus	2310	7070

Chi-Square Statistic: 32823.12402964362

P-Value: 0.0

Degrees of Freedom: 2

Expected Frequencies:

```
[[26934.60640837 35055.39359163]
 [25251.79094426 32865.20905574]
 [ 4075.60264737  5304.39735263]]
```

Reject H0

The p-value is less than 0.05, indicating a significant result.

`sqrt(32823.1 / 129487)`

Cramer's V 0.5034736121178147

strong
association

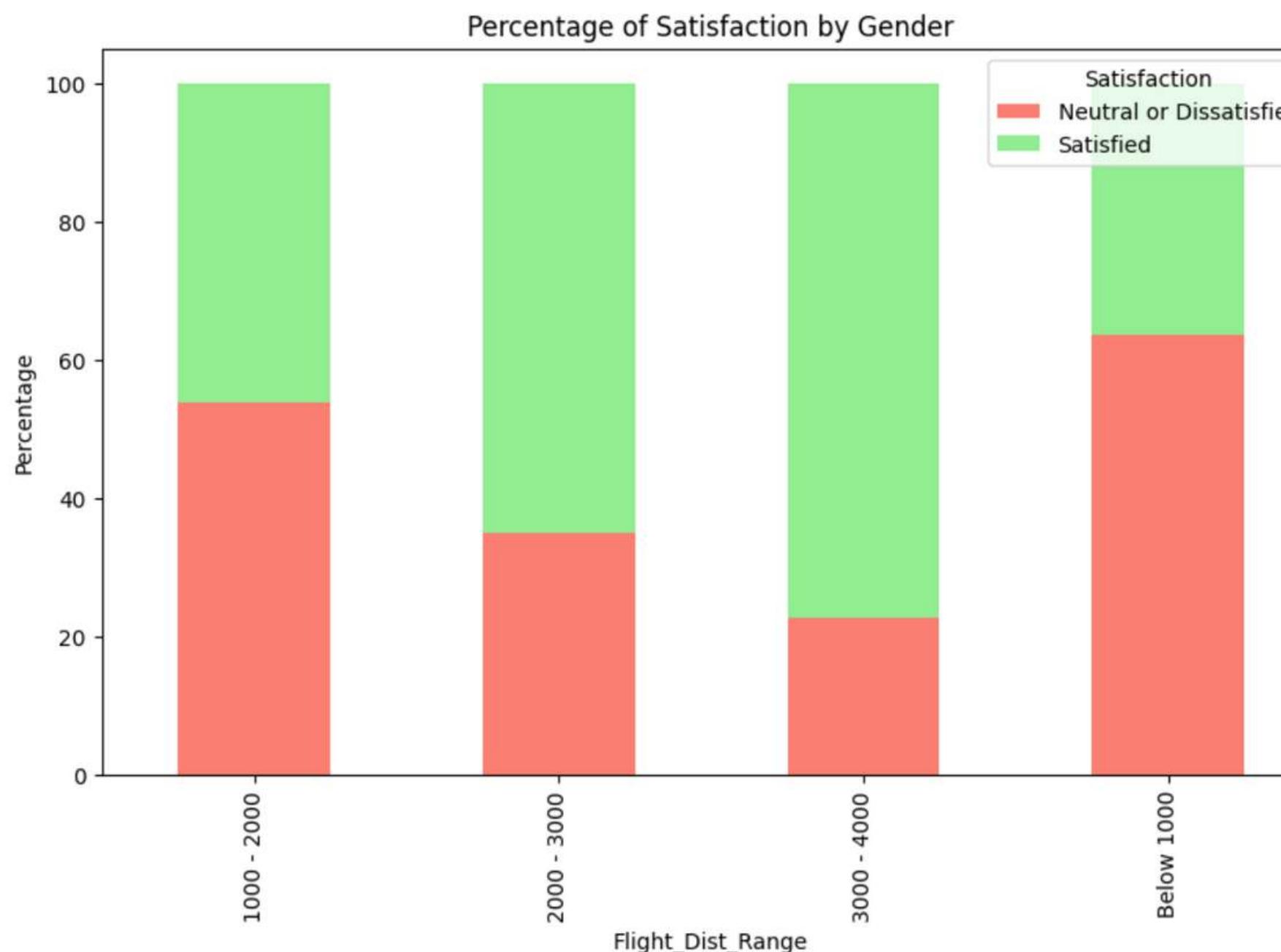
`df = min(rows-1, columns-1) -> df = min(2,1) -> df = 1`

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$	$.50$ or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$	$.35$ or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$	$.29$ or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$	$.25$ or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$	$.22$ or more

Flight Distance VS Passenger's Satisfaction



	satisfied	dissatisfied
1000 - 2000	12826	14986
2000 - 3000	10717	5774
3000 - 4000	3333	979
Below 1000	29386	51486

Chi-Square Statistic: 6869.46466156725

P-Value: 0.0

Degrees of Freedom: 3

Expected Frequencies:

```
[1] [12084.29219922 15727.70780078]  
[2] [ 7165.32657332 9325.67342668]  
[3] [ 1873.56061999 2438.43938001]  
[4] [35138.82060747 45733.17939253]
```

Reject H0

The p-value is less than 0.05, indicating a significant result.

$\sqrt{6869.5 / 129487}$

Cramer's V 0.23032945468473437

weak
association

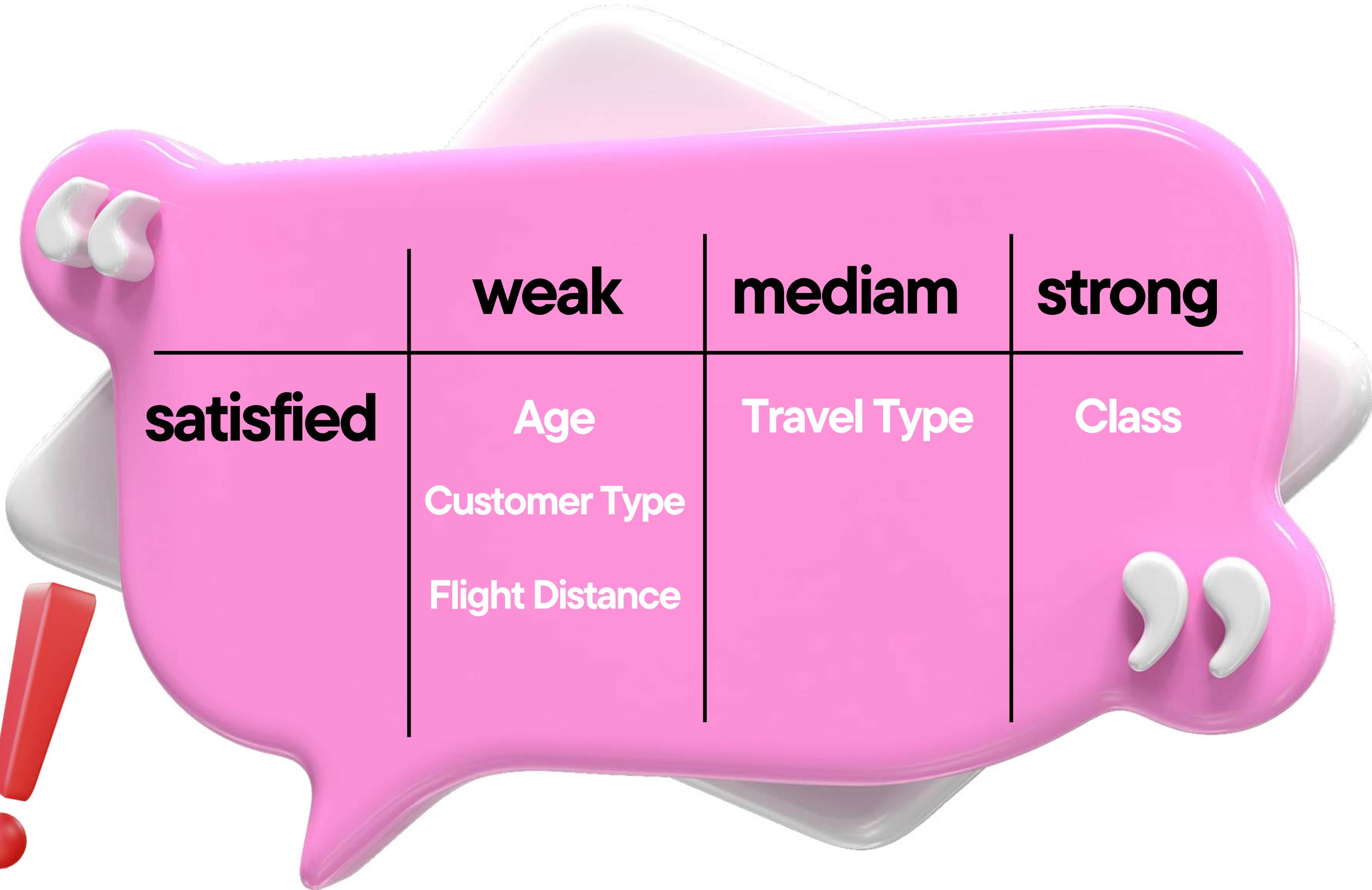
$df = \min(\text{rows}-1, \text{columns}-1) \rightarrow df = \min(3,1) \rightarrow df = 1$

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

සාඟු



Flight Distance Vs Class

Null Hypothesis (H_0) – Flight Distance และ Class ของผู้โดยสารไม่มีความสัมพันธ์

Alternative Hypothesis (H_1) – มีความสัมพันธ์ระหว่าง Flight Distance และ Class ของผู้โดยสาร



	1000 - 2000	2000 - 3000	3000 - 4000	Below 1000
Business	14805	13535	4300	29350
Economy	11291	2484	9	44333
Economy Plus	1716	472	3	7189

Chi-Square Statistic: 17050.79218782937

P-Value: 0.0

Degrees of Freedom: 6

Expected Frequencies:

```
[[13314.58663804 7894.82411362 2064.30668716 38716.28256118]
 [12482.72030397 7401.57272159 1935.33330759 36297.37366685]
 [ 2014.69305799 1194.6031648 312.36000525 5858.34377196]]
```

Reject H_0

The p-value is less than 0.05, indicating a significant result.

```
.sqrt(22321.7 / (129487*2))
```

Cramer's V 0.2935861414397765

medium
association

$df = \min(\text{rows}-1, \text{columns}-1) \rightarrow df = \min(2,3) \rightarrow df = 2$

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

Flight Distance Vs Travel Type

Null Hypothesis (H0) – Flight Distance และ Travel Type ของผู้โดยสารไม่มีความสัมพันธ์

Alternative Hypothesis (H1) – มีความสัมพันธ์ระหว่าง Flight Distance และ Travel Type ของผู้โดยสาร



	1000 - 2000	2000 - 3000	3000 - 4000	Below 1000
Business	19574	14212	4303	51356
Personal	8238	2279	9	29516

Chi-Square Statistic: 5361.11698638915

P-Value: 0.0

Degrees of Freedom: 3

Expected Frequencies:

```
[[19211.53737441 11391.39446431 2978.57576436 55863.49239692]
 [8600.46262559 5099.60553569 1333.42423564 25008.50760308]]
```

The p-value is less than 0.05, indicating a significant result.

Reject H0

$\sqrt{7378.0 / 129487}$

Cramer's V 0.23870210062283168

weak
association

$df = \min(\text{rows}-1, \text{columns}-1) \rightarrow df = \min(1,3) \rightarrow df = 1$

Cramer's V

Interpretations for Cramér's V

df*	negligible	small	medium	large
1	$0 < .10$	$.10 < .30$	$.30 < .50$.50 or more
2	$0 < .07$	$.07 < .21$	$.21 < .35$.35 or more
3	$0 < .06$	$.06 < .17$	$.17 < .29$.29 or more
4	$0 < .05$	$.05 < .15$	$.15 < .25$.25 or more
5	$0 < .05$	$.05 < .13$	$.13 < .22$.22 or more

සූ



Flight Distance

weak

Travel Type

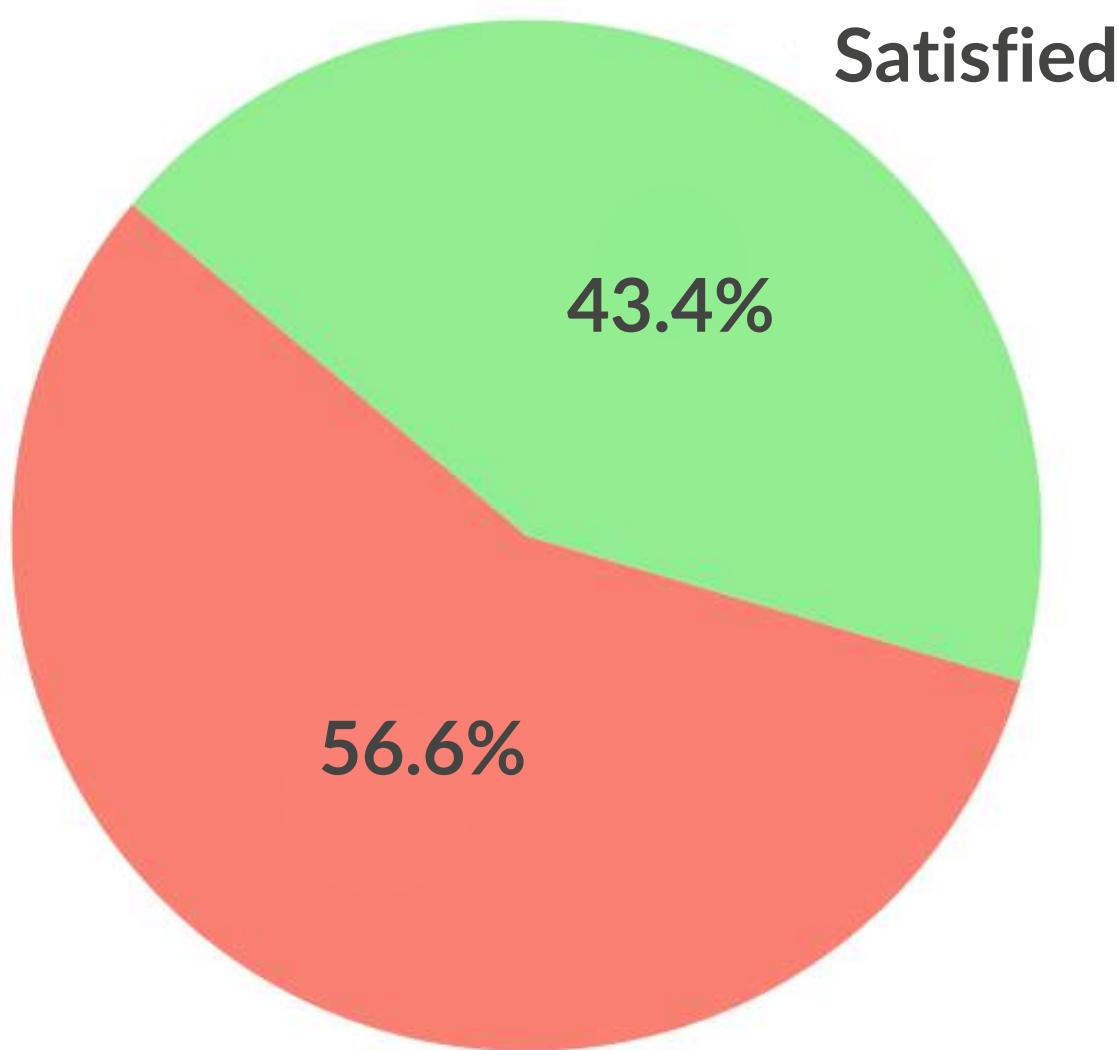
medium

Class

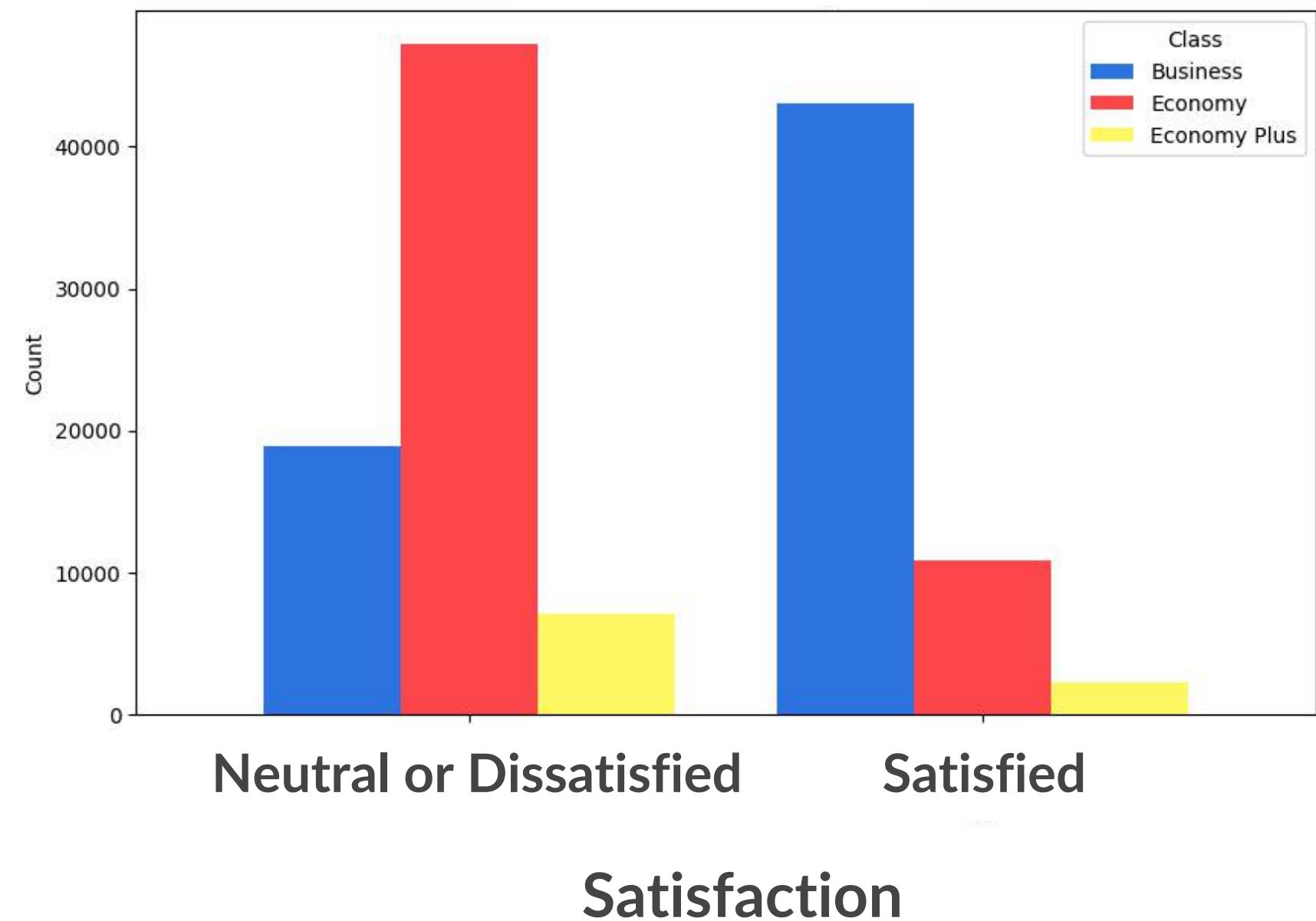
strong

Insights #1 Class of Customer

Promotion of Satisfaction

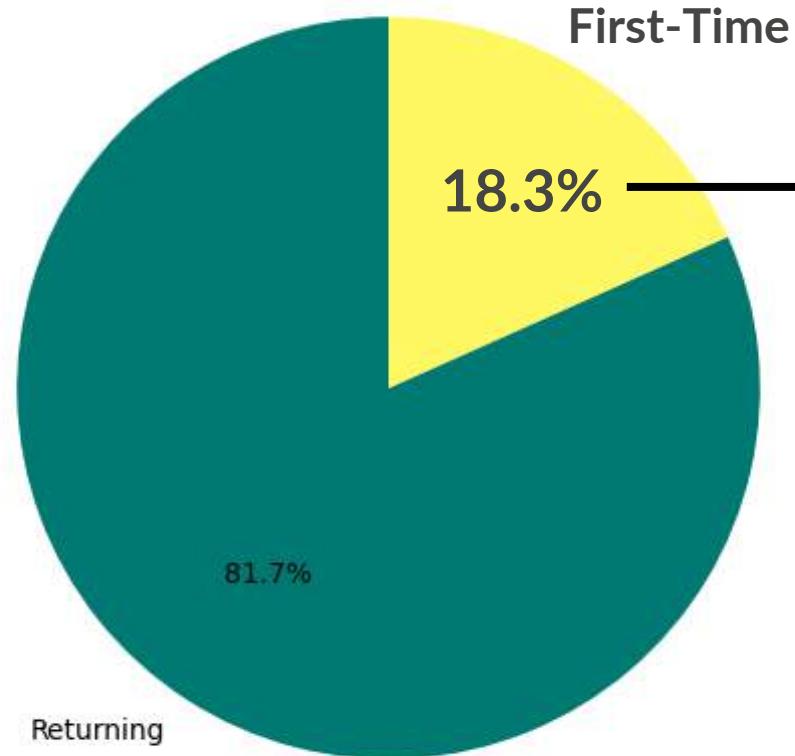


Count of satisfaction by Class

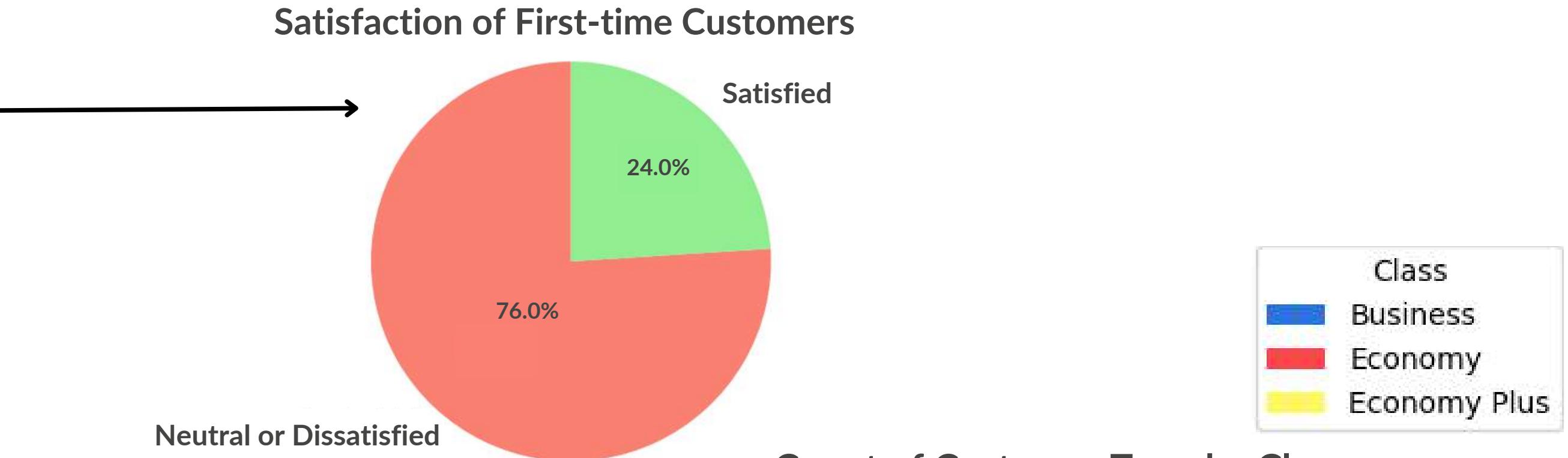


Insights #2 New Customer

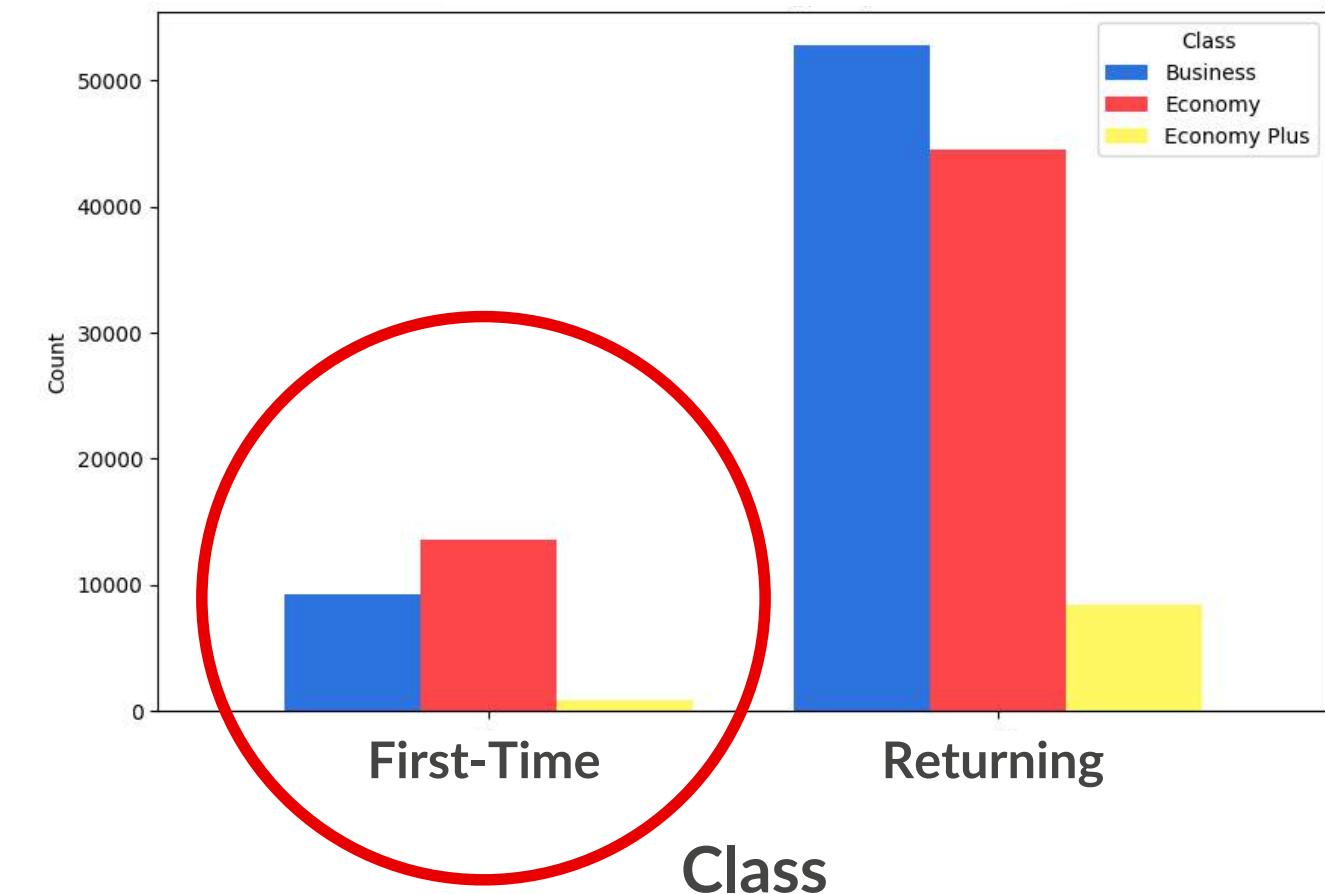
Percentage of Customer Type



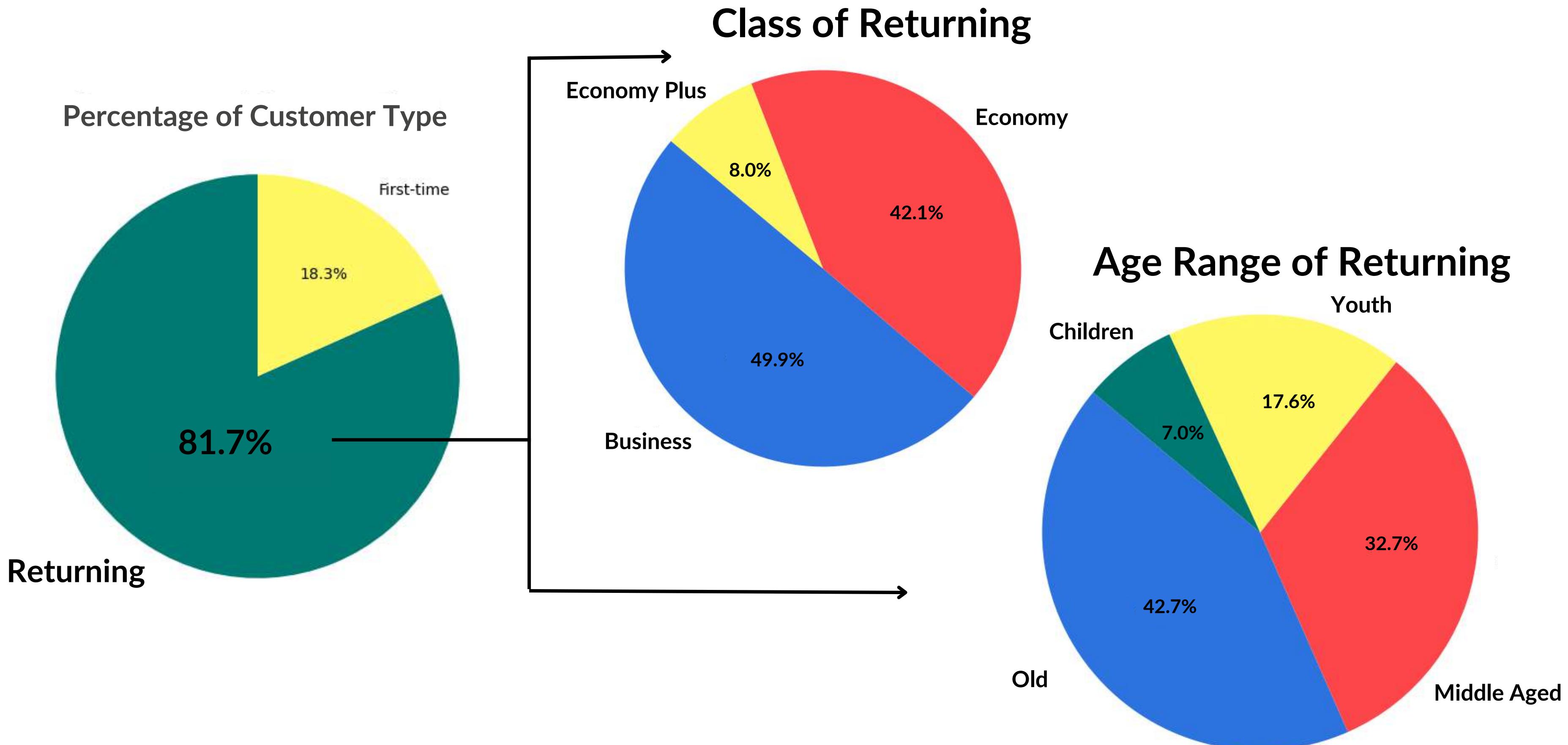
Satisfaction of First-time Customers



Count of Customer Type by Class

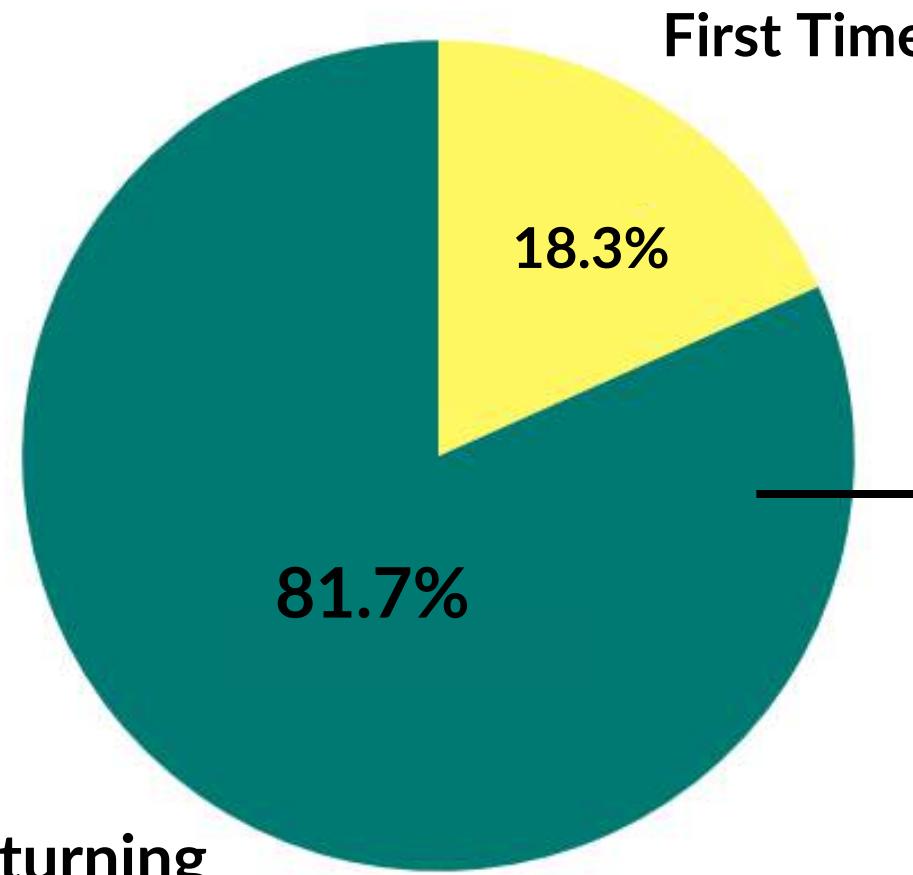


Insights #3 Loyal Customers

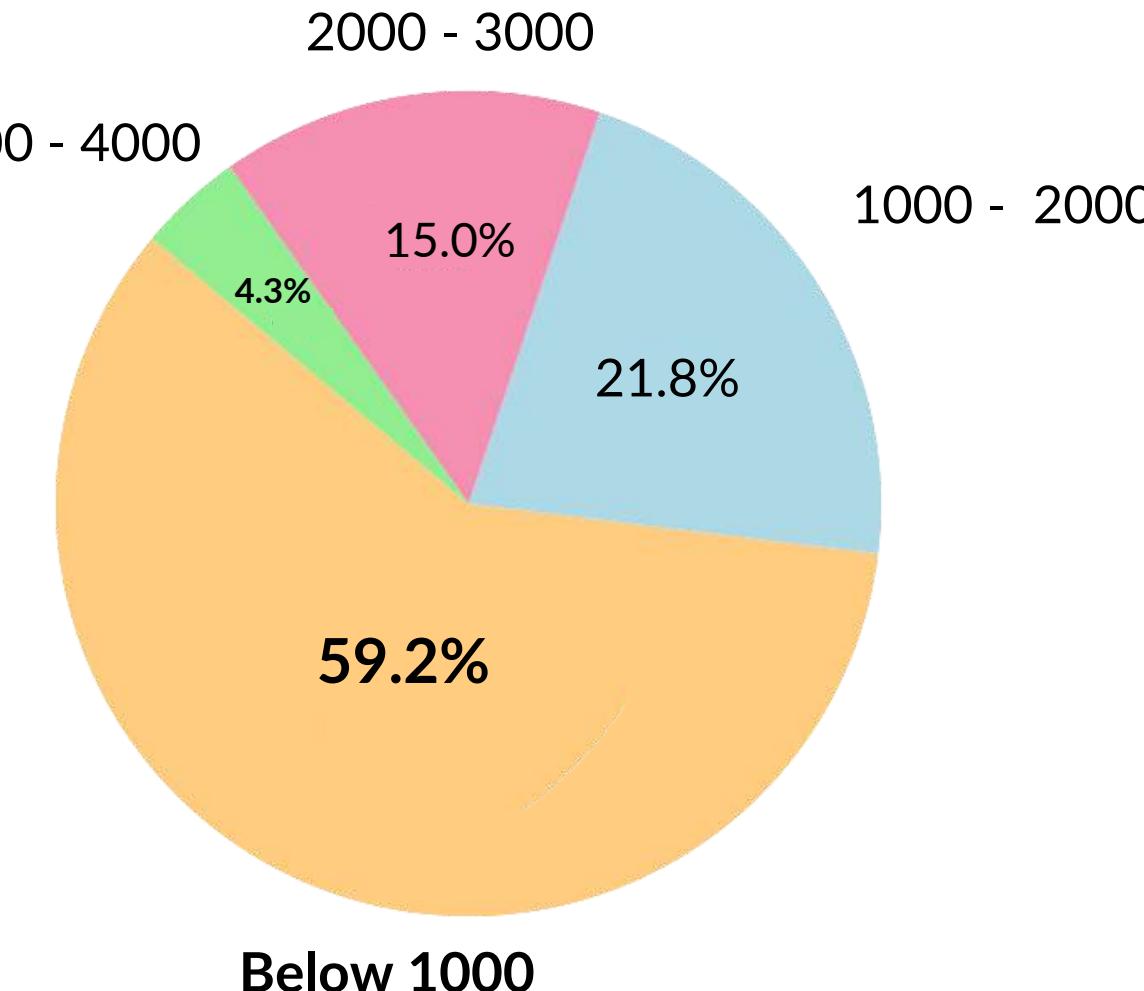


Insights #3 Loyal Customers

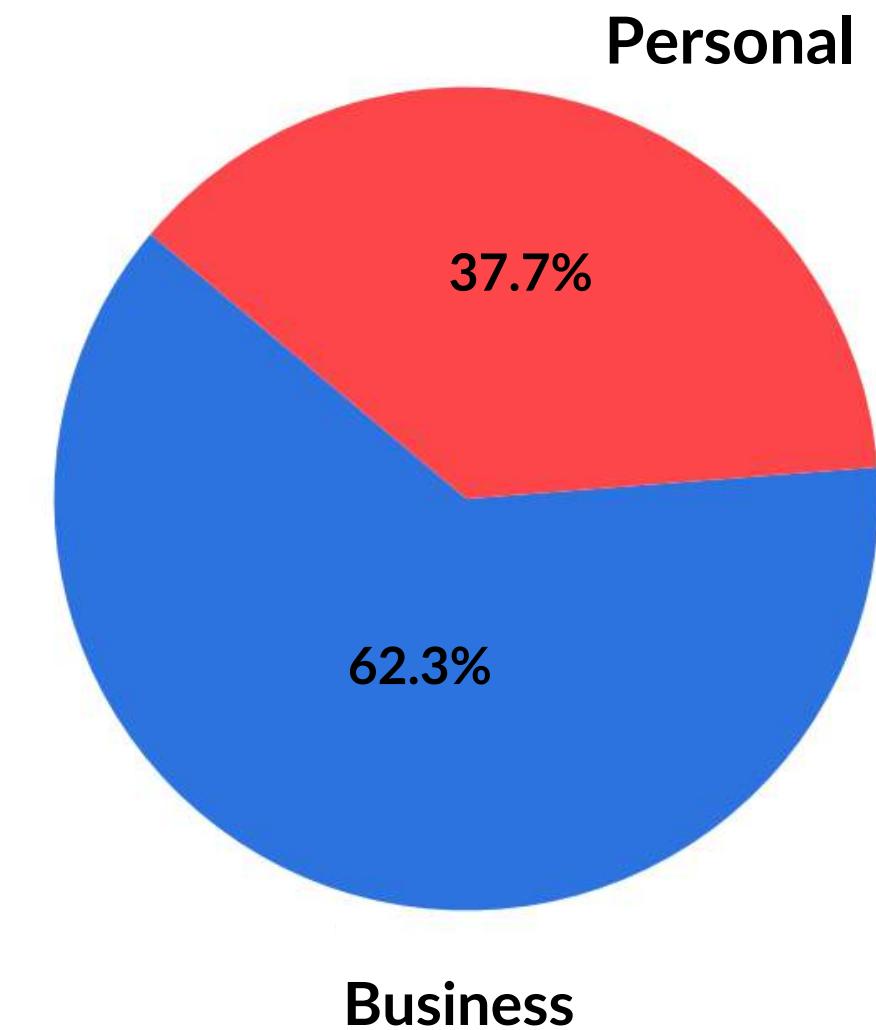
Percentage of Customer Type



Flight Distance Range of Returning



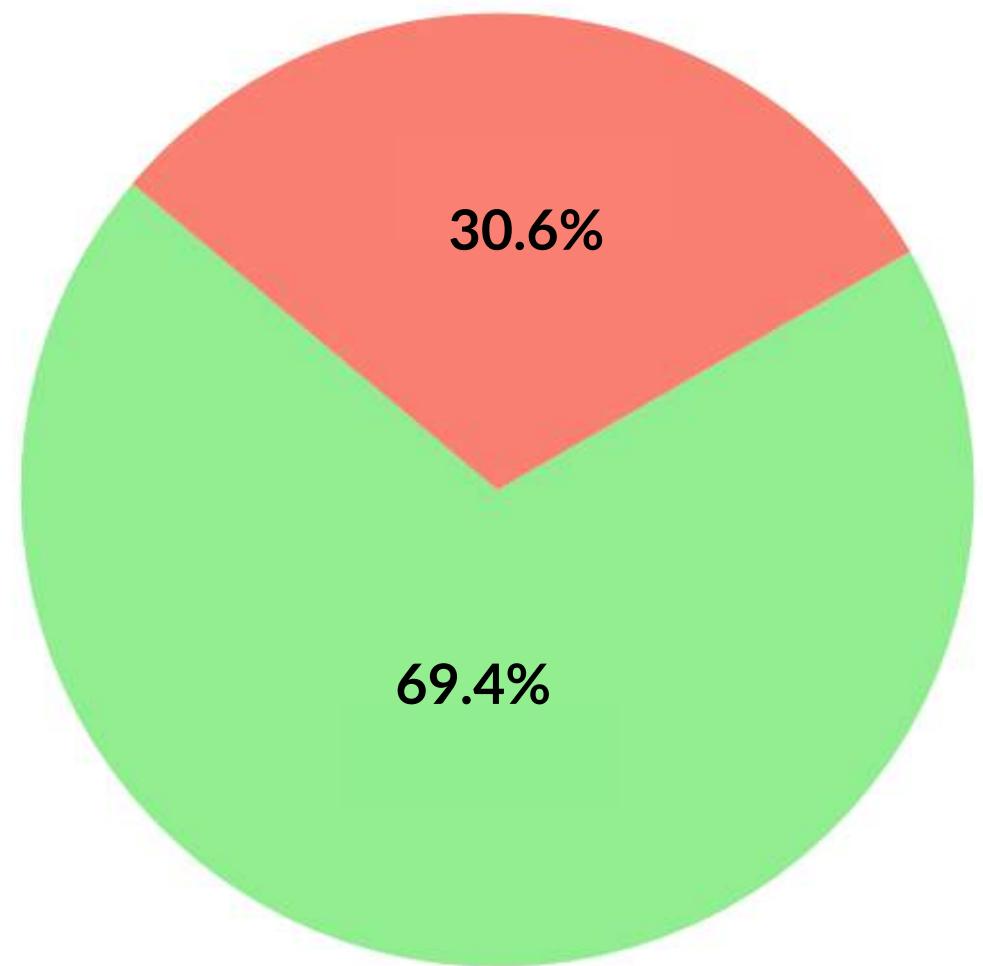
Travel Type of Returning



Insights #4 Class

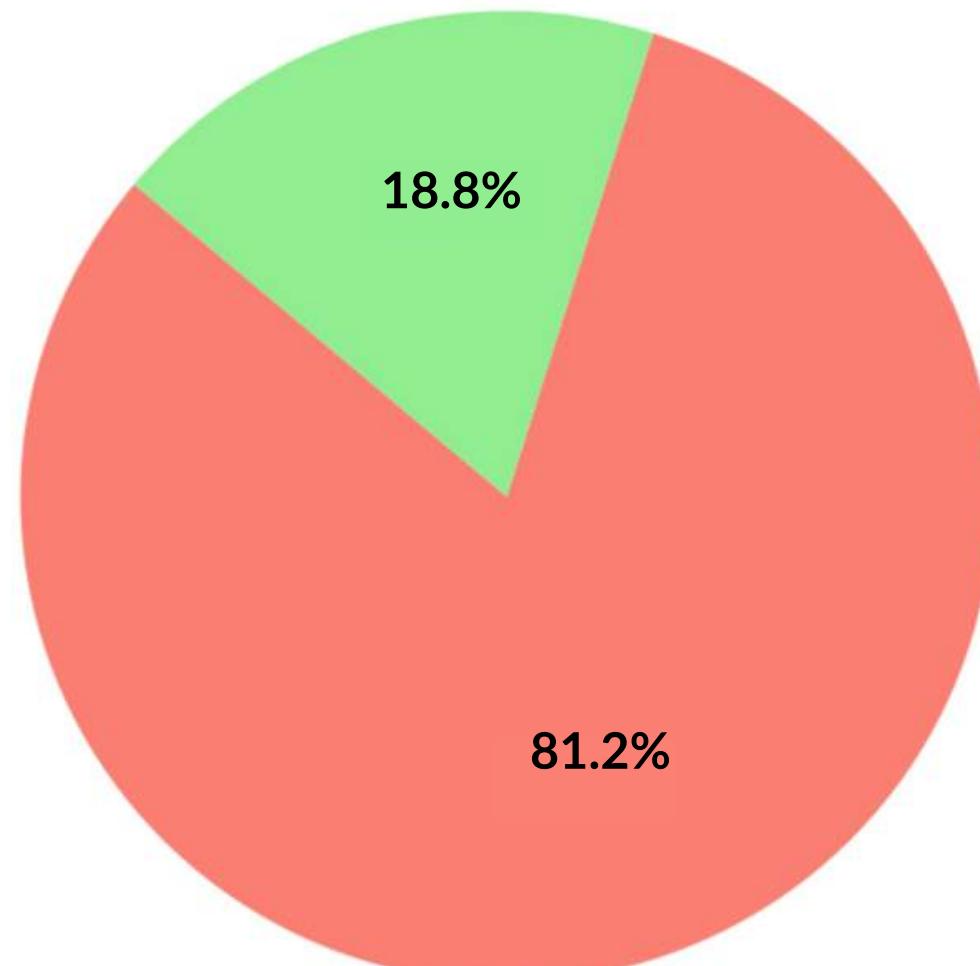
Satisfaction for **Business**

Neutral or Dissatisfied



Satisfaction for **Economy Class**

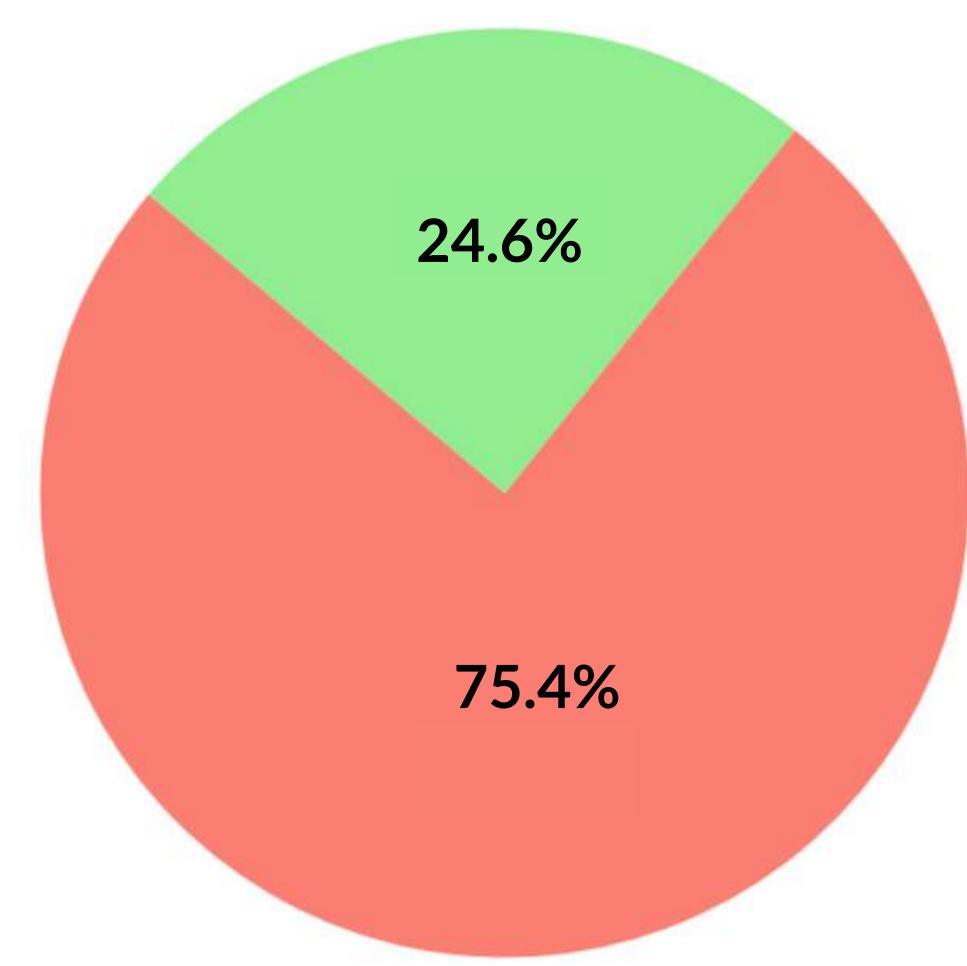
Satisfied



Satisfaction for

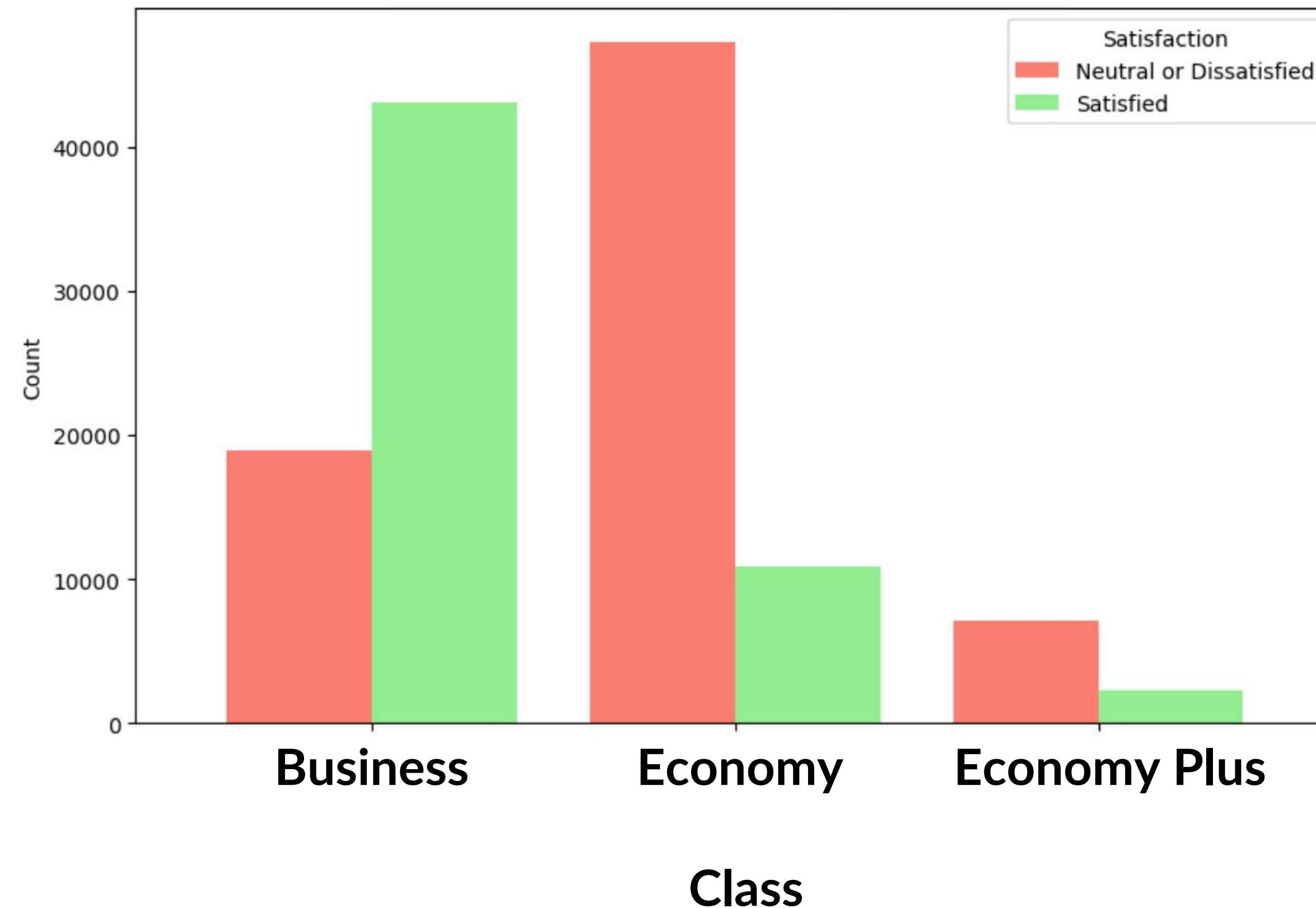
Economy Plus

Satisfied

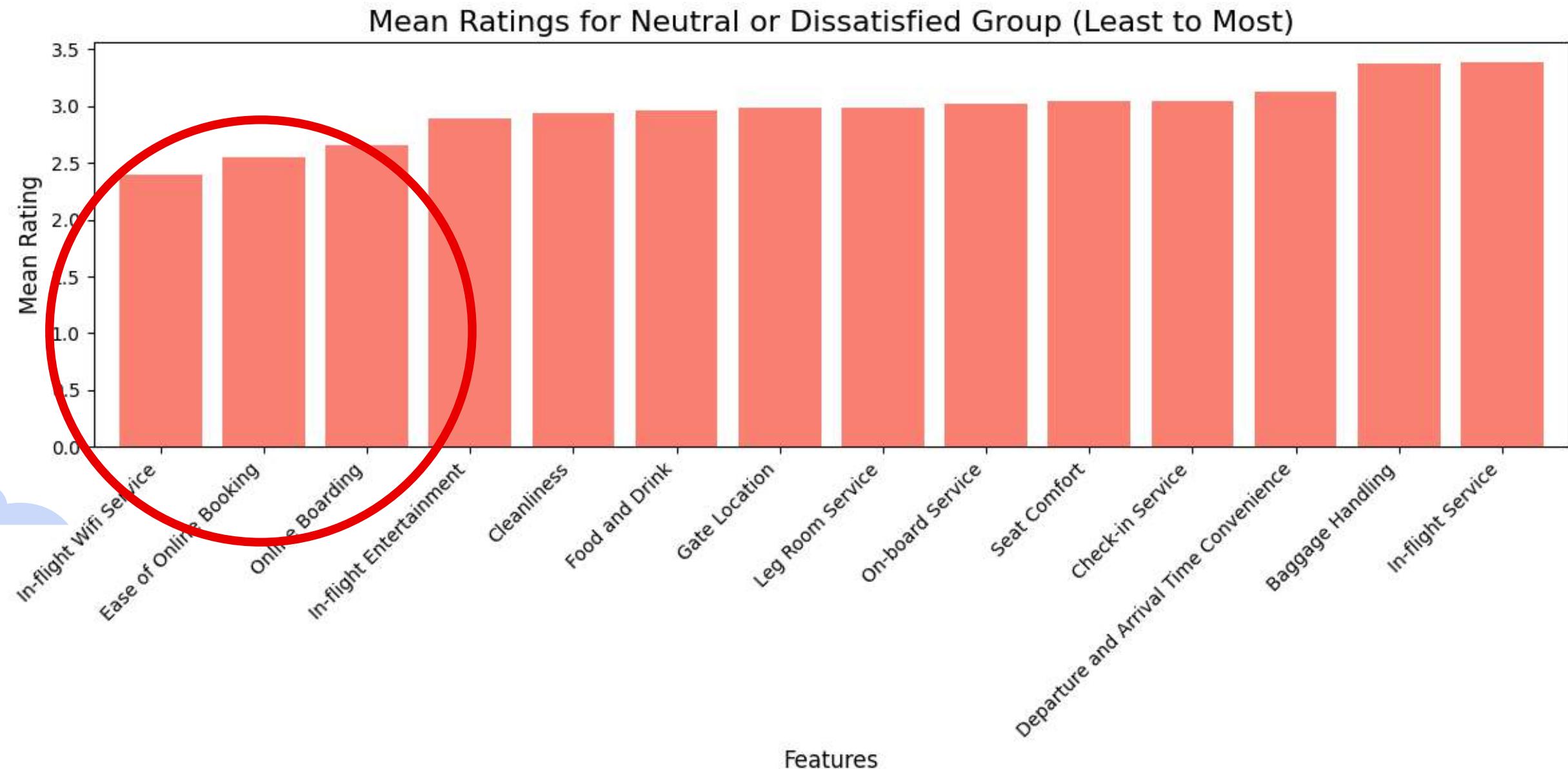
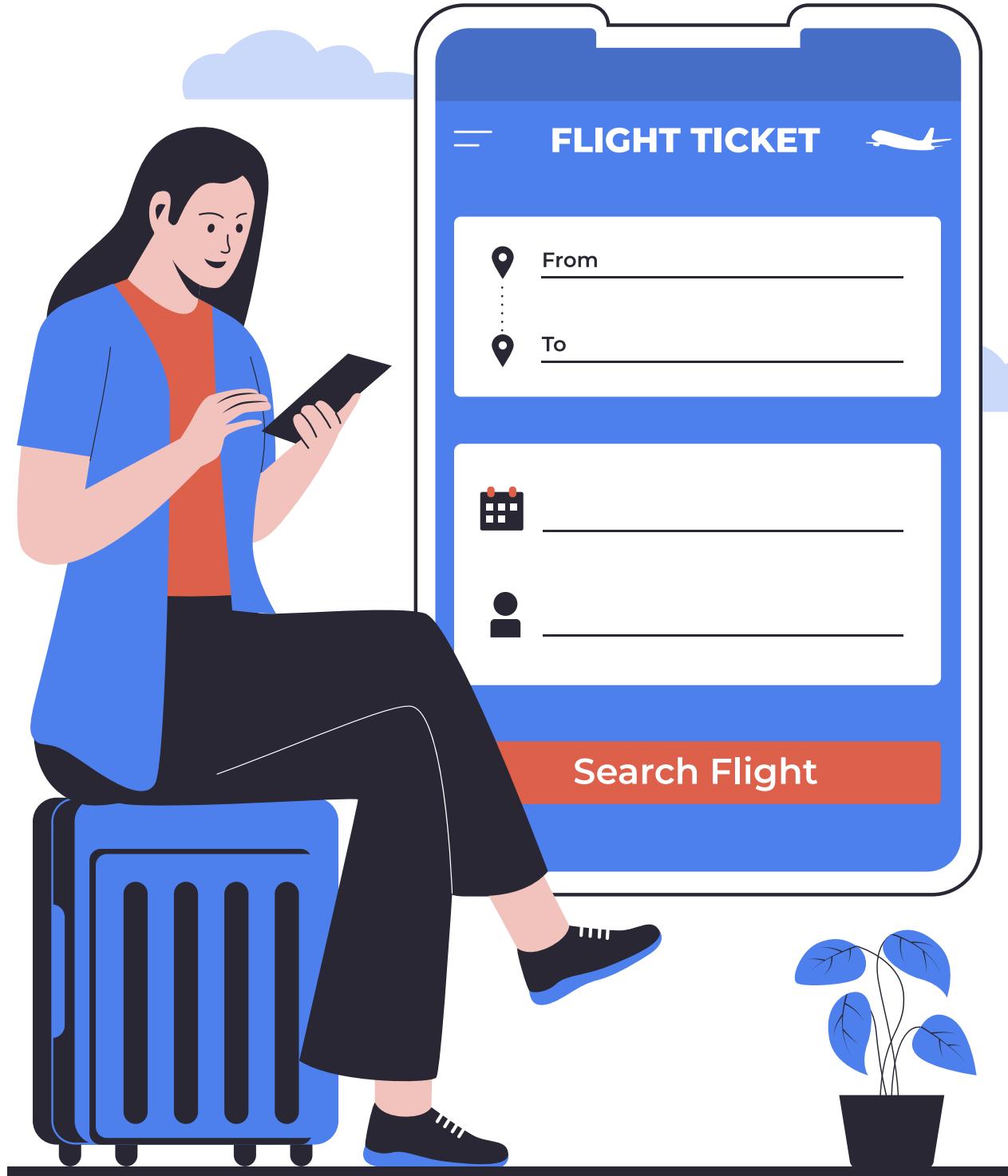


Insights #4 Class

Count of Satisfaction by Class



Insights #5 Overall



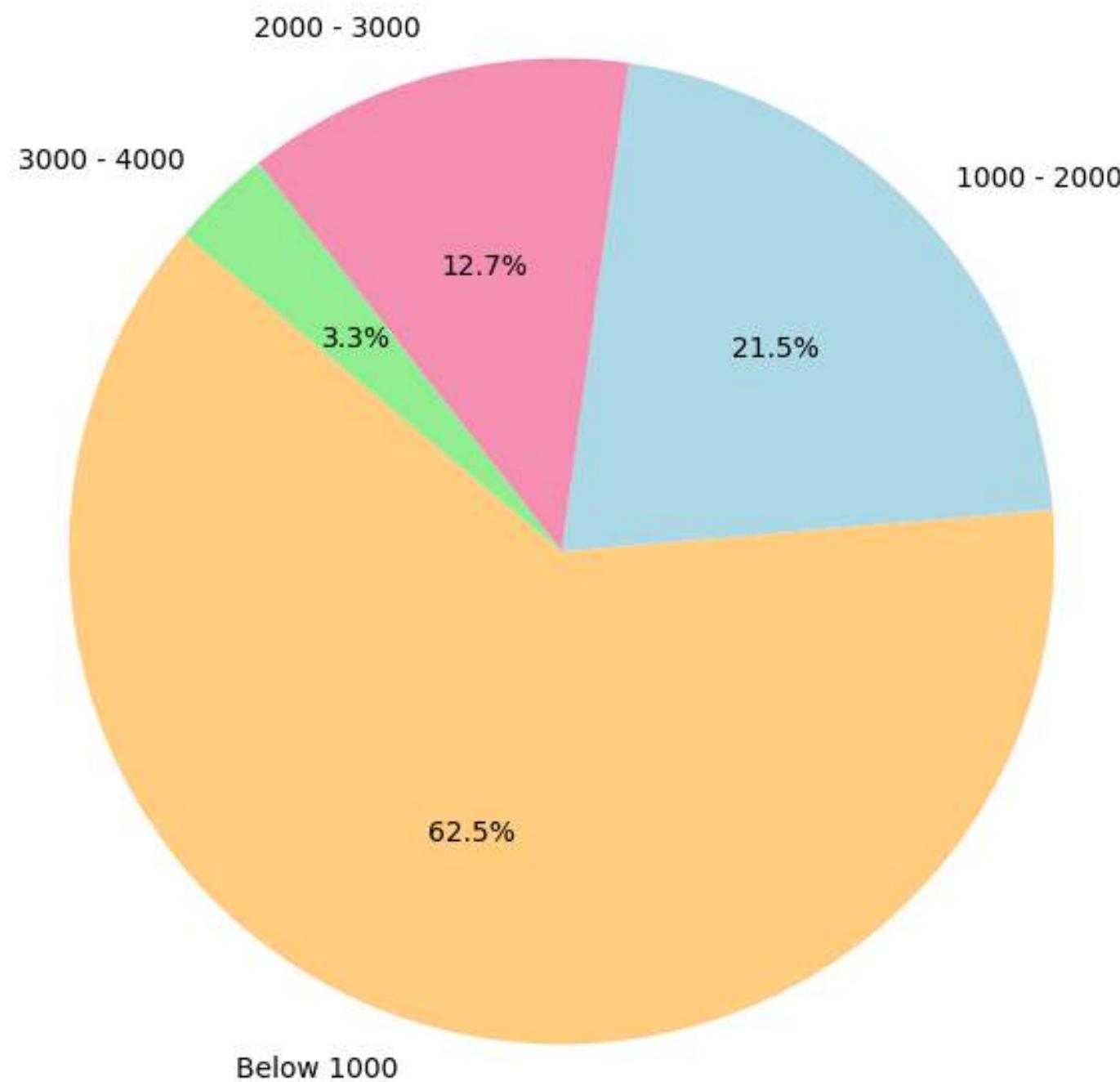
Top 3

1. In-Flight WIFI Service
2. Ease of Online Booking
3. Online Boarding

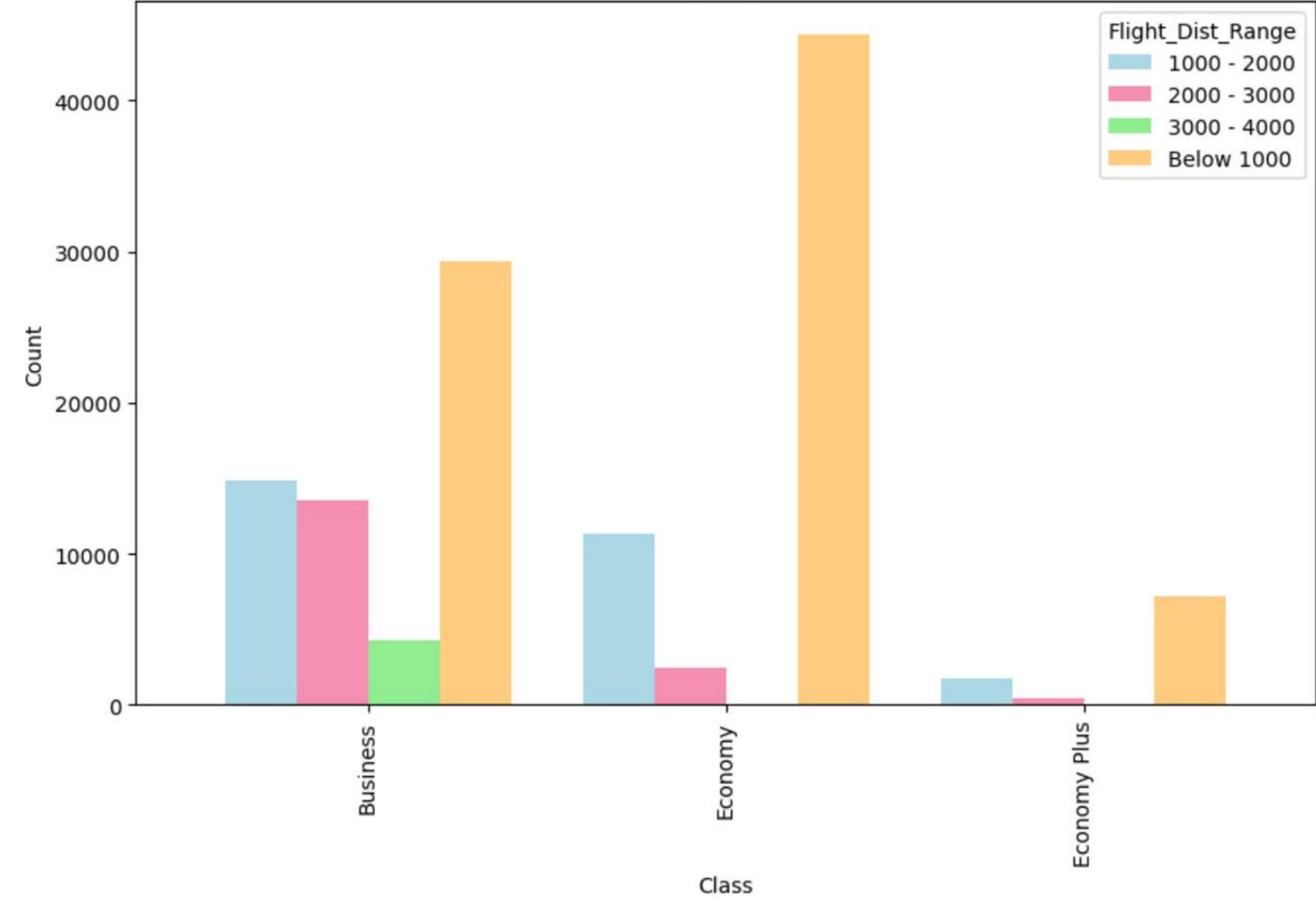


Insights #6 Flight Distance

Proportion of Flight Distantce

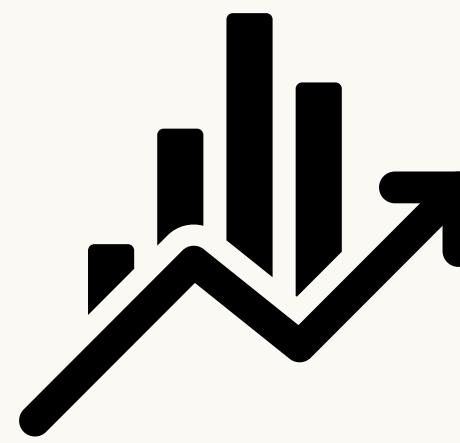


Count of Flight_Dist_Range by Class





IMPROVEMENT & MARKETING STRATEGY



ສຶກຮີພິເສບສໍາຫຼັບ ຜູ້ໄດຍສາրທີ່ໃຊ້ບົວລິການໃນຄຽງແຮກ



ສຶກຮີພິເສບສໍາຮັບ ຜູ້ໄດຍສາຣທີ່ໃຫ້ບົນກາຣໃນຄຣິ່ງແຮກ

ສ່ວນລດ 10%
ເມື່ອບັນຄຣິ່ງແຮກ

ຄຣິ່ງດັດໄປລດ 5%



(ກີ່ນັ້ນຕ້ອງເກົ່າເດີມຮັບອັນດັບຂຶ້ນ)

ອັນດັບກີ່ນັ້ນ
ໃນຮັບອັນດັບ
ກວ່າປົກຕົວ
ສູງສຸດ 15%
ເມື່ອຈອງອອນໄລນ໌
ຄຣິ່ງແຮກ
UPGRADE



ສຶກຮີພິເສບສໍາຮັບ ຜູ້ໄດຍສາຣທີ່ໃຫ້ບົນກາຣໃນຄຽງແຮກ

ສ່ວນລດ 10%
ເນື້ອບັນຄຽງແຮກ

ຄຽງດັດໄປລດ 5%



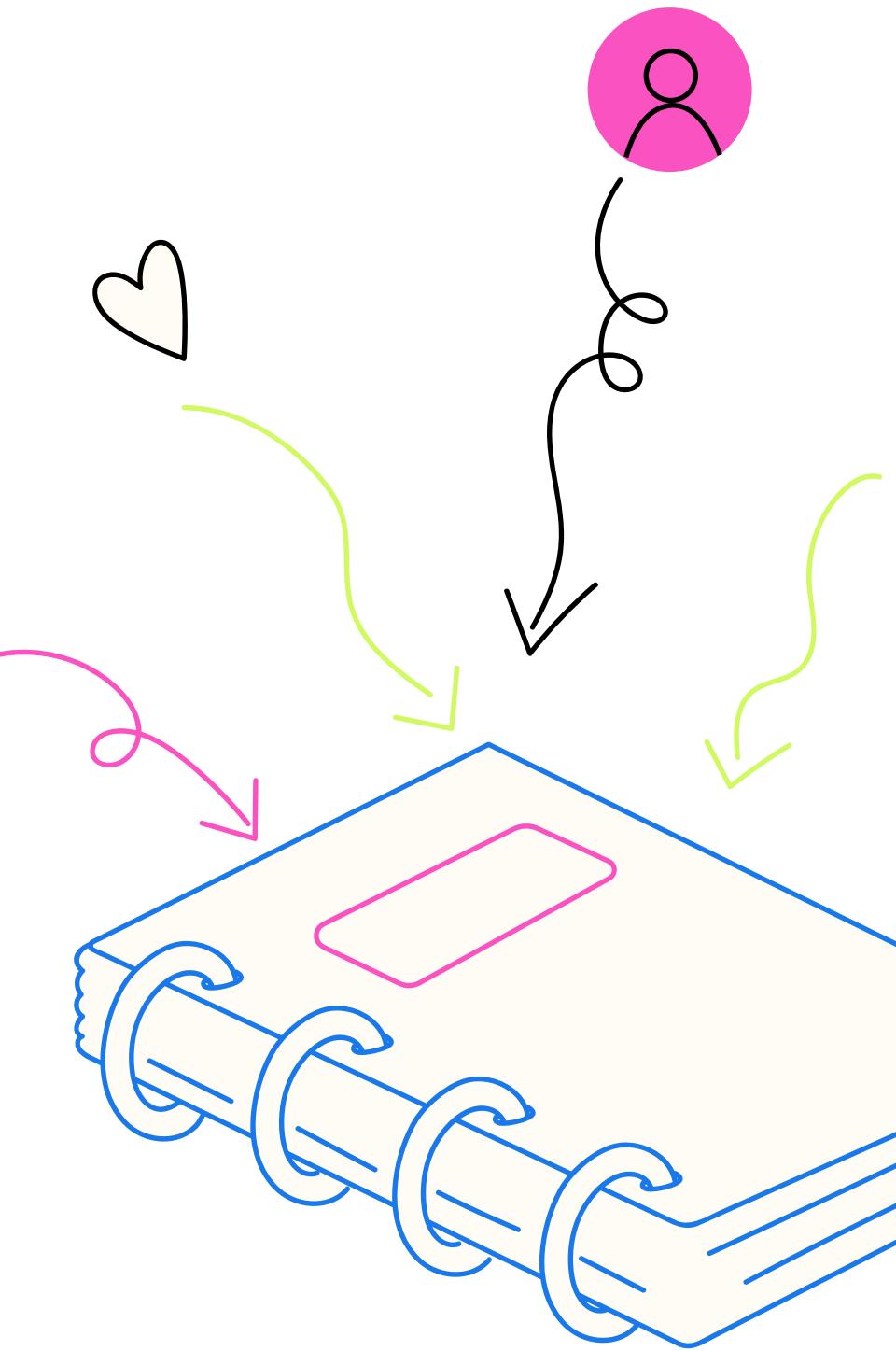
(ຖີ່ນັ້ນຕ້ອງເກົ່າເດີມຫຼືວັນກາຣຂຶ້ນ)

ວັພເກຣດຖີ່ນັ້ນ
ໃນຮາຄາທີ່ ດູກລົງ
ກວ່າປົກຕົວ
ສູງສຸດ 15%

ເນື້ອຈອງອອນໄລນ໌
ຄຽງແຮກ

UPGRADE

ເມື່ອຊັບບົນກາຣພິເສບ
ສັນກະຣະ
ວິສ
ອາຫາຣ
ບະເກີຍວັບນ



LOYAL BUSINESS



LOYAL BUSINESS



บริการรับส่ง
สนามบิน

WS



LOYAL BUSINESS



รับส่ง
ฟรี
ที่โรงแรม



สะสมไมล์ครบ
150,000
ไมล์
รับส่วนลดที่นั่ง
30%



แซร์ประสาการณ์
การบิน
BUSINESS CLASS
รับรางวัลพิเศษ
ส่วนลดในครั้ง
ถัดไป
หรือ
ไมล์ X2



NEW DESIGN UX/UI

กำคลิปໂປຣໂມກให้
ເປັນ ICONIC
ຂອງສາຍການບັນ

ແນະນຳການໃຊ້ຈຳນວນບົດການ
ຕ່າງໆໃນສາຍການບັນ



ຄລິກເດືອຍວັບນໄດ້
ໄວນຈ່າຍ ໄມຍາກ

ແຈ້ງເຕັ້ວນເນື່ອໄກລັດຶ່ງ
ເວລາບັນ

Conclusion



01
Hypothesis
Cramer's V



02
Insight
สร้างกราฟ



03
Improvement &
Marketing
Strategy

THANK YOU



MEMBERS

KANTIMA
6624650146



DUANGJAI
6624650245



THANAWAN
6624650252



CHADAPA
6624650187



រាបូលសមាជិក

6624650146 ការព័ត៌មាន ពាណិជ្ជប័ណ្ណ

6624650187 ខ្សោយការ នាមរោង

6624650245 ទំនាក់ទំនងអគ្គិសន៍

6624650252 ឯកសារយោង និងការងារ