

CAPSTONE PROJECT OF  
EDA ON  
**TELECOM CHURN ANALYSIS**

TEAM MEMBERS

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# **INTRODUCTION**



- **Customer churn means shifting from one service provider to its competitor in the market.**
- **Customer churn is a major problem and one of the most important concerns for large companies. Due to the direct effect on the revenues of the companies.**
- **The average churn rate in telecom companies is 22% which is the most among other companies like IT(19%) and professional service(16%).**
- **Losing customers is costly for any business. As per the authors of “Leading on the Edge of Chaos” [1], a 2% decrease in customer churn is equivalent to 10% reduction in costs.**

# **BUSINESS PROBLEMS**



- **Customer churn can down the company revenue with a major extent.**
- **Consumers today go through a complex decision making process before subscribing to any one of the numerous telecom operator.**
- **Moreover, as per the White House Office of Consumer Affairs [2], acquiring new customers is 6–7 times more expensive than retaining an old one.**
- **Loyalty of customers becomes an issue for the companies.**
- **Identifying unhappy customers early, taking into consideration their values and the risk to churn, give you a chance to offer them incentives to stay.**

# DATA SUMMARY



- This is The Orange Telecom Churn Dataset. In the below table it's show the top and bottom 5 rows respectively

	State	Account length	Area code	International plan	Voice mail plan	Number vmail messages	Total day minutes	Total day calls	Total day charge	Total eve minutes	Total eve calls	Total eve charge	Total night minutes	Total night calls	Total night charge	Total intl minutes	Total intl calls	Total intl charge	Customer service calls	Churn
0	KS	128	415	No	Yes	25	265.1	110	45.07	197.4	99	16.78	244.7	91	11.01	10.0	3	2.70	1	False
1	OH	107	415	No	Yes	26	161.6	123	27.47	195.5	103	16.62	254.4	103	11.45	13.7	3	3.70	1	False
2	NJ	137	415	No	No	0	243.4	114	41.38	121.2	110	10.30	162.6	104	7.32	12.2	5	3.29	0	False
3	OH	84	408	Yes	No	0	299.4	71	50.90	61.9	88	5.26	196.9	89	8.86	6.6	7	1.78	2	False
4	OK	75	415	Yes	No	0	166.7	113	28.34	148.3	122	12.61	186.9	121	8.41	10.1	3	2.73	3	False

	State	Account length	Area code	International plan	Voice mail plan	Number vmail messages	Total day minutes	Total day calls	Total day charge	Total eve minutes	Total eve calls	Total eve charge	Total night minutes	Total night calls	Total night charge	Total intl minutes	Total intl calls	Total intl charge	Customer service calls	Churn
3328	AZ	192	415	No	Yes	36	156.2	77	26.55	215.5	126	18.32	279.1	83	12.56	9.9	6	2.67	2	False
3329	WV	68	415	No	No	0	231.1	57	39.29	153.4	55	13.04	191.3	123	8.61	9.6	4	2.59	3	False
3330	RI	28	510	No	No	0	180.8	109	30.74	288.8	58	24.55	191.9	91	8.64	14.1	6	3.81	2	False
3331	CT	184	510	Yes	No	0	213.8	105	36.35	159.6	84	13.57	139.2	137	6.26	5.0	10	1.35	2	False
3332	TN	74	415	No	Yes	25	234.4	113	39.85	265.9	82	22.60	241.4	77	10.86	13.7	4	3.70	0	False

# DATA DICTIONARY



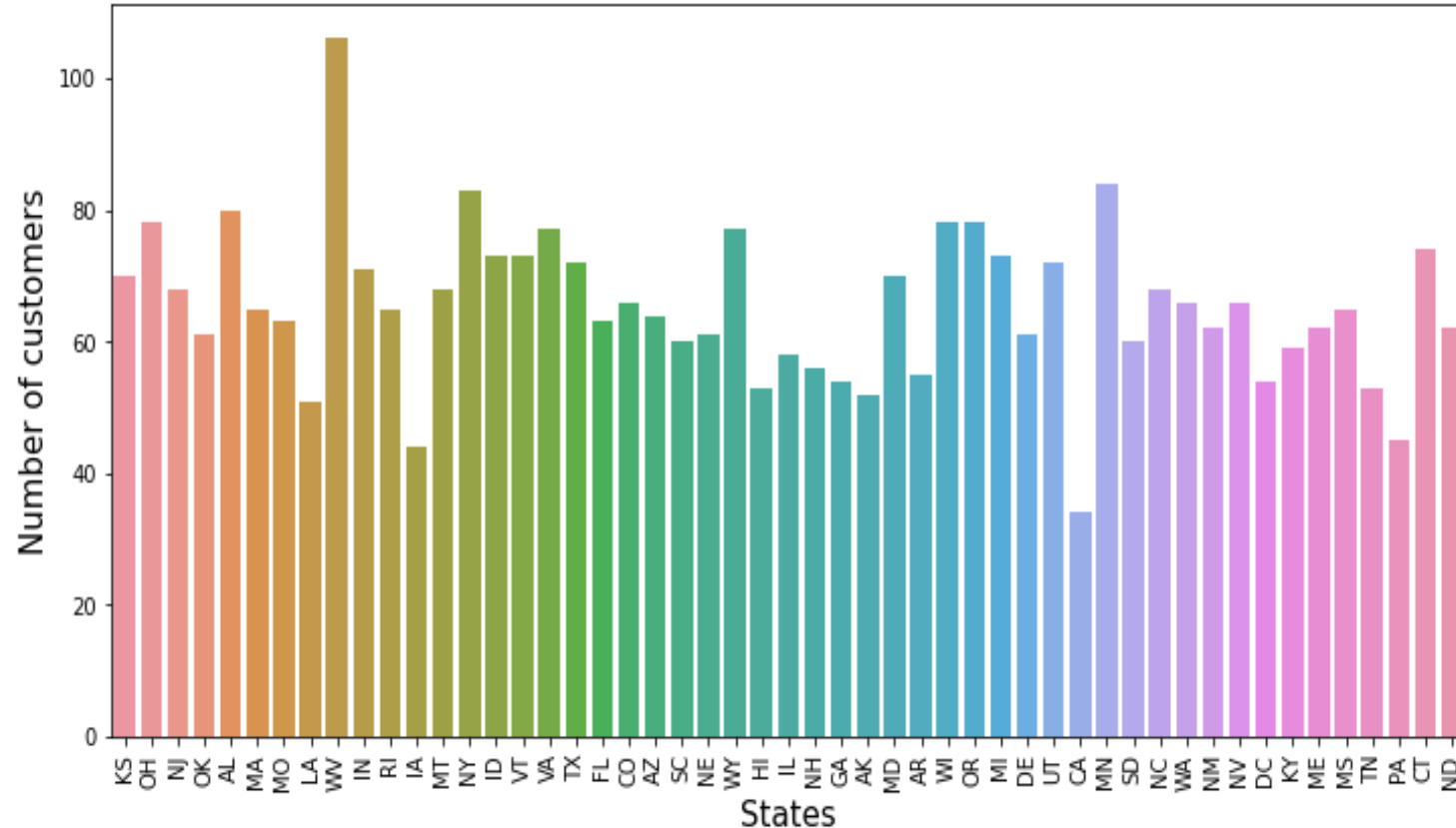
•State	: the state in which the customer resides, indicated by a two-letter abbreviation
•Account Length	: the number of days that this account has been active
•Area Code	: the three-digit area code of the corresponding customer
•International Plan	: whether the customer has an international calling plan: (yes/no)
•Voice Mail Plan	: whether the customer has a voice mail feature: (yes/no)
•Number VMail Message	: the average number of voice mail messages
•Total Day Mins	: the total number of calling minutes used during the day
•Total Day Calls	: the total number of calls placed during the day
•Total Day Charge	: the billed cost of daytime calls
•Total Eve Mins	: the total number of calling minutes used during the evening
•Total Eve Calls	: the total number of calls placed during the evening
•Total Eve Charge	: the billed cost of evening time calls
•Total Night Mins	: the total number of calling minutes used during the night
•Total Night Calls	: the total number of calls placed during the night
•Total Night Charge	: the billed cost of nighttime calls
•Total Intl Mins	: the total number of international minutes
•Total Intl Calls	: the total number of international calls
•Total Intl Charge	: the billed cost for international calls
•Customer Service Calls	: the number of calls placed to Customer Service
•Churn	: whether the customer left the service: true/false

# DATA INSIGHTS

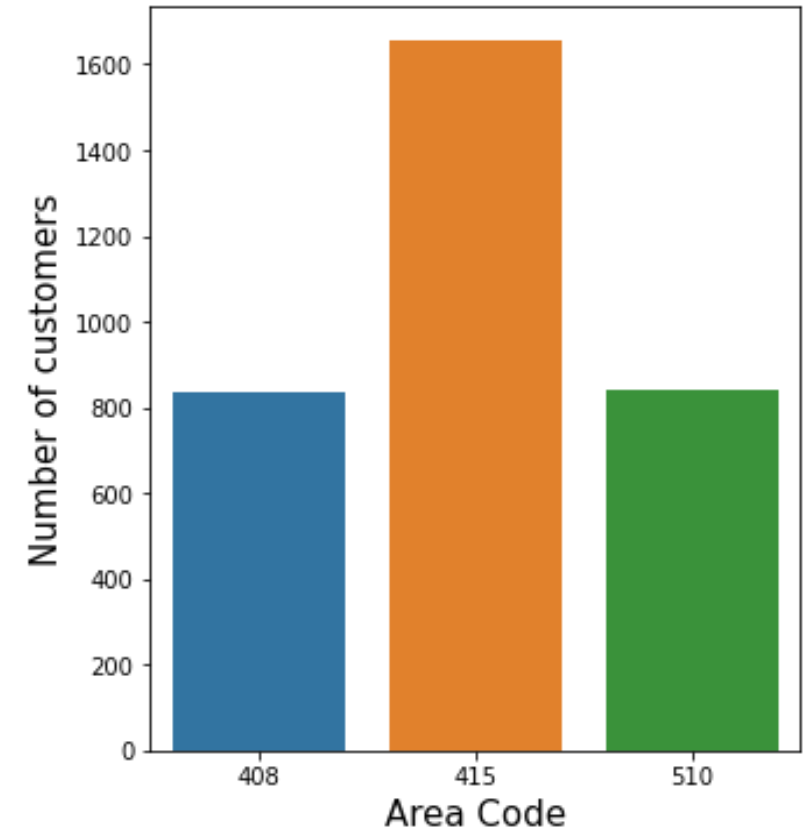
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- There are 51 different states which is distributed among 3 area codes such as 408, 415, 510.
- The state code 'WV' has the maximum number of customers while the state code 'CA' has the minimum customers.
- For the area code 415 the number of customer are the maximum.

State wise customer number



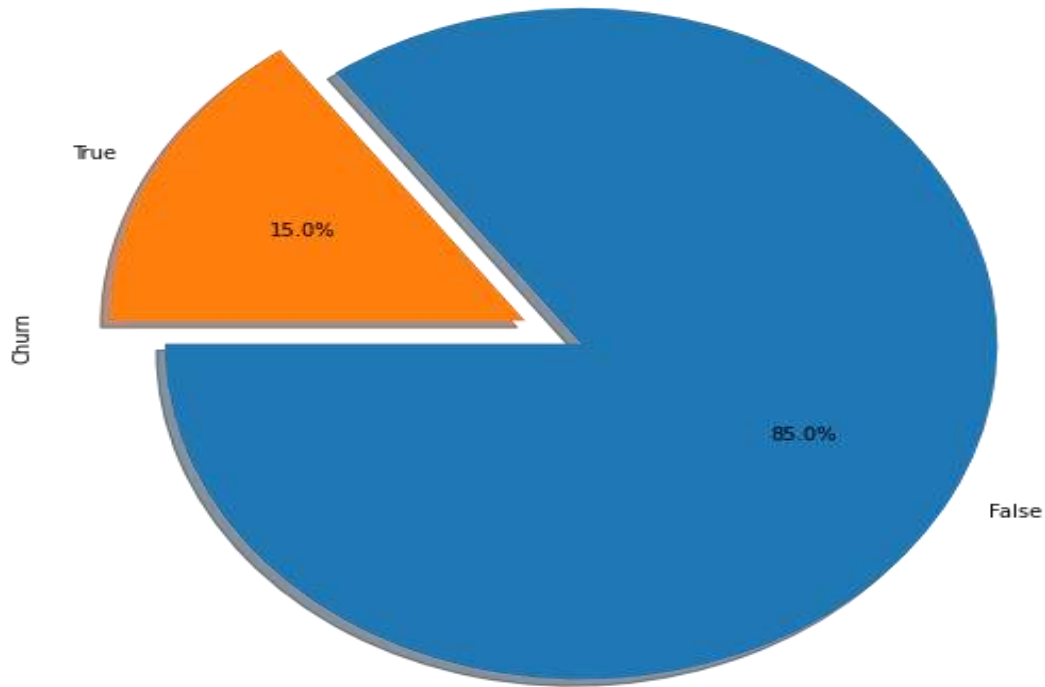
Area Code wise customer number



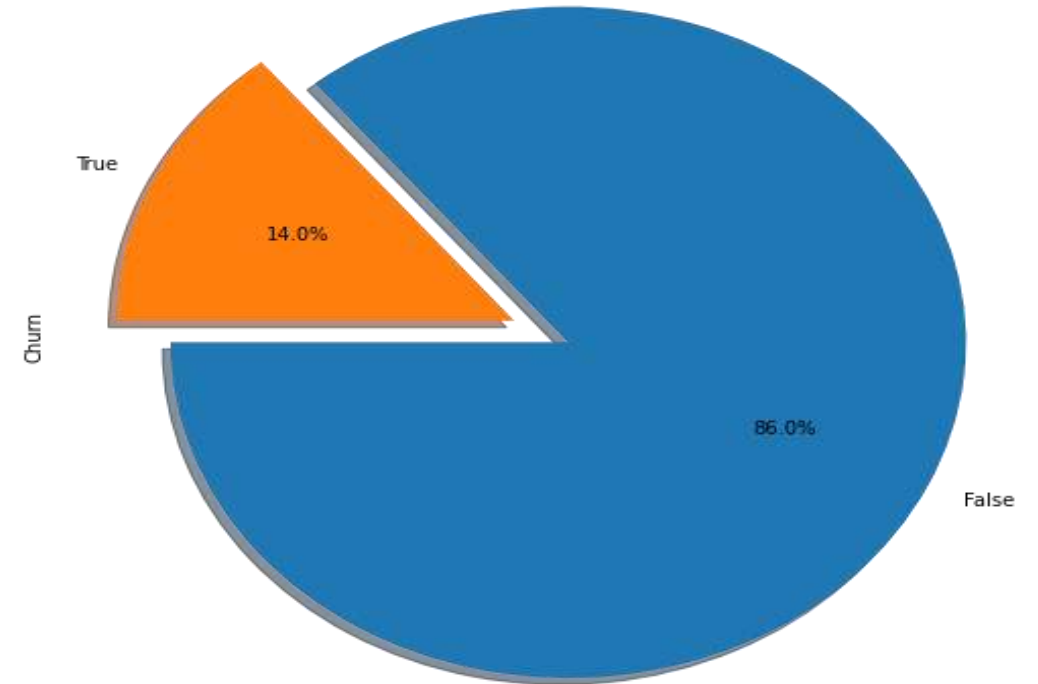
# DATA INSIGHTS(CONT.)



CHURNED REGULAR CUSTOMER'S CHART



New comer vs Churn

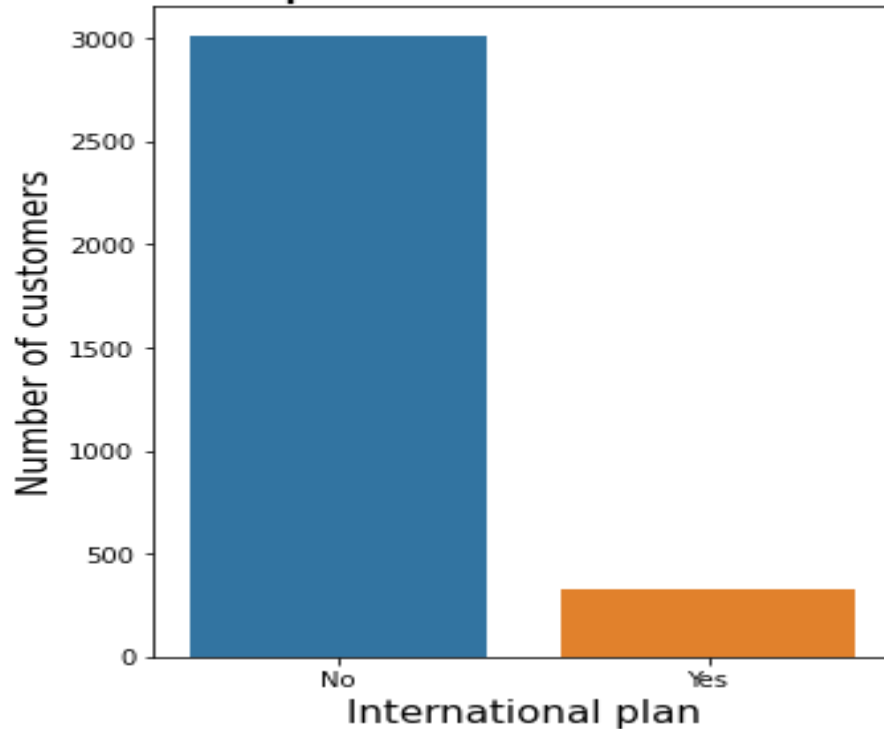


- Here we may conclude that the percentage of churning is same for both regular and new comers.



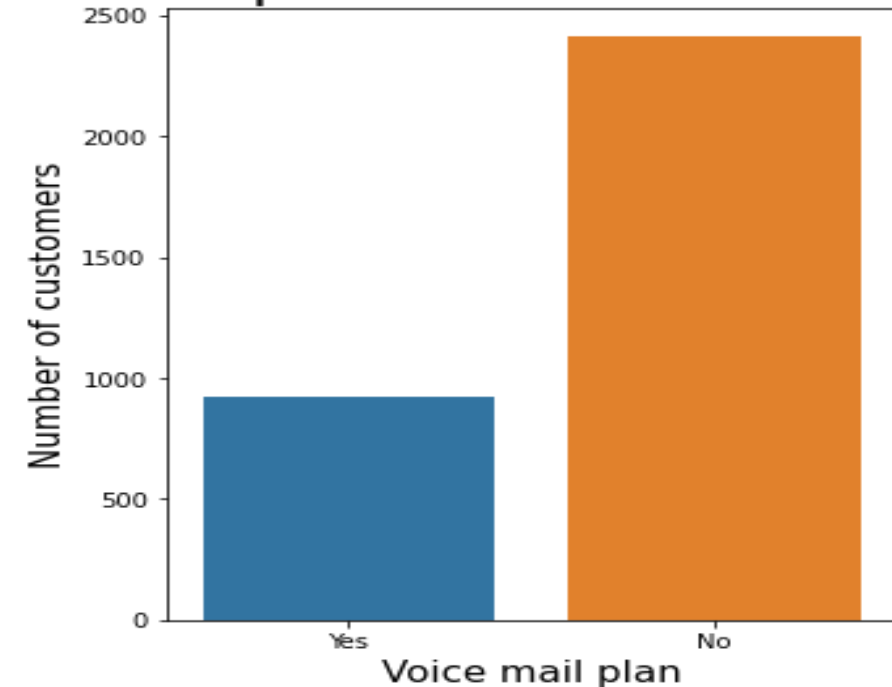
## DATA INSIGHTS(CONT.)

### International plan wise customer number



- **Number of international Plan**  
No 3010 = 90.309031%  
Yes 323 = 9.690969%
- **Number of voice mail Plan**  
No 2411 = 72.337234%  
Yes 922 = 27.662766%

### Voice mail plan wise customer number

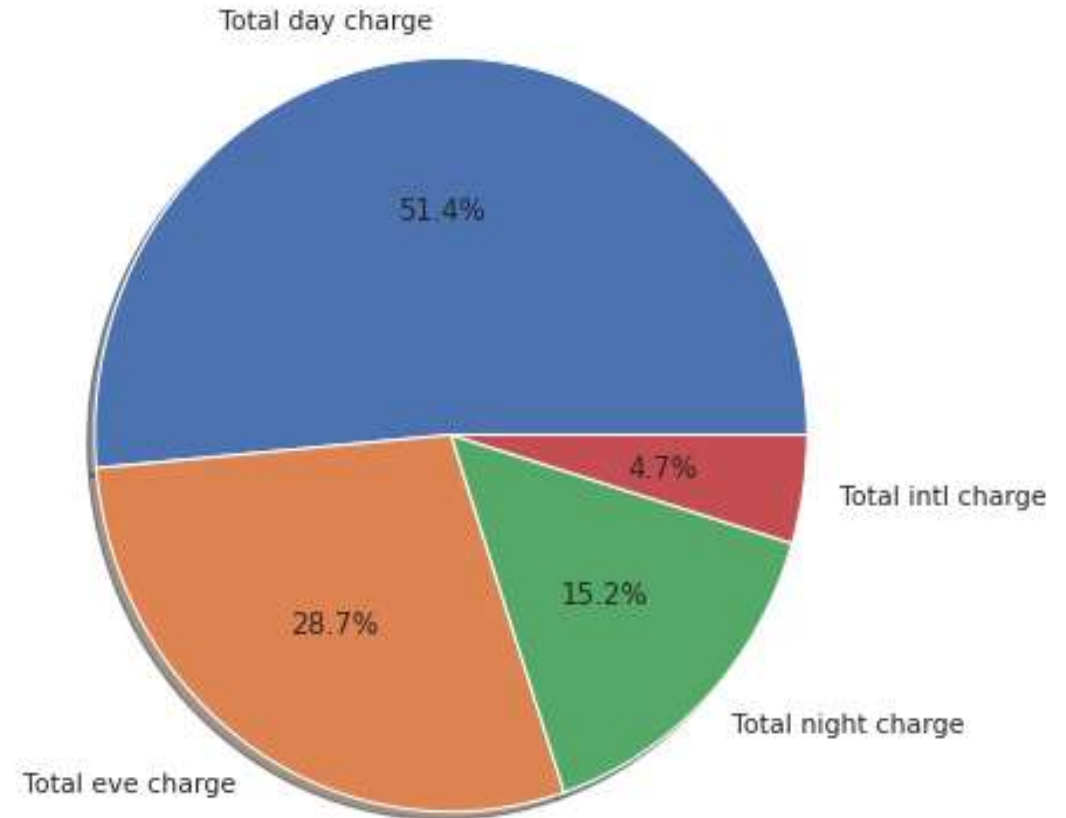


- In both the cases the number of customers is very low.

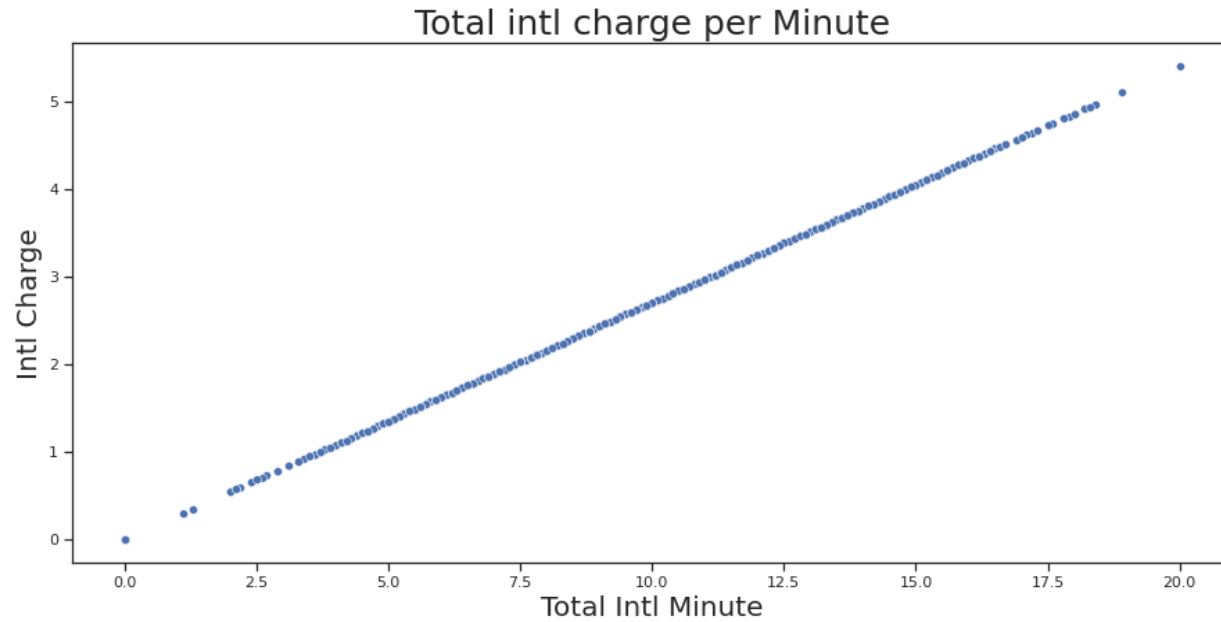
## DATA INSIGHTS(CONT.)

- This plot shows the total revenue percentages of calls for the company.
- From this chart we conclude that Total day charge is the highest and Total international charge is the lowest.

Total Charges Distribution Of All Customers

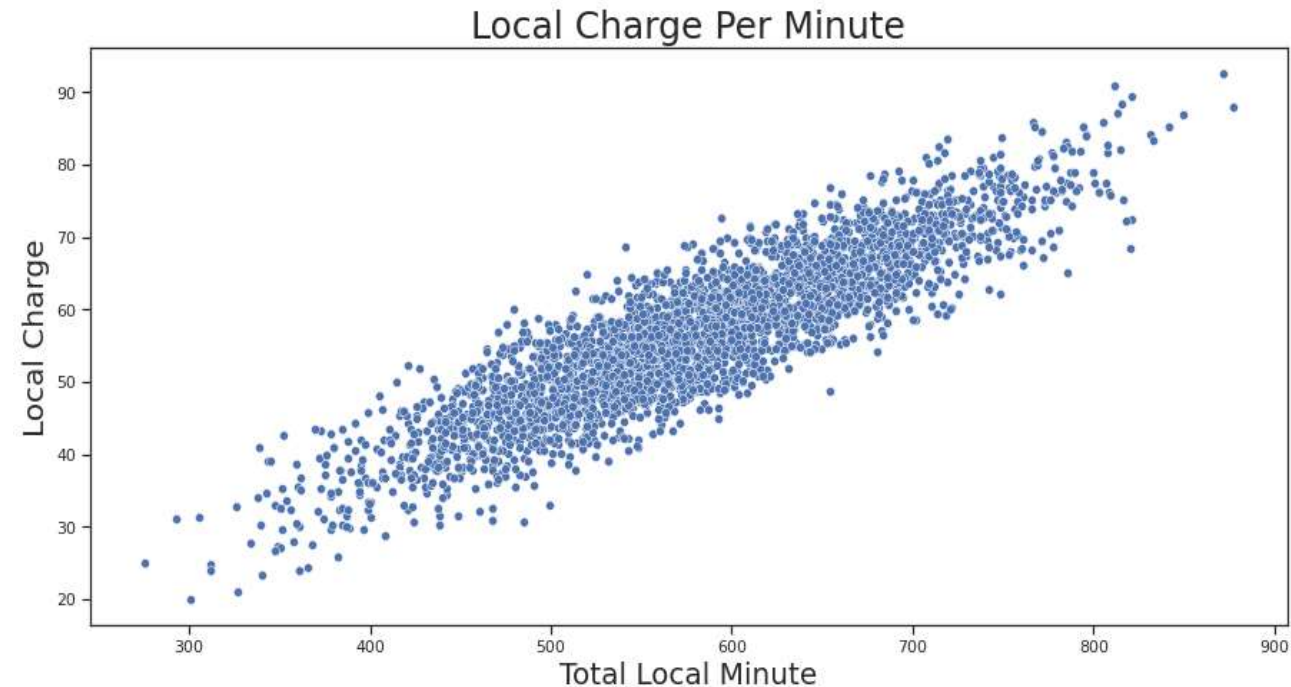


# DATA INSIGHTS(CONT.)



- Intl charge per minute for each customer is constant.

- But Day charge , eve charge and night charge per minute for different states are different.

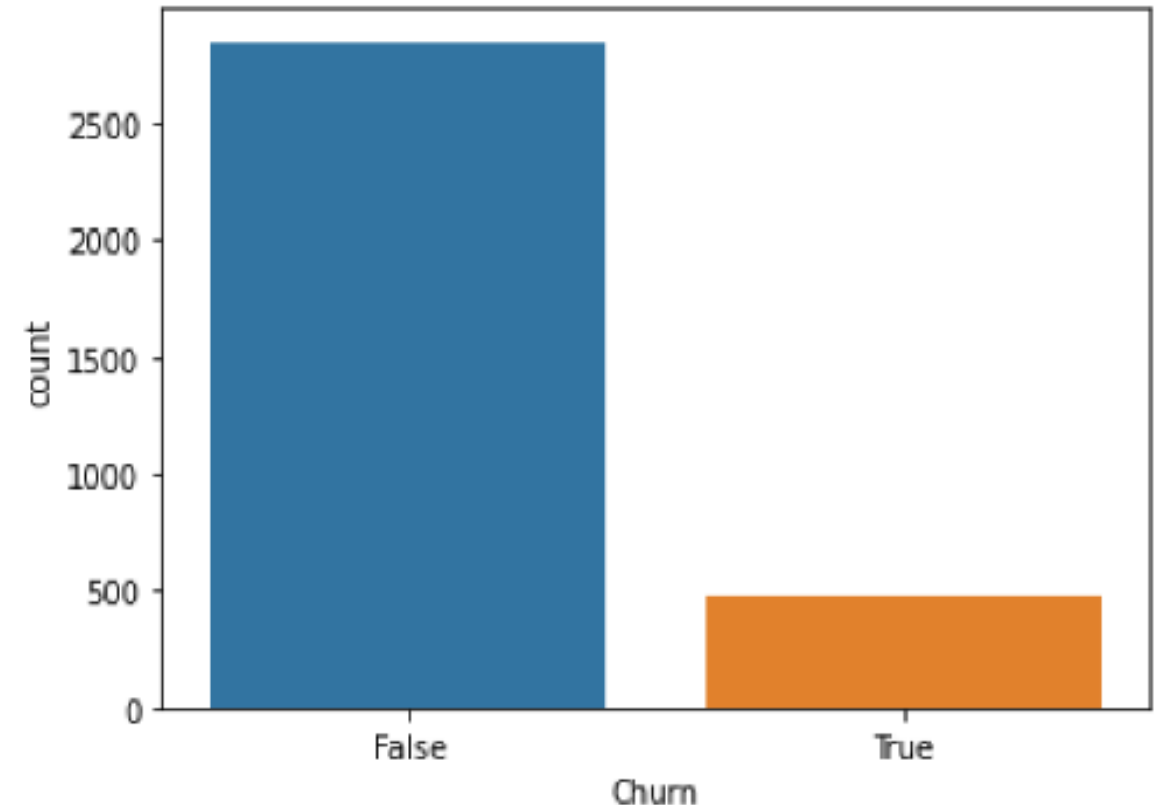
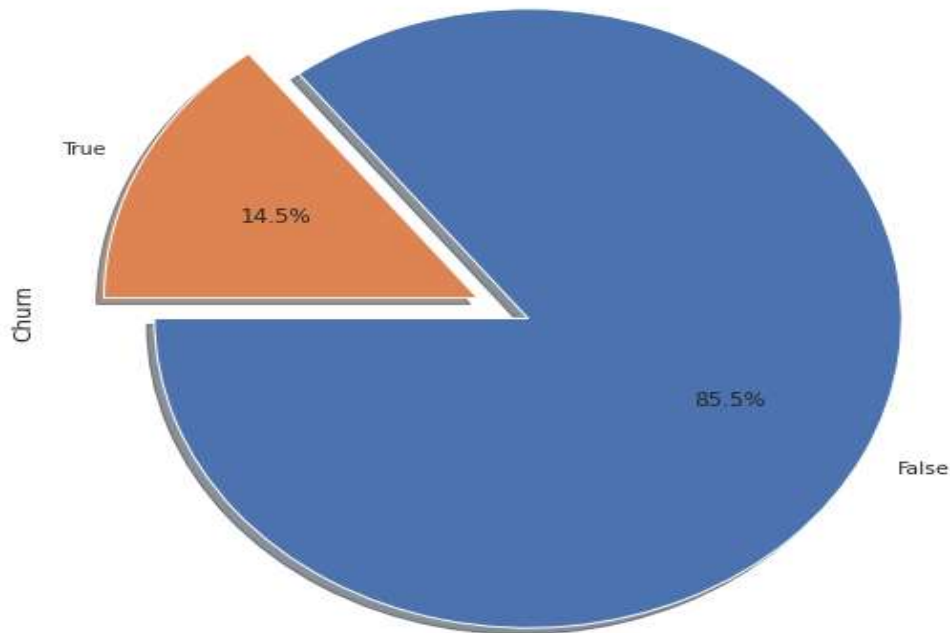


# CHURN COUNT

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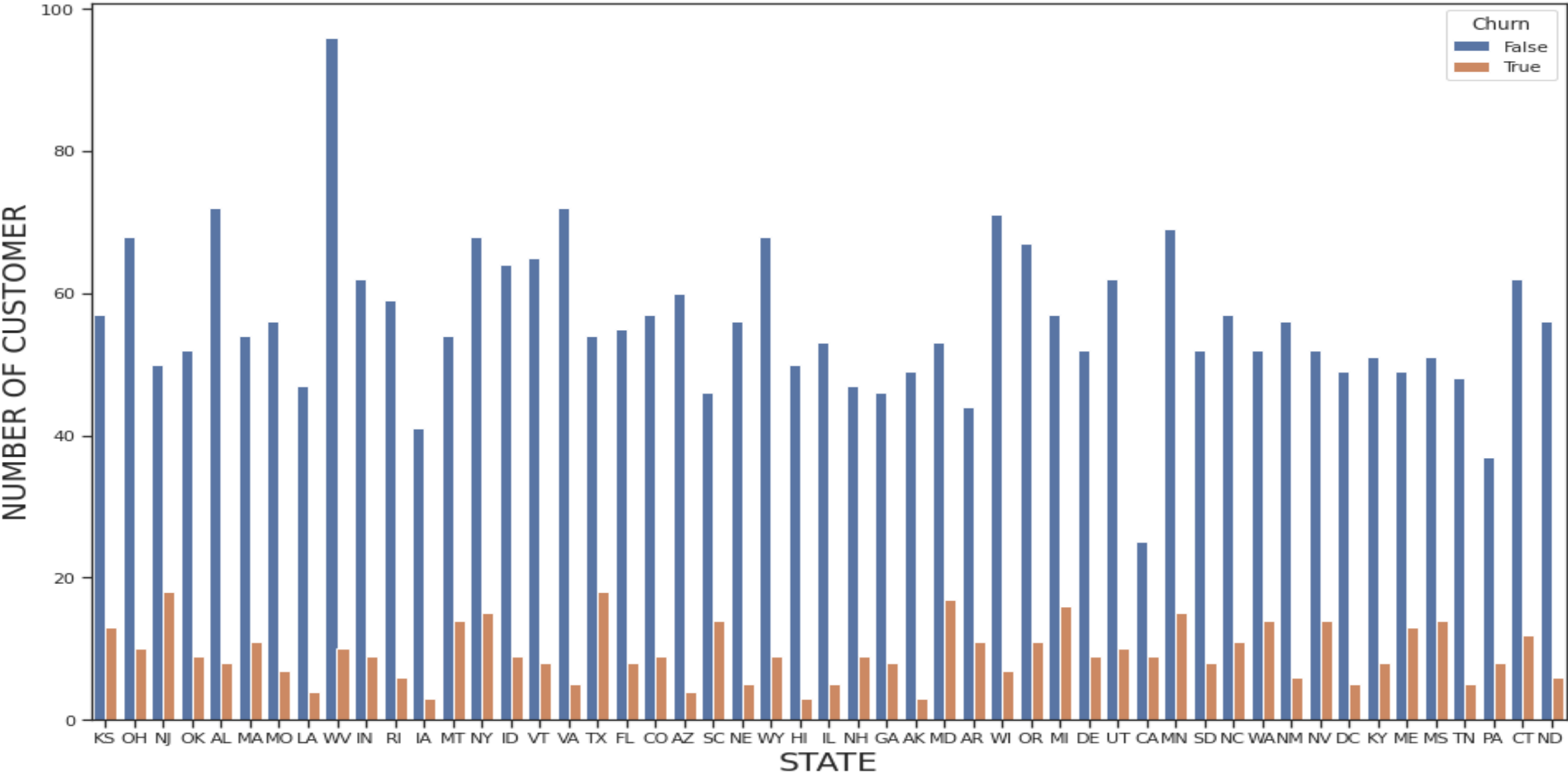
- Here we come to know that out of 3333 peoples 483 people have churned from the service whereas 2850 people still continuing.
- We get to know that 14.5 percent of customers got churned and 85.5 percent of customers get remain with the company.

CHURNED CUSTOMER'S CHART



# DATA ANALYSIS

# STATE WISE CHURN COUNT



# STATE WISE CHURN COUNT(CONT.)

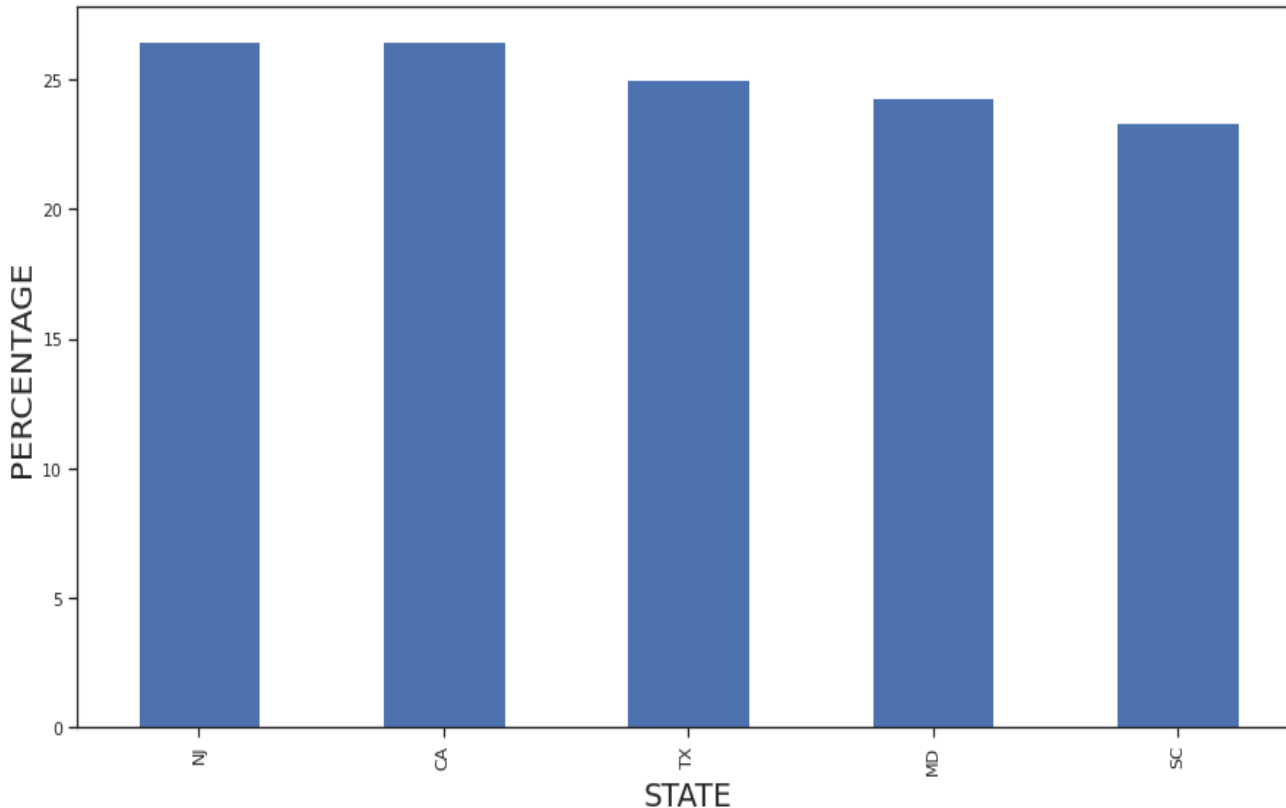


- Churn Rate is maximum in states CA, NJ, TX and Churn Rate is minimum in states AK, AZ, HI.

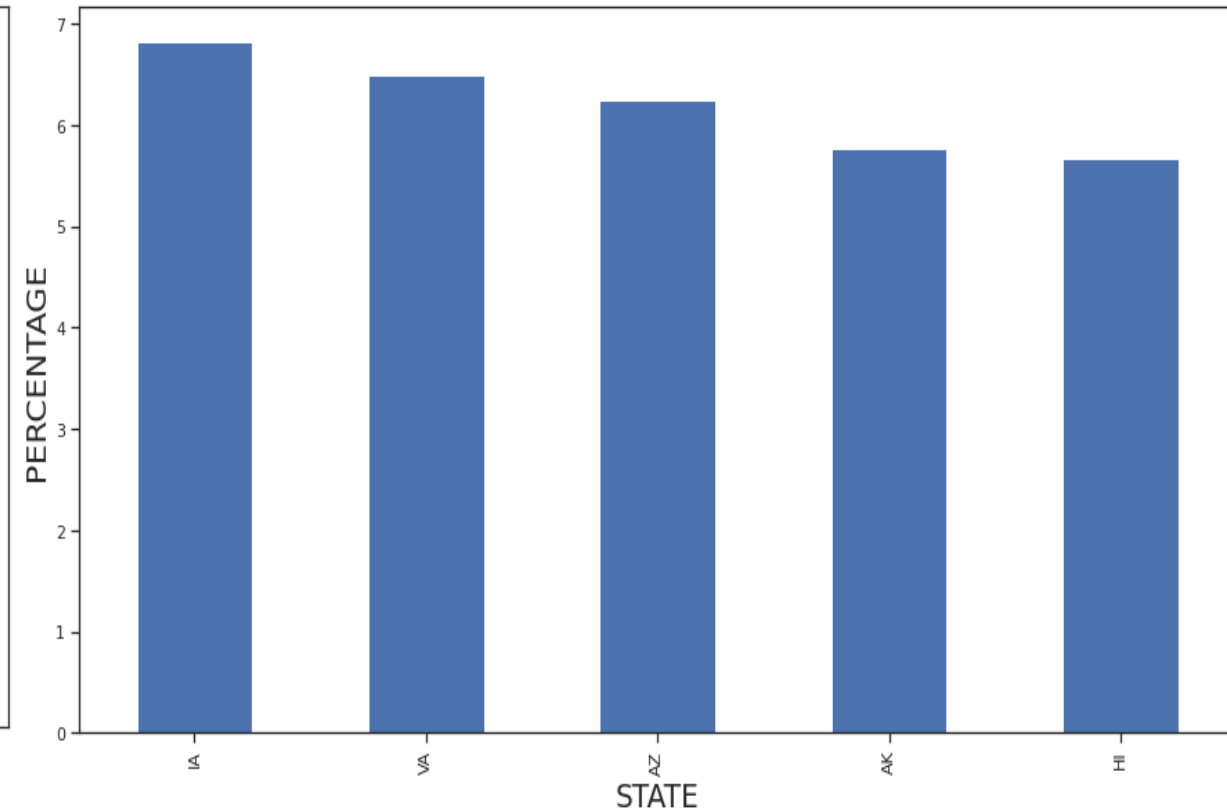
# STATE WISE CHURN COUNT(CONT.)



TOP 5 STATES WITH HIGHEST CHURN



LEAST 5 STATES WITH LOWEST CHURN



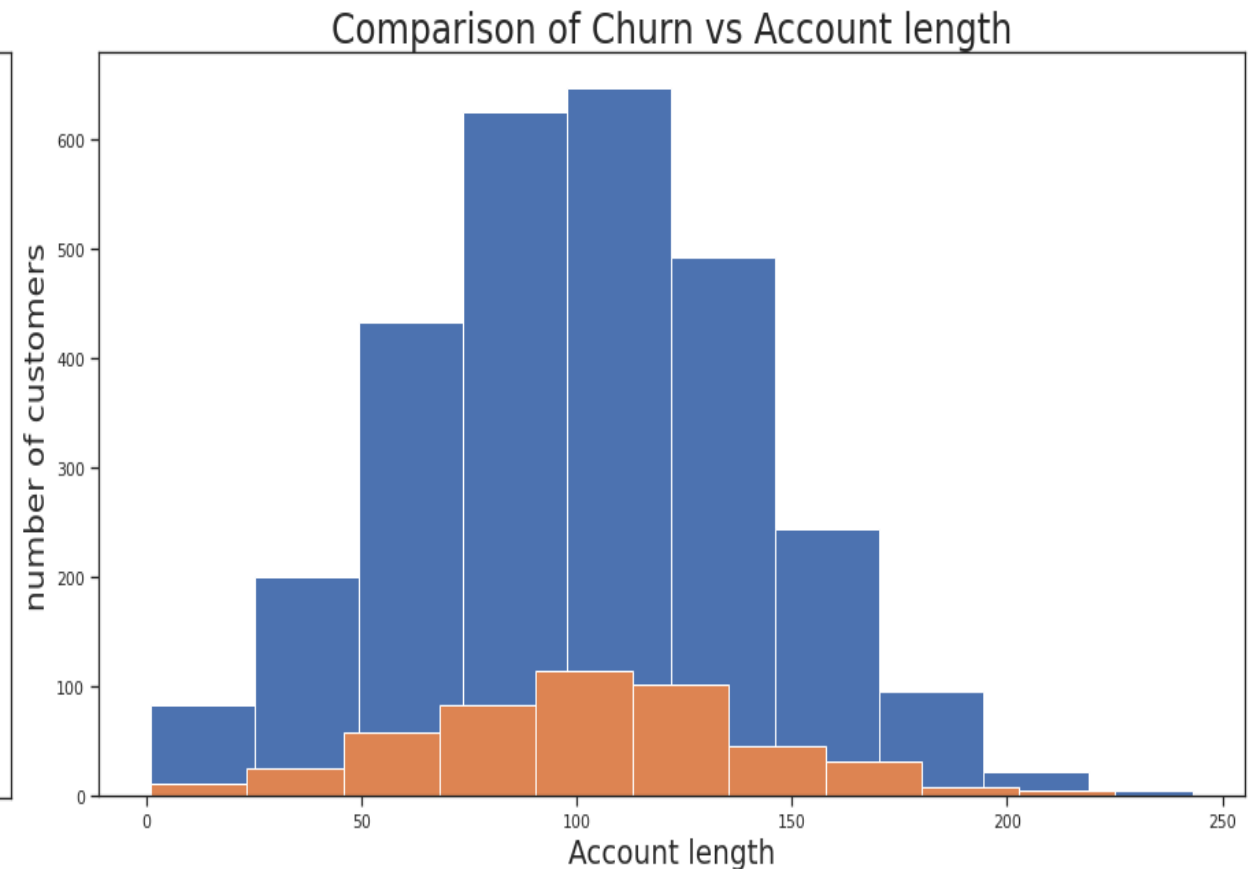
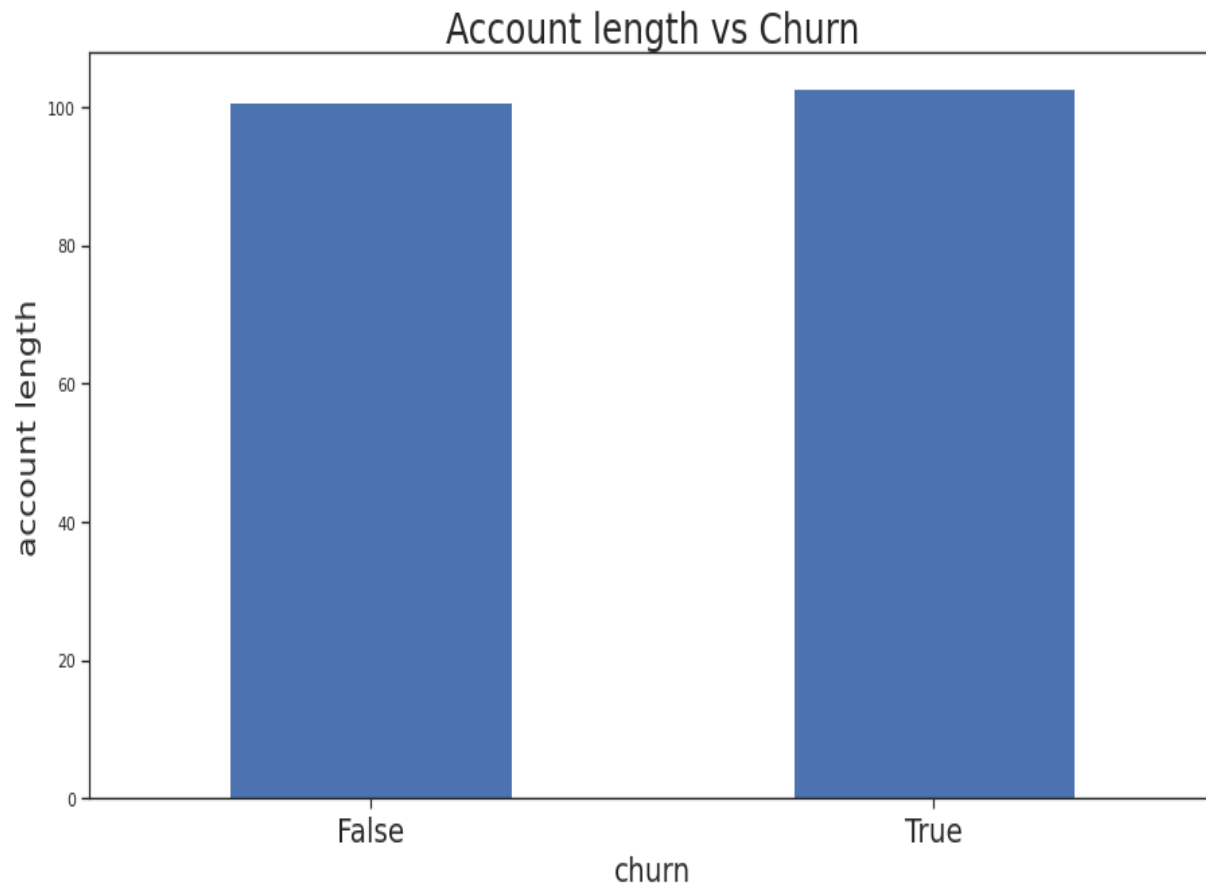
- Here we can say that top 5 states which have highest number of churn percentage are (IN,CA,TX,MD,SC). These states have to be careful towards customer because their losing percentage is very high.
- Here We Can Say That Top 5 States Which Have Lowest Number Of Churn Percentage Are (IA,VA,AZ,AK,HI) So By Analysis We Get To Know That They Provided Good Services Compare With Other States.



# ACCOUNT LENGTH vs CHURN COUNT

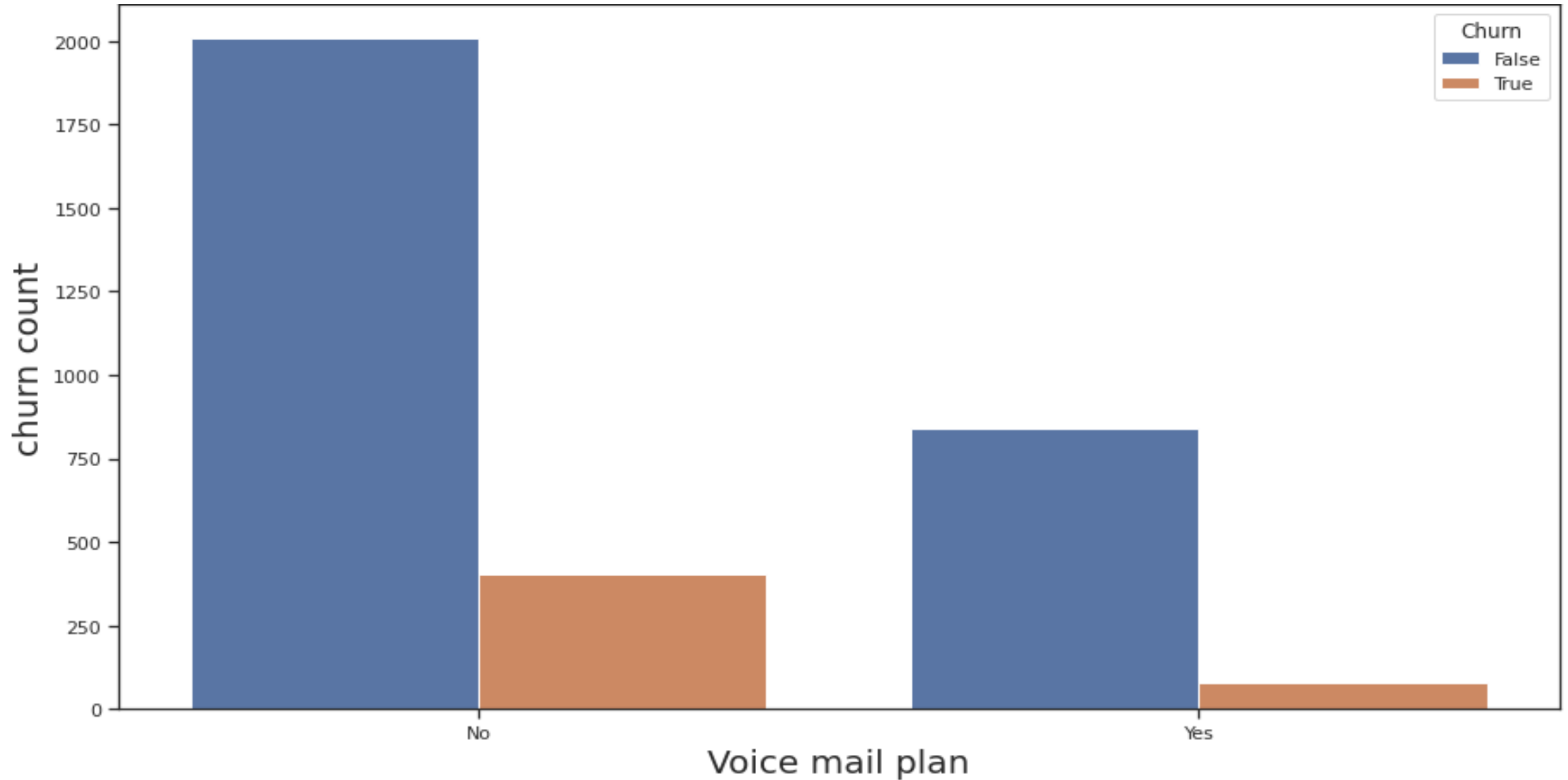


- The churn rate is proportional according to the account length.
- The churned people and non-churned people have almost same average of account length

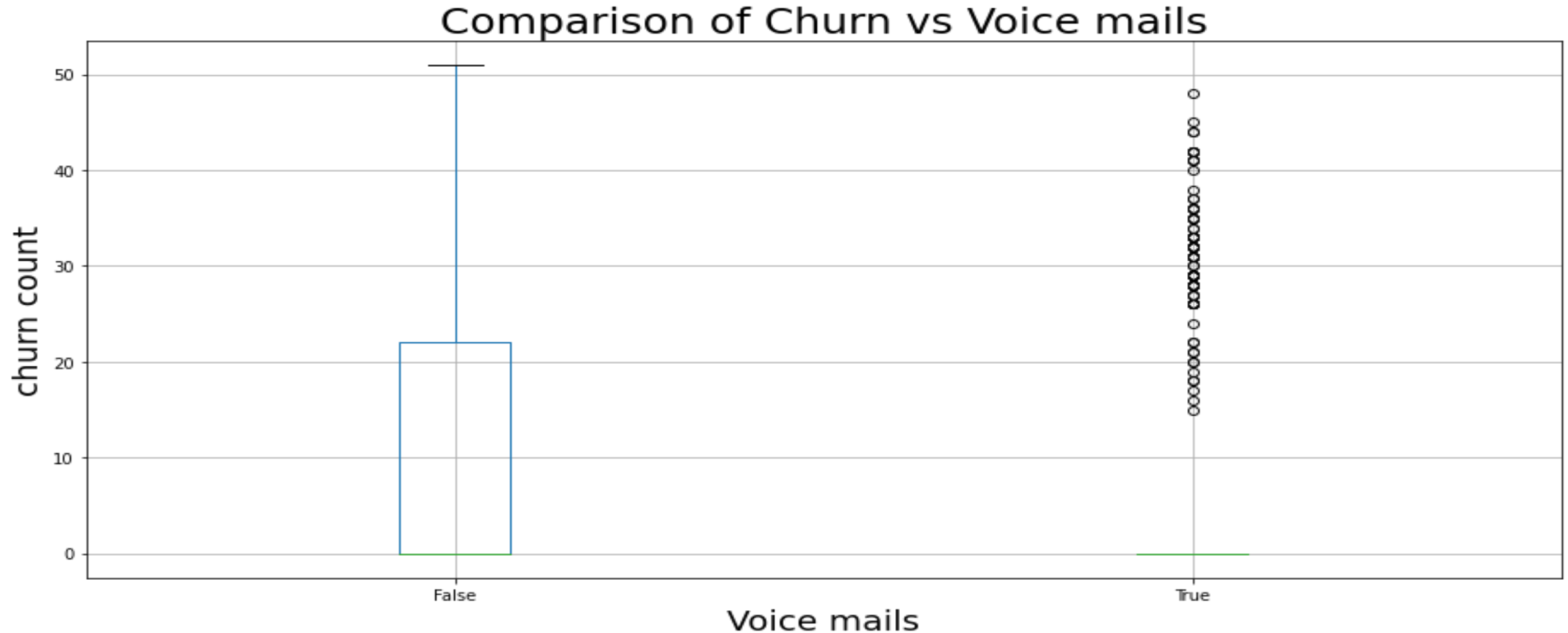


# VOICE MAIL vs CHURN COUNT

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# VOICE MAIL vs CHURN COUNT(CONT.)

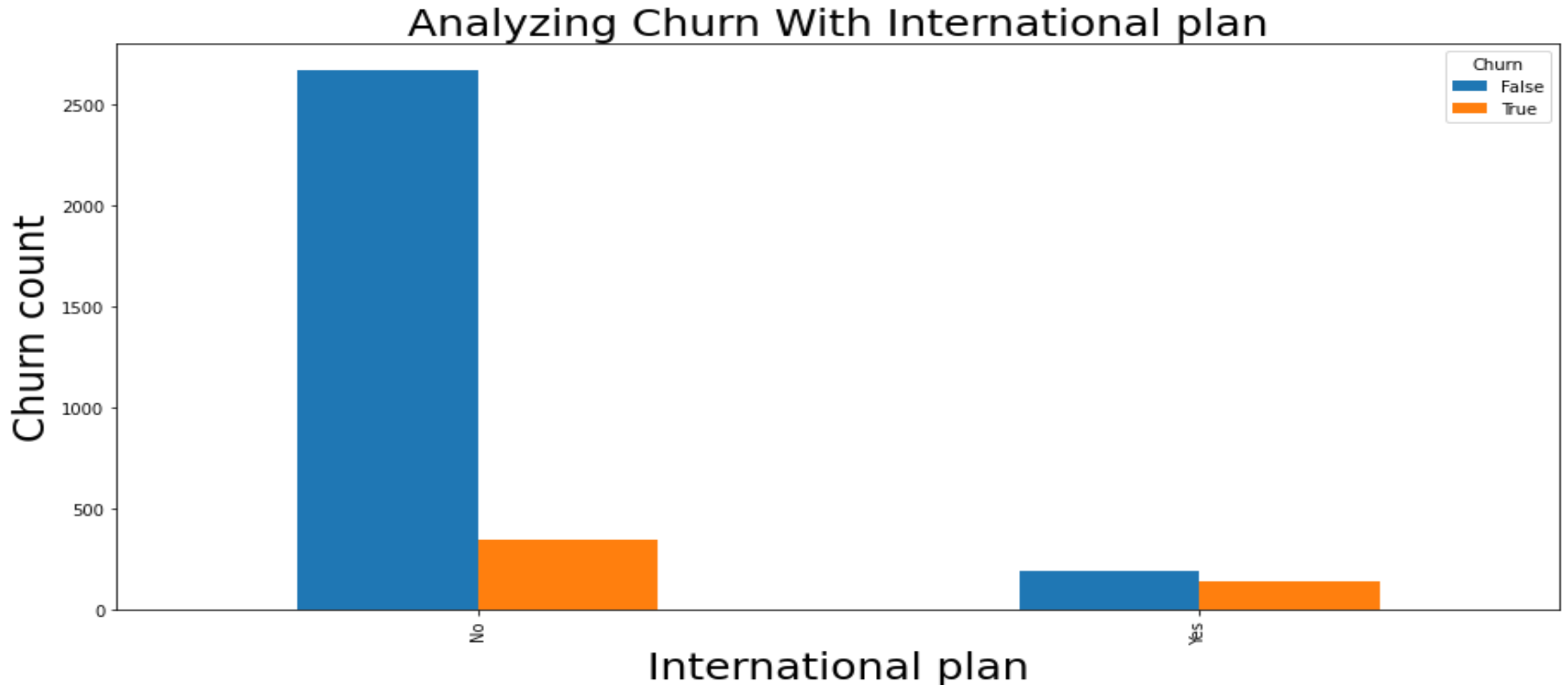


- Here we can say that if the number of voice message is more than 20 Then there shows a churning.

# INTERNATIONAL PLAN vs CHURN

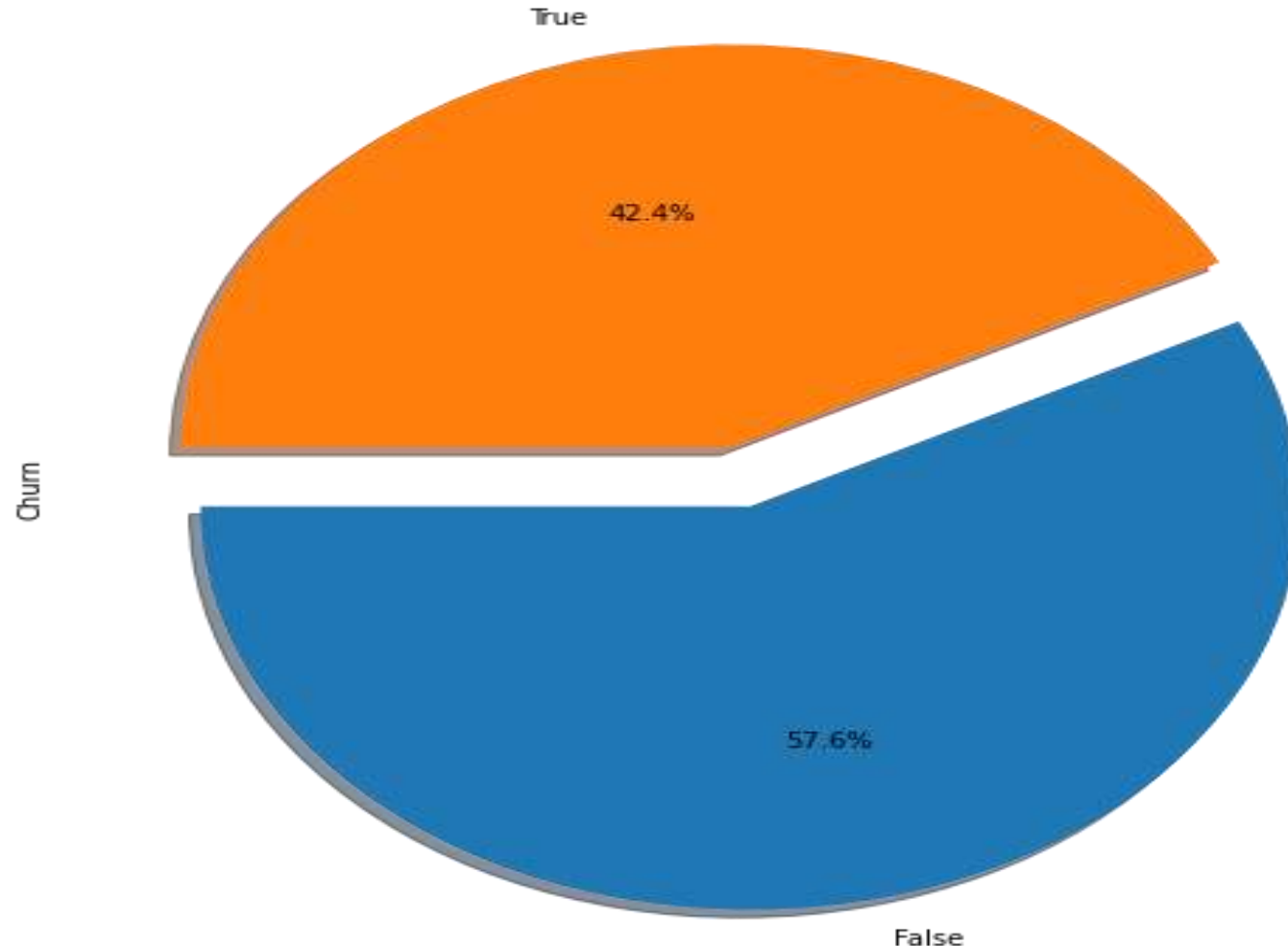
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- Now the major cause shows that, the number of active international plans make a good cause for the people for churning.



# INTERNATIONAL PLAN vs CHURN (CONT.)

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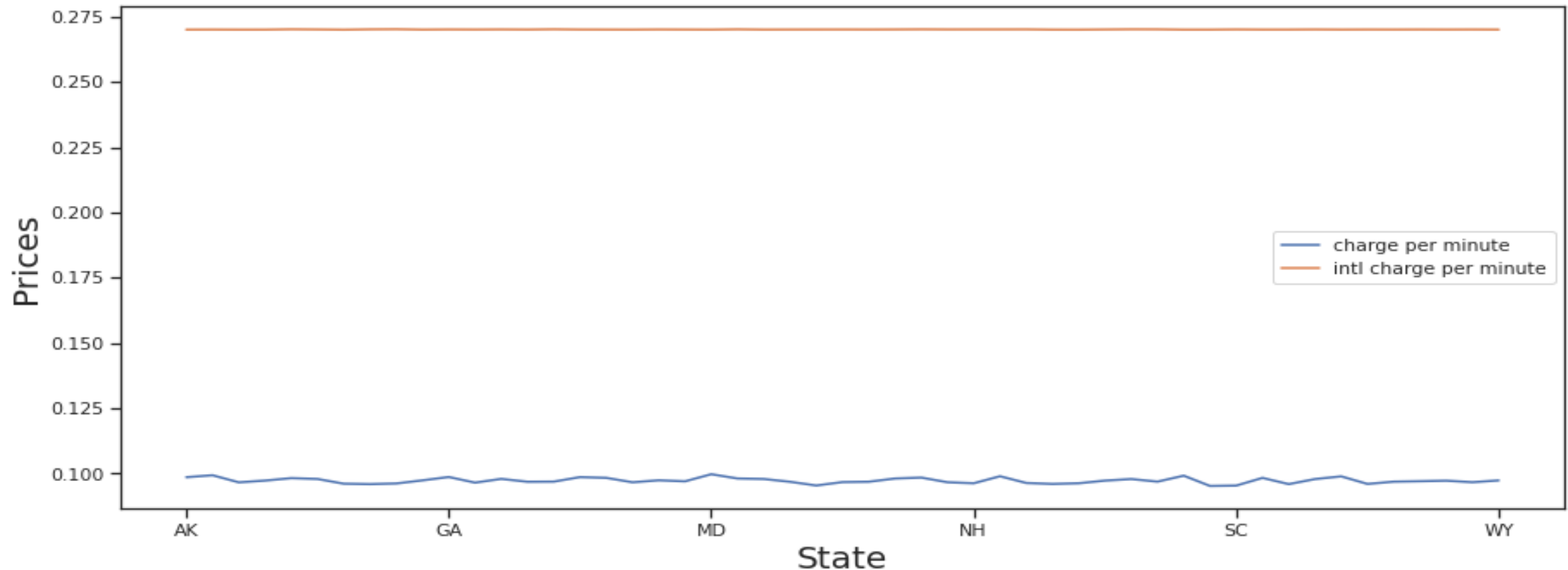


- Now it is clear that almost half of the people having intl. plan are getting churned.
- There may be issue with their Charges or may be with Their network.

# PRICE DIFFERENCE ANALYSIS

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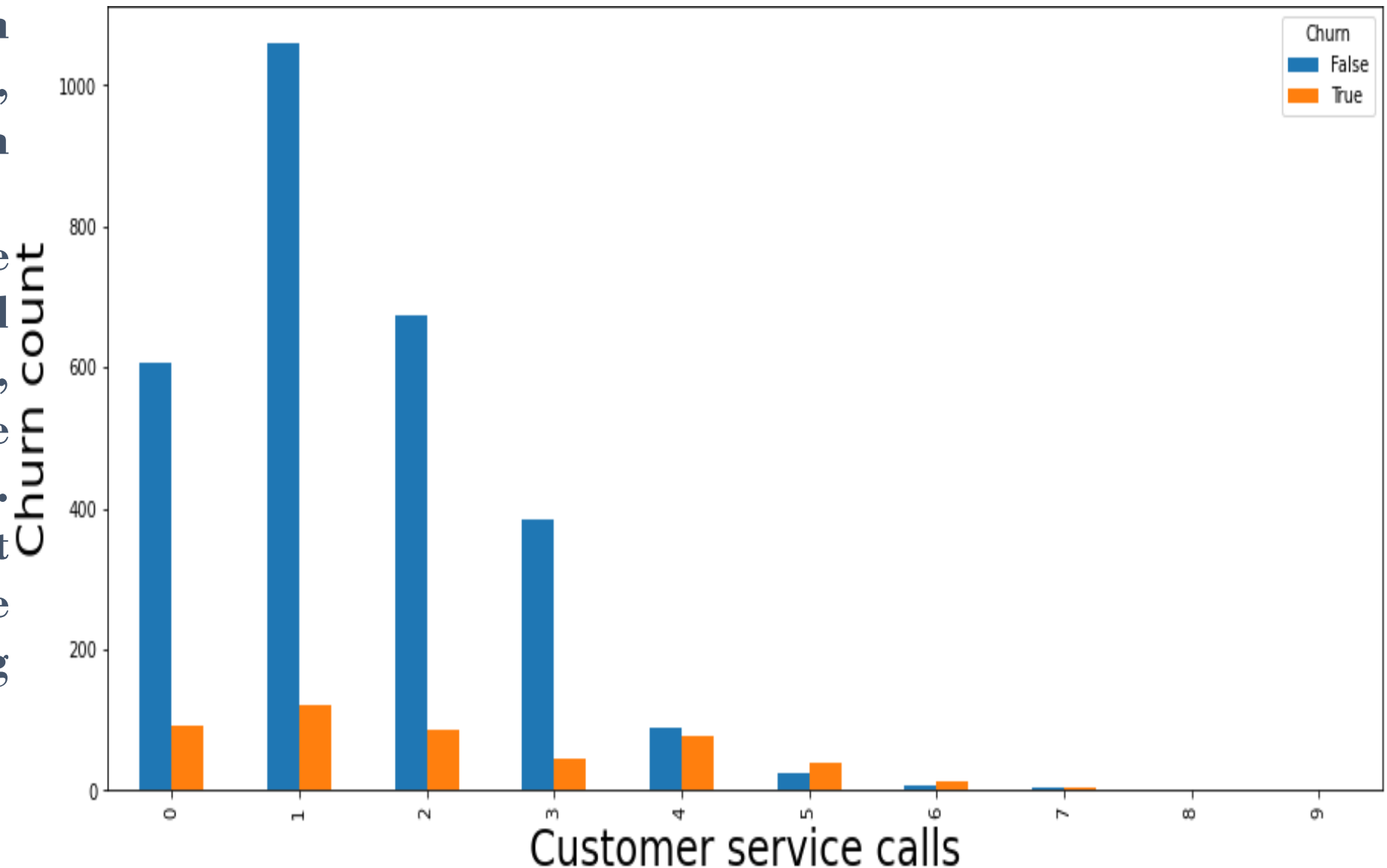
- By this graph we can see that there is huge difference between the local charges to the intl. charges. Which refers that the high pricing of intl. charge may cause churning.
- Average Charge per minute for each customer is 0.09728939604058527 units.
- Intl charge per minute for each customer is 0.27005654558216496 units.



# CUSTOMER SERVICE CALL ANALYSIS



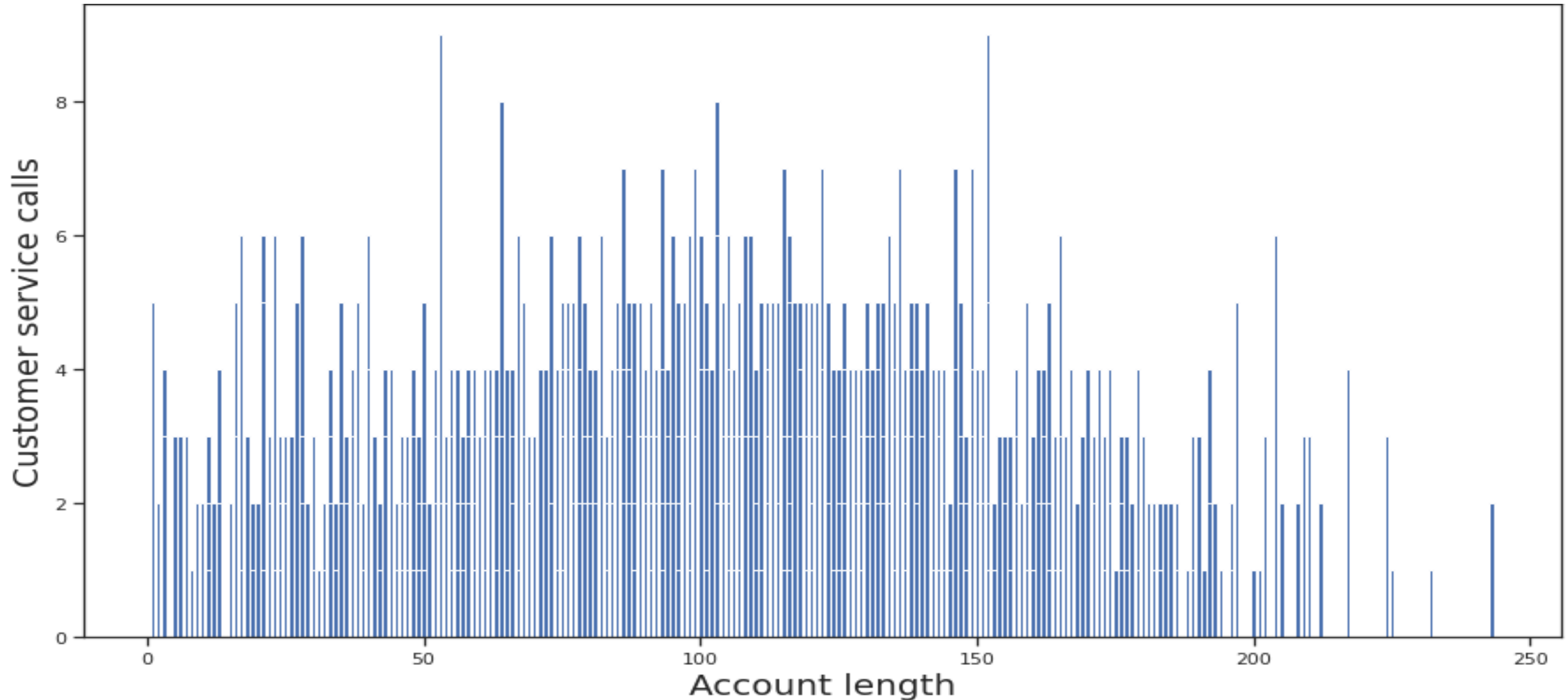
- Here we can see, when the service calls are 0, 1, 2, 3 there is no such issues.
- But when the customer service call is 4 or more than 4, we can see some actions of churning. Which indicates that customers with more service calls is going to churn very easily.



# CUSTOMER SERVICE CALL vs ACCOUNT LENGTH



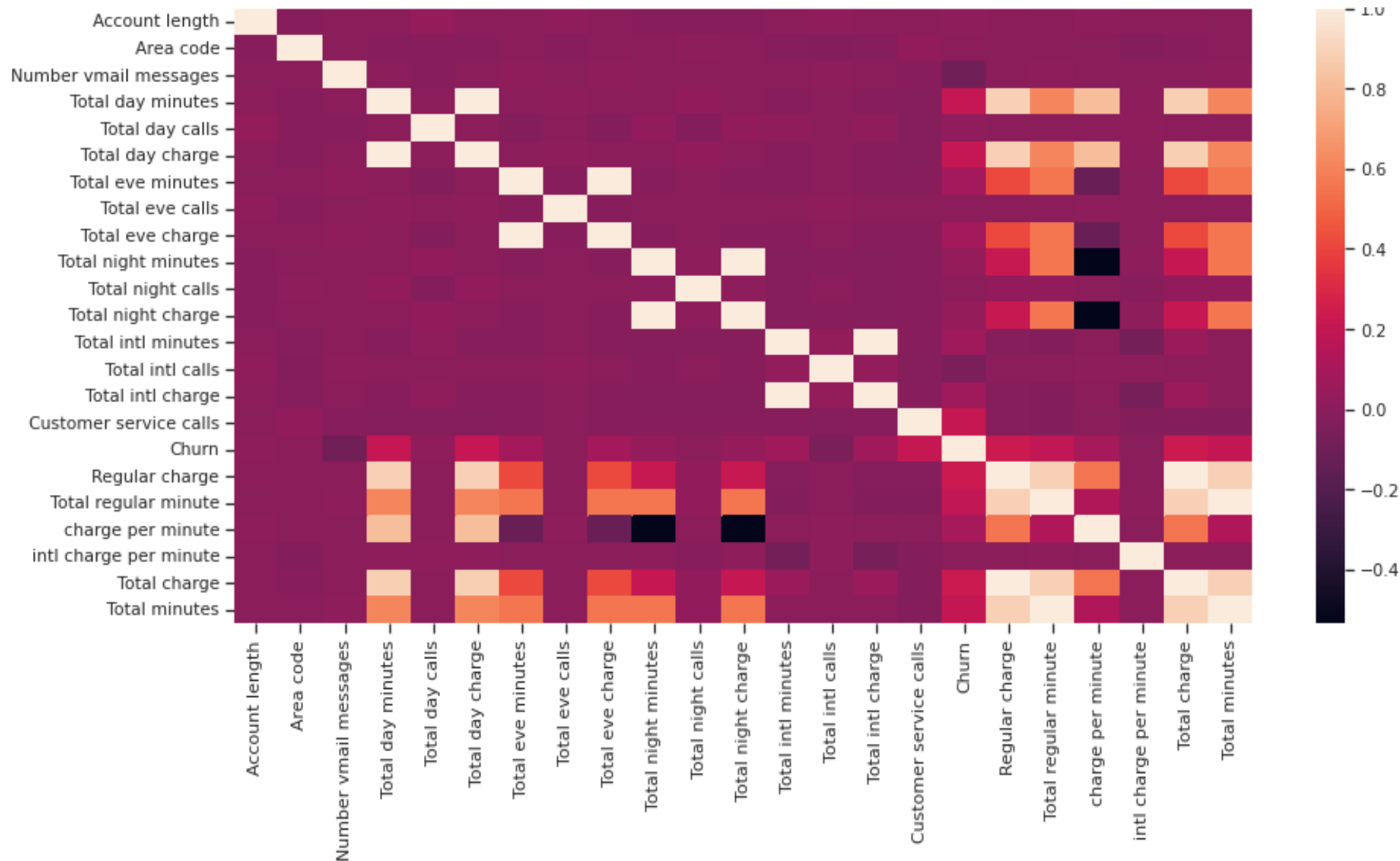
- We can see a increase in customer service call around 50 to 150 account length.





# CORRELATION MATRIX

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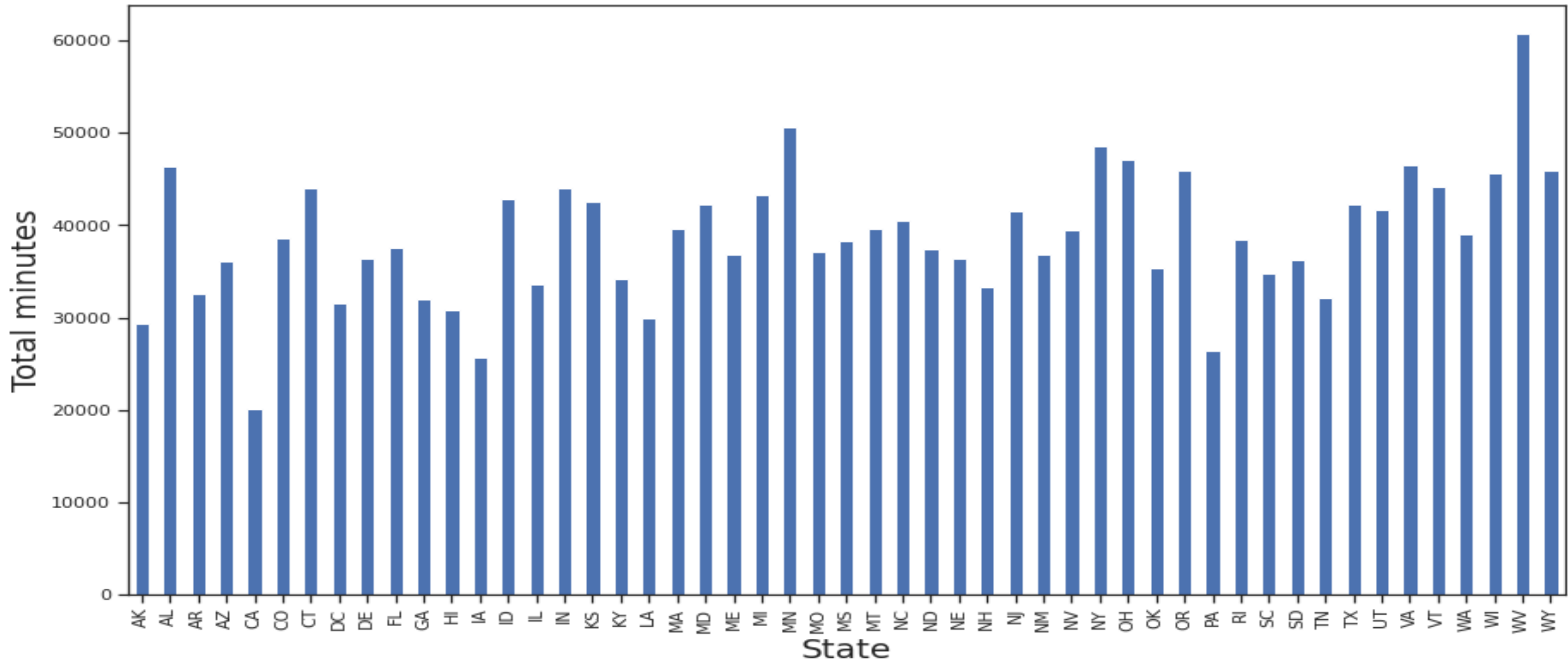


➤ In the correlation graph we can see that churn is related to charges, minutes and customer service call in some extent.

➤ So now let's analyze this relations and find the cause.

# STATE WISE TOTAL CALLING MINUTE

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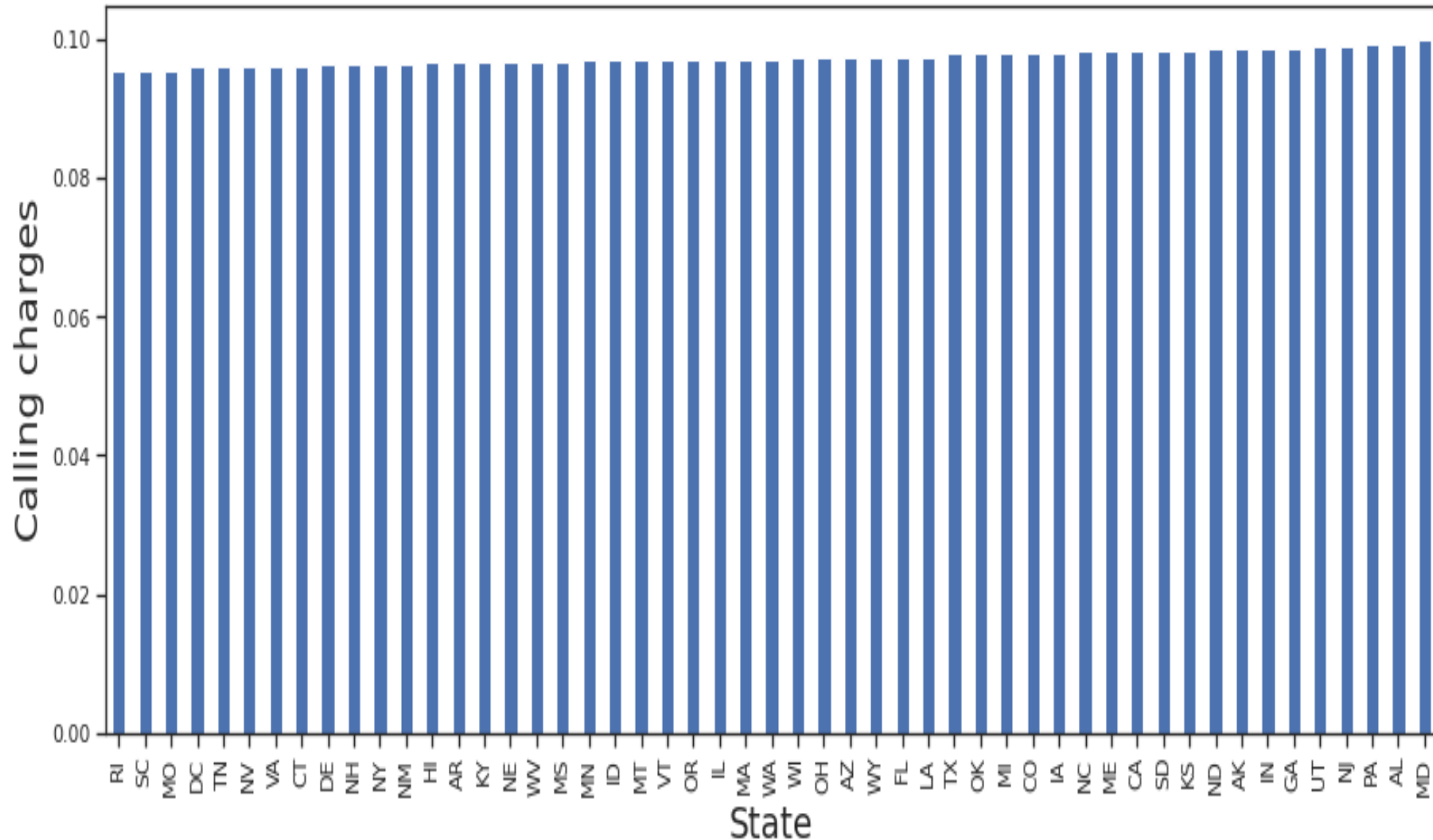


➤ Here also the state which has highest minutes of call is 'WV' and the least in 'CA'.

# STATE WISE CALLING RATE

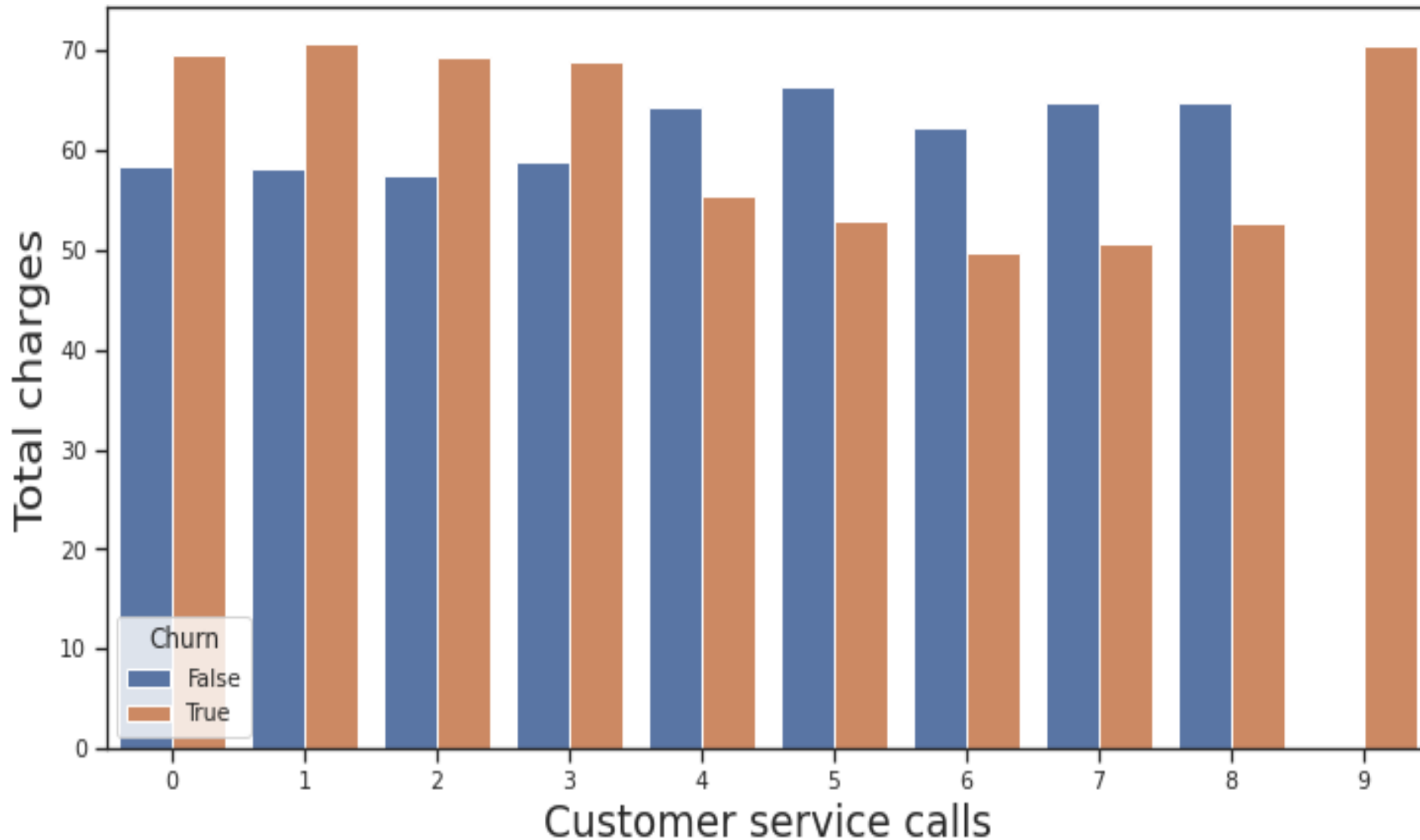
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- Here we can see that the call charge rate is higher in state code 'MD' and lowest in 'RI'.
- We can see that 'CA' which has lowest customer has a higher charge rate.



# TOTAL CHARGE vs CUSTOMER SERVICE CALL

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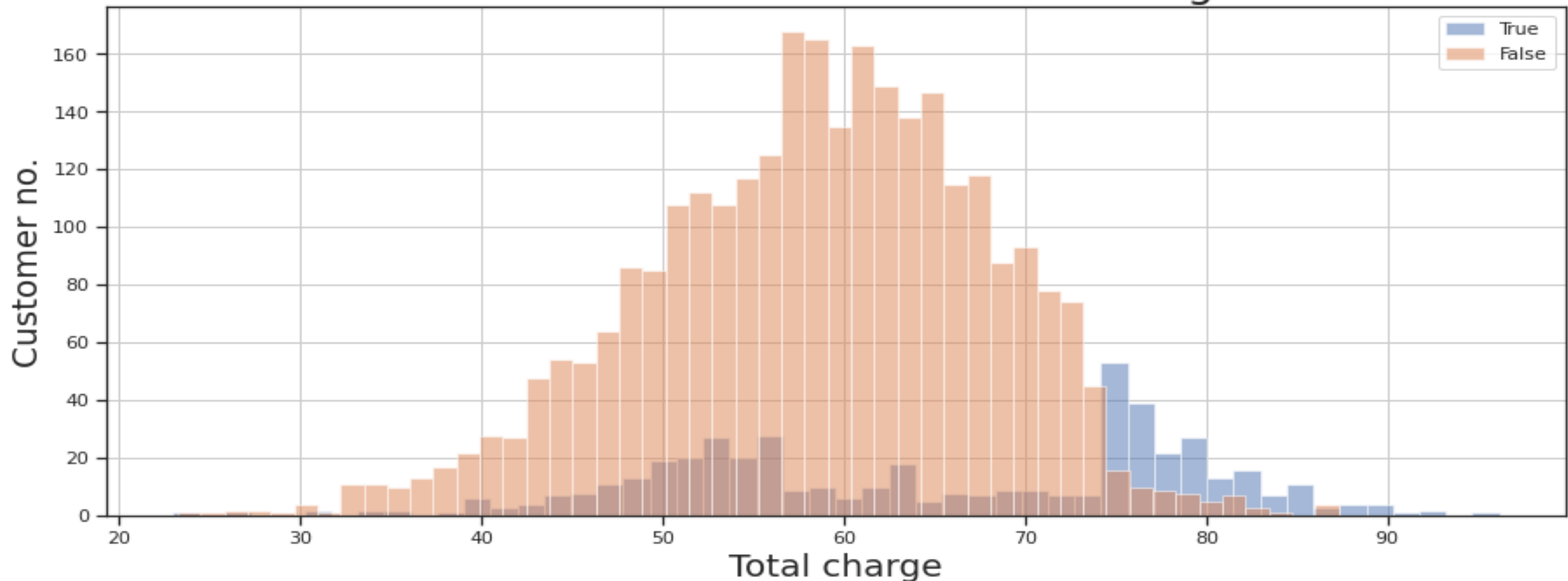


- Here we have seen that, the 1st 3 lines shows the pricing of charges leads to customer service calls which may results in churning.
- But we can't the same for rest lines.
- But when there is 9 customer service calls there are all in churned.

# CHURN vs TOTAL CHARGE

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- When the price rate go beyond 74 units, the rate of churn is increased dominantly.



# **CONCLUSION**

- From the '**CHURNED CUSTOMER'S CHART**' we found that the churn rate is 14.5%.The average Churn rate for Telecom company should be 20-25%.So here Churn rate is good.
- The graph '**State Wise Percentage Churn**' and '**State wise avg charges**' indicate that although state '**CA**' has maximum churn rate, lowest customer but avg local charges are relatively more as compared to other states.
- By referring to '**Price Different Count**' chart we conclude that international charge per minute is very much higher than the local charge per minute.
- Chart '**No. of customers acc. to Total charges**' clearly shows churn rate is maximum when total charges exceeds more than '**74**'.
- From "**Analyzing churn with customer service calls**" it is pretty much clear that The churn rate is more when customer service calls exceed '**4**'.It also shows that churned customer much more than the existing customer.
- From "**Voice Mail Analysis**" it is found that when the number of voice mail increase 20, there is churning. This may be due to Quality of Voice Mail.
- From the scatter plot '**Local Charge Per Minute**' , We Conclude Day charges, eve charges, night charges are not same.
- By comparing '**Churn vs Intl plan**' it is concluded that 50% of the people get churned those take the international plan. It may be due to higher charges or may be due to network issue.

# **RECOMMENDATION**



- **Local charges are not same for day, evening and night so to reduce churn rate the company should make Local charge uniform.**
- **We observe that more churn is due to expensive intl. charge per minute so it should reduce its intl. charge to reduce churn rate.**
- **In some particular states churn rate is much higher than that of others may be due to network issue. So It should focus on these states to reduce churn rate.**
- **It should improve its customer service and take frequently feedback from the customer regarding their issue and try to solve it as soon as possible**

***THANK  
YOU***