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Project 3: Churn Prediction
Milestone 2
August 4, 2024

Topic

My project will be to use a data set provided by IBM for a fictional company,Telco, to determine who of their customers are more likely to churn. From the same data set, I would also like to investigate what characteristics or reasons of the long term customers prevented them from leaving.

Business Problem

When a customer churns from a company, it means that that customer is no longer a customer of that company's services. When customers churn, it can be for many different reasons. Maybe the product stopped being reliable. Maybe the product got too expensive and was no longer worth it in the eyes of the customer or, even worse, competition from another company has attracted them to try their similar product.

In my own life, I know I have churned a couple different times for my car insurance, who I had streaming platform subscriptions with, or even where I ate my fast food at. No worries, there will always be a new customer to take a churned customer's place right? Yes and no. Yes because there are probably so many different people and types of audiences that a product could go to to attract new customers. No, because it is actually more expensive to sell to a new customer than it is to sell to an existing customer. If you take on a lot of customers but also have a high churn rate, you won't have enough money to sustain a constant flow of customers coming in and going out.

There needs to be a balance of trying to achieve low churn and maintain existing customer satisfaction. My business questions to answer will be:

What customers are more likely to churn and why?

Datasets

Kaggle.com is providing the data set I will be using. It is a dataset given by IBM for a fictional company called Telco. It has over 7000 rows of customer data including tenure, the products they have or don't have, how much they spend, and some personal information about them. This is a fictional set, any personal identifiable information is a farce.

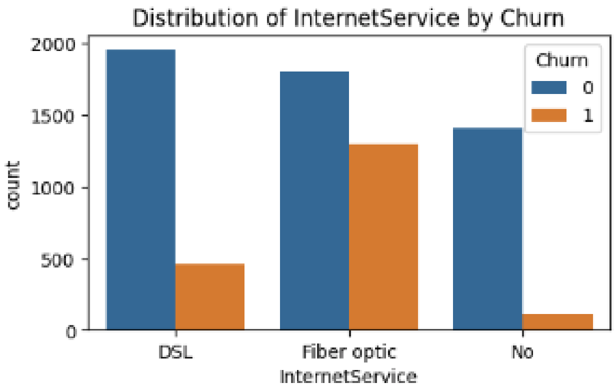
Methods

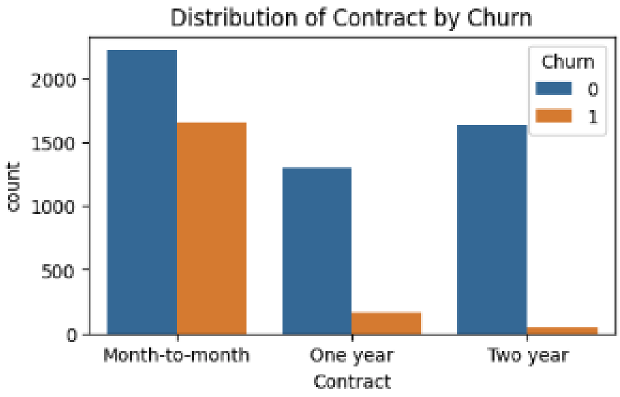
I will be doing exploratory data analysis as well as 2 predictive models. I would like to try a logistic regression model and a Naive Bayes model. Logistic regression model is easy to interpret and can classify who churned and who didn't.

A Naive Bayes model would also be good because it does well with multiple classifications and can classify customers as ‘low', ‘medium', or ‘high' risk.

Analysis

Exploratory Data Analysis



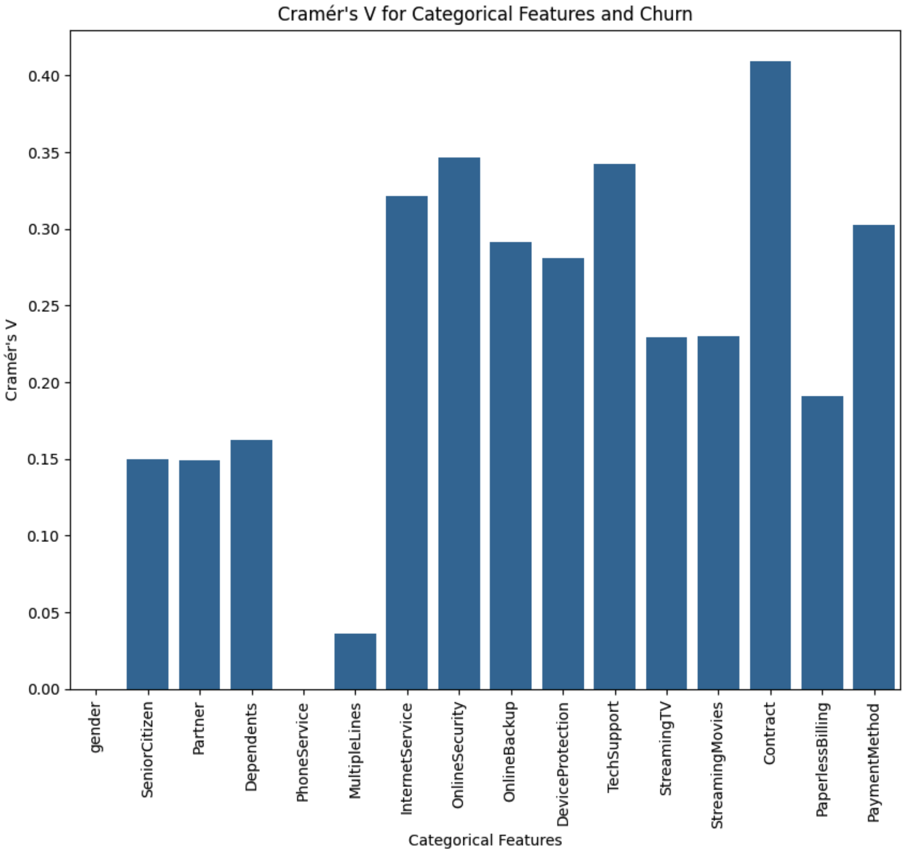


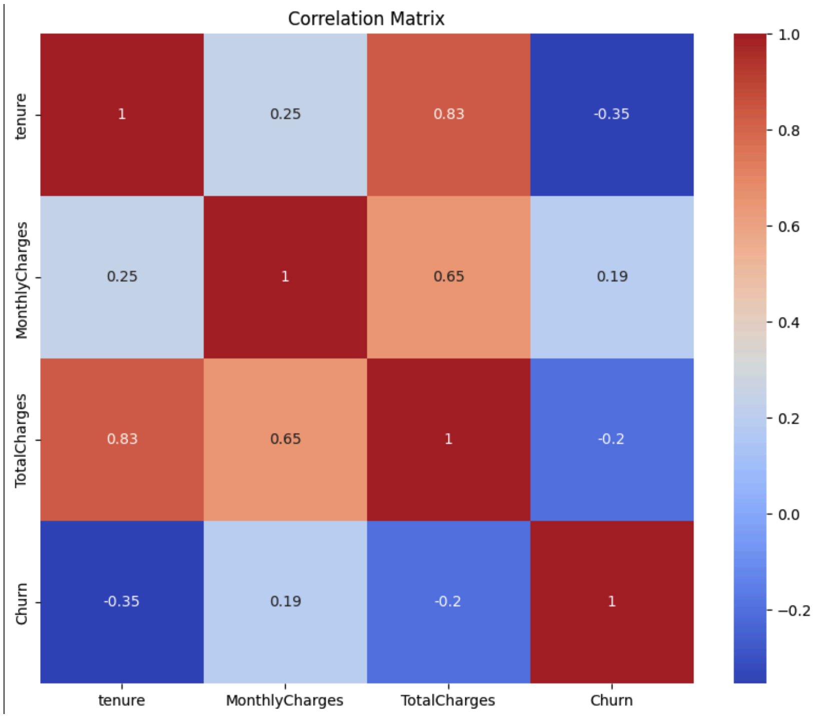
Of the categorical features:

['gender', 'SeniorCitizen', 'Partner', 'Dependents', 'PhoneService', 'MultipleLines', 'InternetService', 'OnlineSecurity', 'OnlineBackup', 'DeviceProtection', 'TechSupport', 'StreamingTV', 'StreamingMovies', 'Contract', 'PaperlessBilling', 'PaymentMethod']

Having a fiber optic cable or a contract seems to be what customers had before they churned the next month.

I also did a Cramers V statistic to give a better overview visual of the categorical features and how they correlate with churning. Online security, device protection, and payment method also seem to have some significance. Though In my opinion, I really couldn't see why these would have significance as security and device protection seem to be products and payment methods seem to be a personal preference.





Conclusion

TBD

Assumptions/Limitations

Churning prediction is specific to each company. Although principles and trends can be seen across multiple companies, there are many different reasons both financial and non financial reasons as to why a customer might cancel services. I am limited in just this dataset for this specific company.

It would also be hard to know if the reason there is a high churn rate is because of something political and not something to do with the services of the company. For example, if the company came out to the public about being a supporter of LGBTQ+ communities, customers that don’t support those communities might leave simply for having a different political standpoint.

Ethical Considerations

No ethical considerations to consider since the data I am using is open to the public and is fictional.

Challenges/Issues

This is my first time analyzing any data set to investigate churning rates. This data set is specific to this company only. Although there may be companies with similar products, this data set should only be considered for this project.

Future Uses

Churn prediction is different for every company. It should be up to the company to do a periodic pull of all customers and then analyze those that left. If the churn is significant, then it might be wise to allocate some money into churn prevention and customer retention.

Recommendations

TBD

Implementation plans

TBD

References

https://www.kaggle.com/datasets/blastchar/telco-customer-churn

10 Questions

1. What are the most significant factors that contribute to customer churn?

2. How did you handle missing data in the dataset?

3. Why did you choose the specific models for this analysis?

4. How do you evaluate the performance of your predictive models?

5. How do the categorical features correlate with churn?

6. What preprocessing steps were taken before training the models?

7. How does the churn rate vary across different customer segments?

8. Did you use any techniques to handle imbalanced data?

9. How does the model handle new data? Is it robust to changes over time?

10. What are the business implications of your findings?