

Mini Project

Data Manipulation on Telco Customer Churn Dataset

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Hi, I'm **Rena**, an **Actuarial Science student** passionate about **data science**. Over the past two years of college, I've worked on projects involving statistics, modeling, visualization, and predictive analytics, with **hands-on experience in Python**. I'm passionate about using data to drive smarter decisions.

Data Manipulation

The process of changing, organizing, combining, or processing data in a way that makes it more suitable or appropriate for analysis or other purposes. The main purpose of data manipulation is to gain a better understanding of the data, to remove or correct invalid data.

About Dataset

Telco Customer Churn

- Analyze the behavior of customers who churn to telecom services.
- From Kaggle ([link dataset](#))
- 7043 records and 21 features

Features

| Features | Description |
|---------------|---|
| customerID | Customer ID |
| gender | Whether the customer is a male or a female |
| SeniorCitizen | Whether the customer is a senior citizen or not |

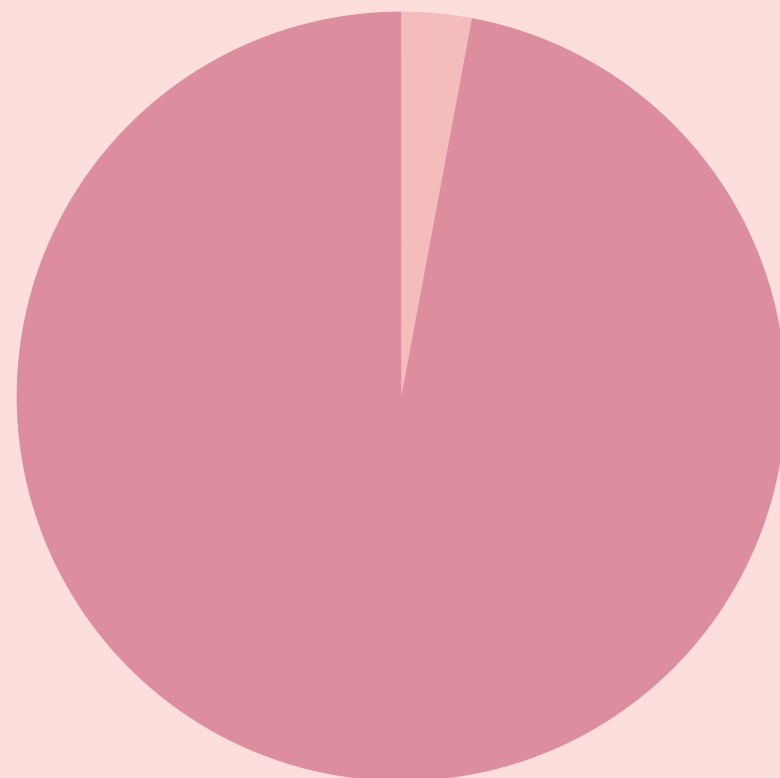
| Features | Description |
|-----------------|---|
| Partner | Whether the customer has a partner or not |
| Dependents | Whether the customer has dependents or not |
| tenure | Number of months the customer has stayed with the company |
| PhoneService | Whether the customer has a phone service or not |
| MultipleLines | Whether the customer has multiple lines or not |
| InternerService | Customer's internet service provider |

| Features | Description |
|------------------|---|
| OnlineSecurity | Whether the customer has online security or not |
| OnlineBackup | Whether the customer has online backup or not |
| DeviceProtection | Whether the customer has device protection or not |
| TechSupport | Whether the customer has tech support or not |
| StreamingTV | Whether the customer has streaming TV or not |
| StreamingMovies | Whether the customer has streaming movies or not |

| Features | Description |
|------------------|---|
| Contract | The contract term of the customer |
| PaperlessBilling | Whether the customer has paperless billing or not |
| PaymentMethod | The customer's payment method |
| MonthlyCharges | The amount charged to the customer monthly |
| TotalCharges | The total amount charged to the customer |
| Churn | Whether the customer churned or not |

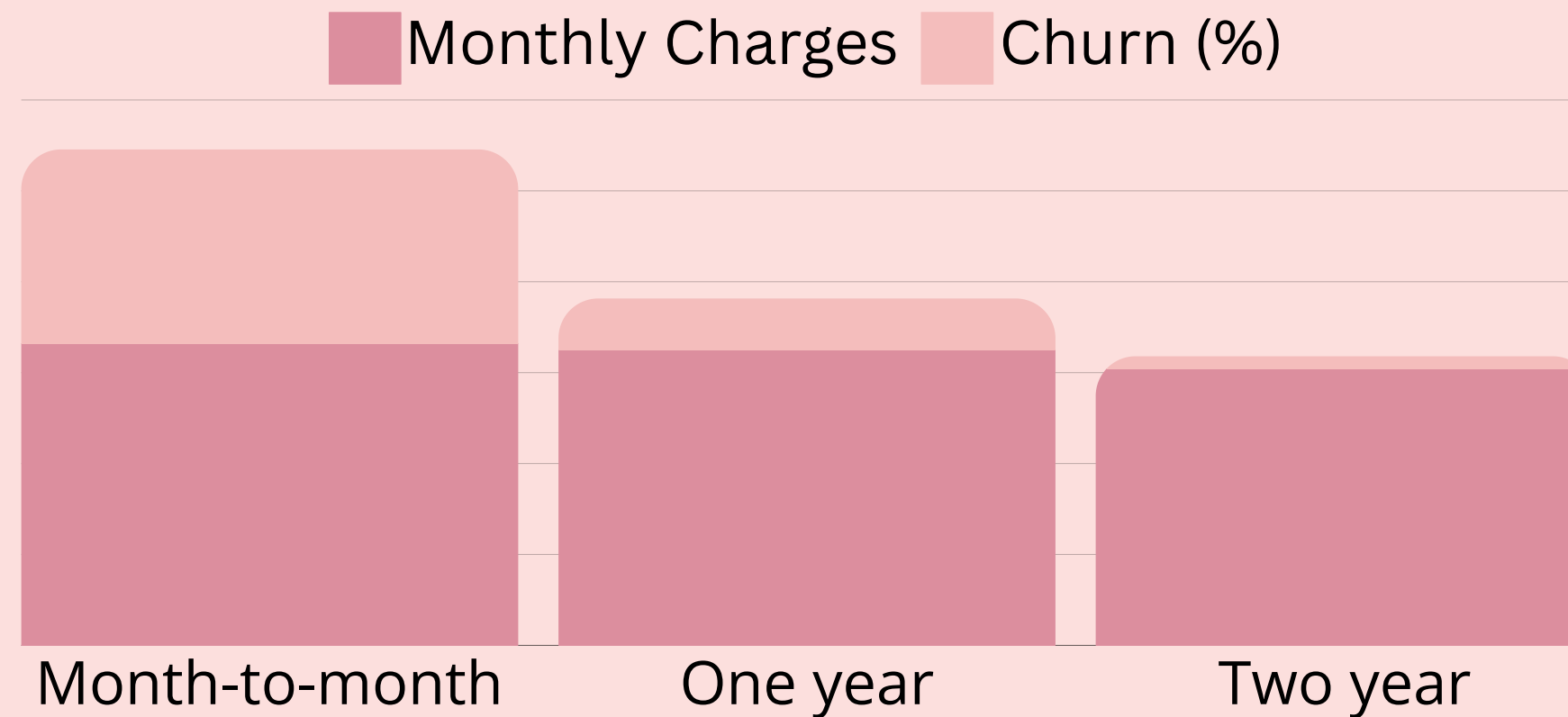
Find customers who are at high risk of churn with the criteria that customers must have a monthly contract and their monthly bill is above the 90th percentile.

High-Risk Group
Others



The 207 customers in the high-risk category, may be dissatisfied with the service or perceive the cost as too high.

Grouping data by contract type and calculating average monthly billing and churn percentage for each group.



Customers with month-to-month contracts have the highest churn percentage (42.71%) compared to customers with one or two year contracts.

Pivot table to analyze the relationship between contract type and payment method on average monthly billing.

| Contract | Bank transfer (automatic) | Credit card (automatic) | Electronic check | Mailed check |
|----------------|------------------------------|----------------------------|---------------------|-----------------|
| Month-to-month | 69.085399 | 67.678821 | 74.989486 | 46.050056 |
| One year | 67.484143 | 67.972362 | 79.095245 | 44.306380 |
| Two year | 65.013918 | 64.422117 | 84.335714 | 38.587304 |

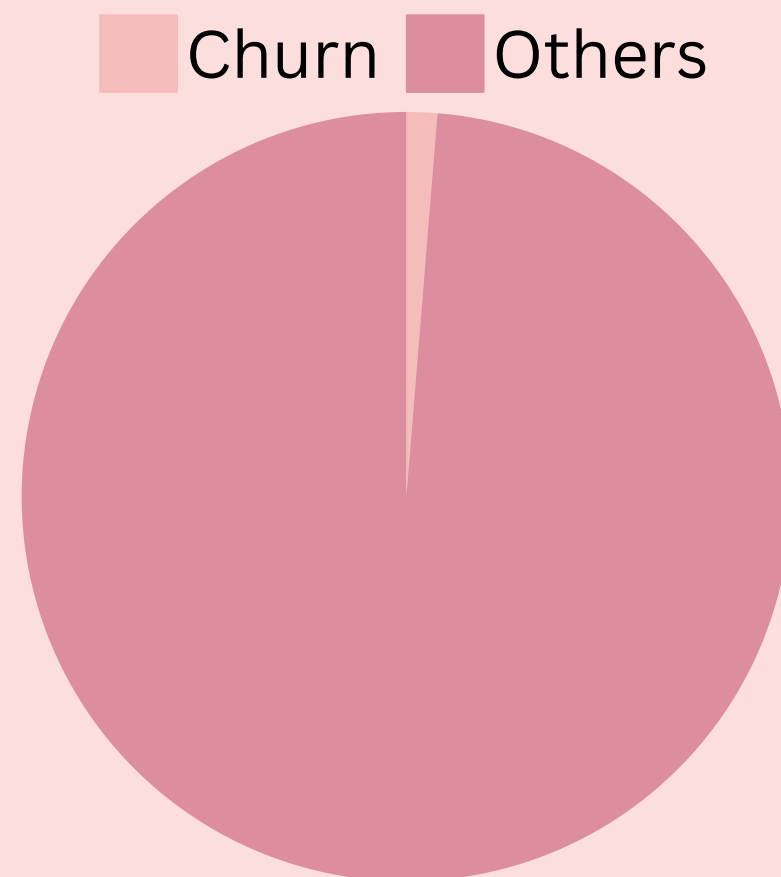
Annual contracts have lower average monthly bills than monthly contracts. Electronic checks have the highest average bills, while mailed checks have the lowest for all contract types.

Crosstab to evaluate the relationship between churn and payment method, and calculate the churn percentage for each payment method.

| Payment Method | Churn (%) |
|---------------------------|-----------|
| Bank transfer (automatic) | 16.709845 |
| Credit card (automatic) | 15.243101 |
| Electronic check | 45.285412 |
| Mailed check | 19.106700 |

Payment method has a significant relationship with churn. Customers with Electronic check payment method showed the highest churn percentage compared to other payment methods.


Aggregation to evaluate total churn with senior citizen yes and dependents more than 0.



There are 91 out of 7043 customers who are Senior Citizens with dependents > 0 and experienced churn. This shows that this group has a small contribution to the total churn as a whole.

Thank you

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