Customer Churn Analysis

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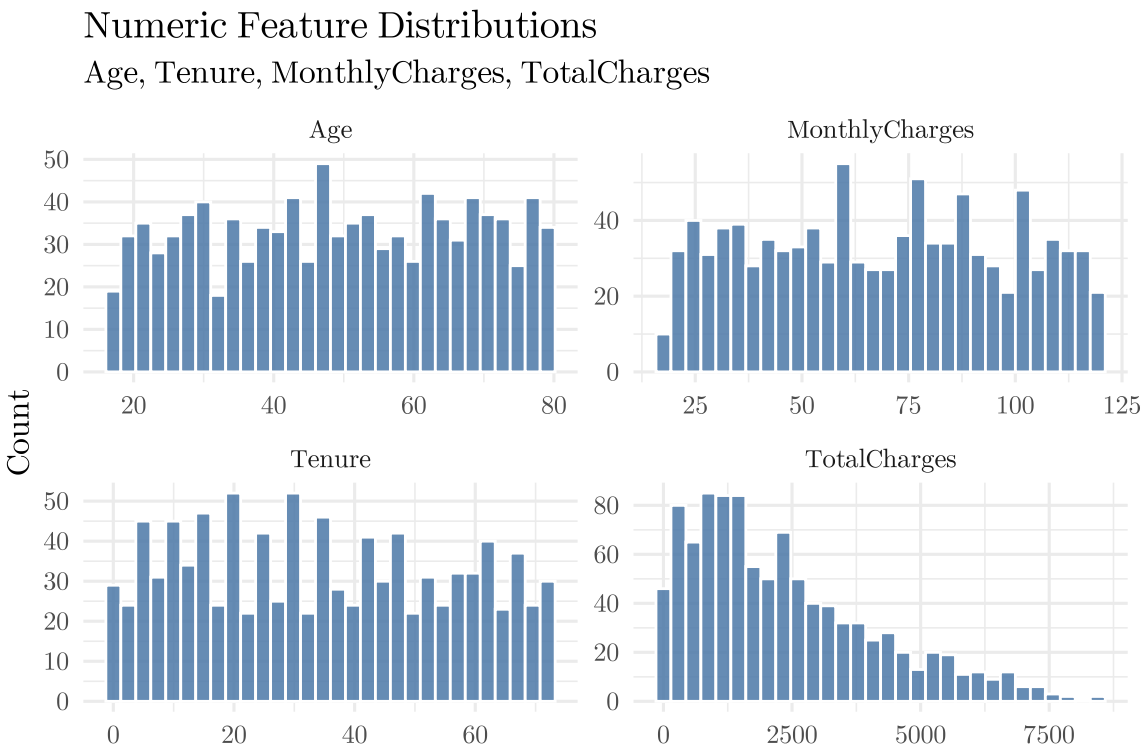
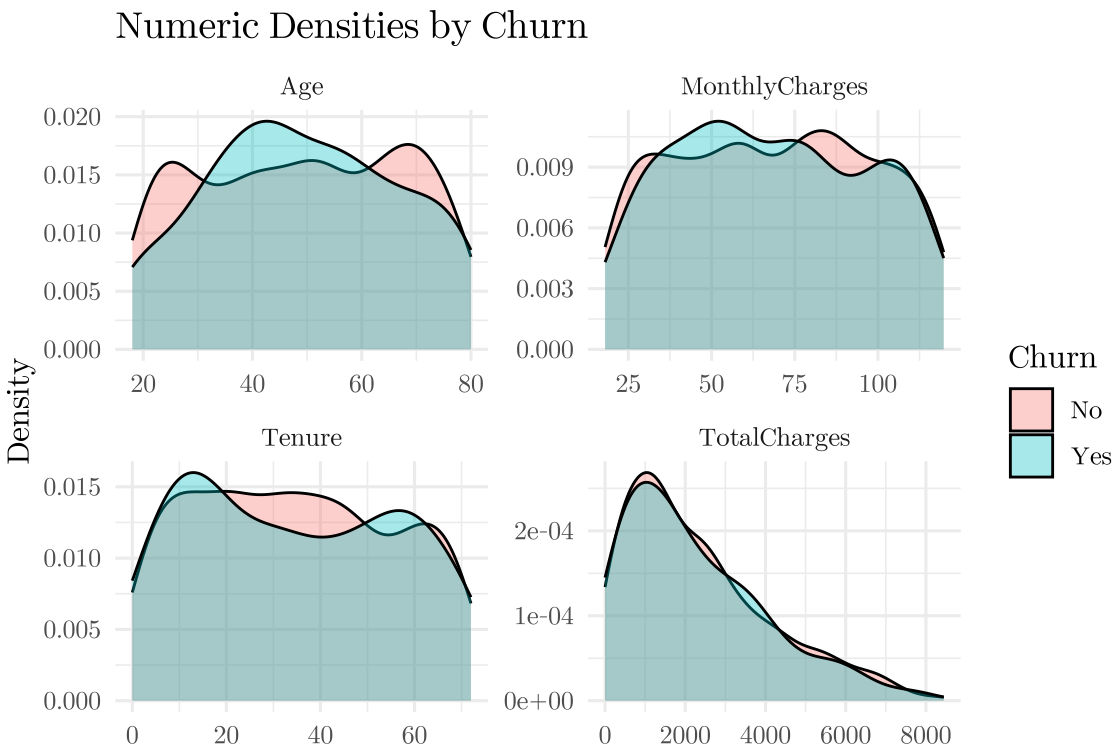
Table of contents

1 Numeric Distributions (Histograms)

```
 [1] "X"              "CustomerID"      "Gender"          "Age"
 [5] "Tenure"         "PhoneService"    "InternetService" "Contract"
 [9] "MonthlyCharges" "TotalCharges"    "Churn"
```

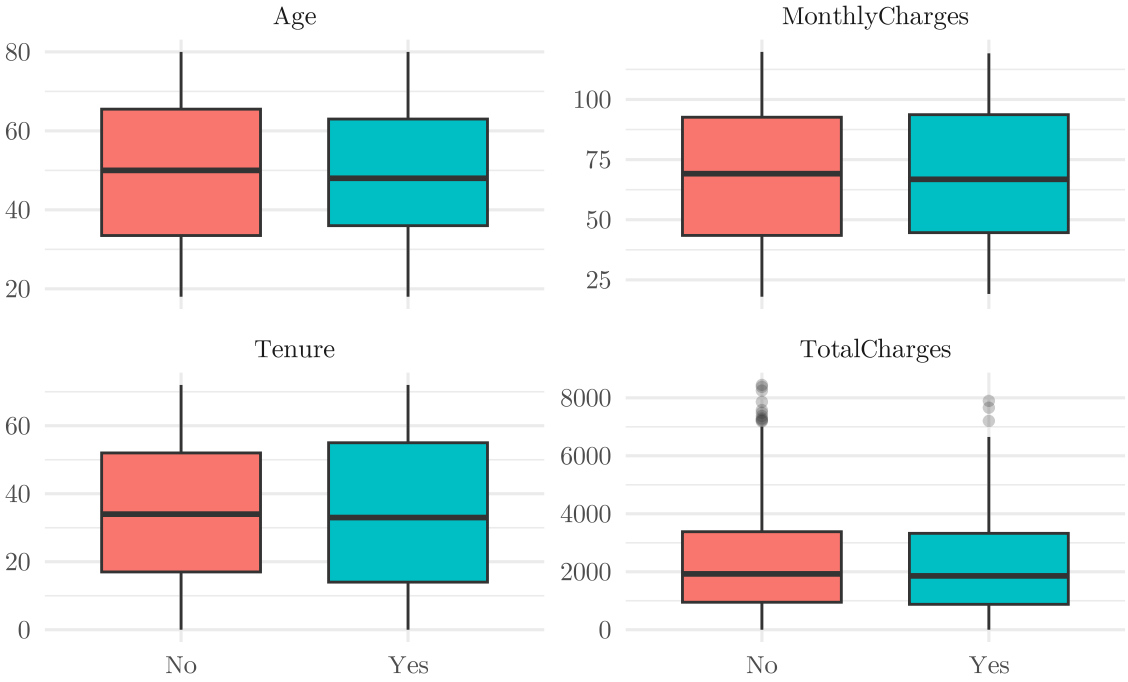


2 Numeric Densities by Churn



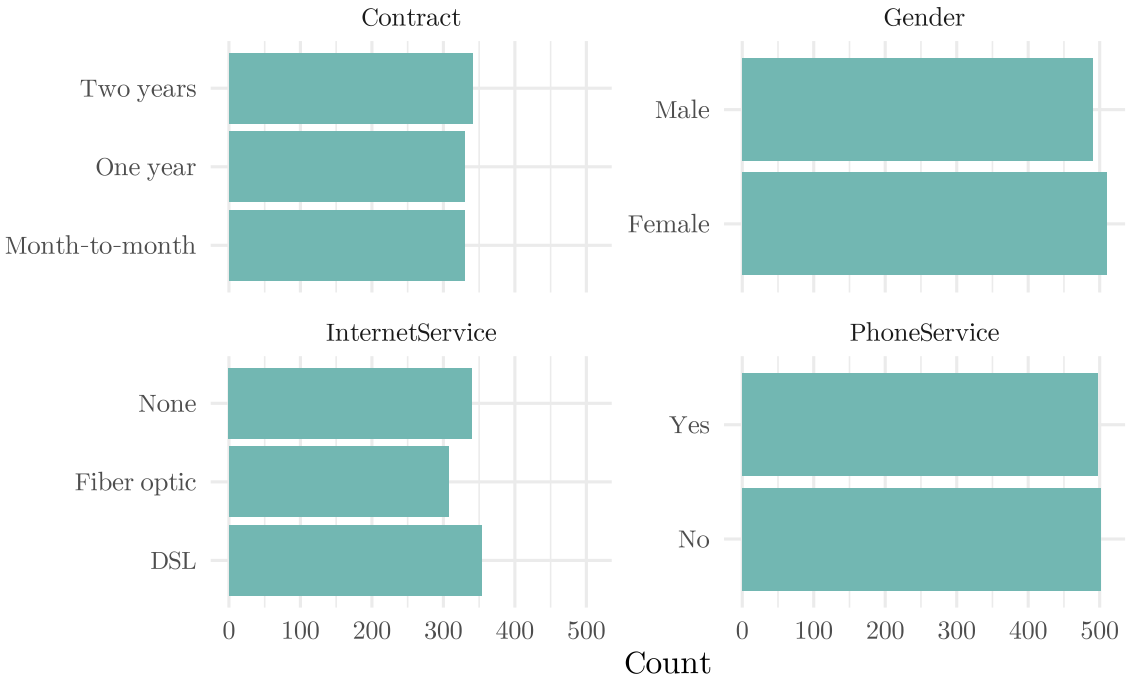
3 Numeric Box Plots by Churn

Numeric Spread & Outliers by Churn

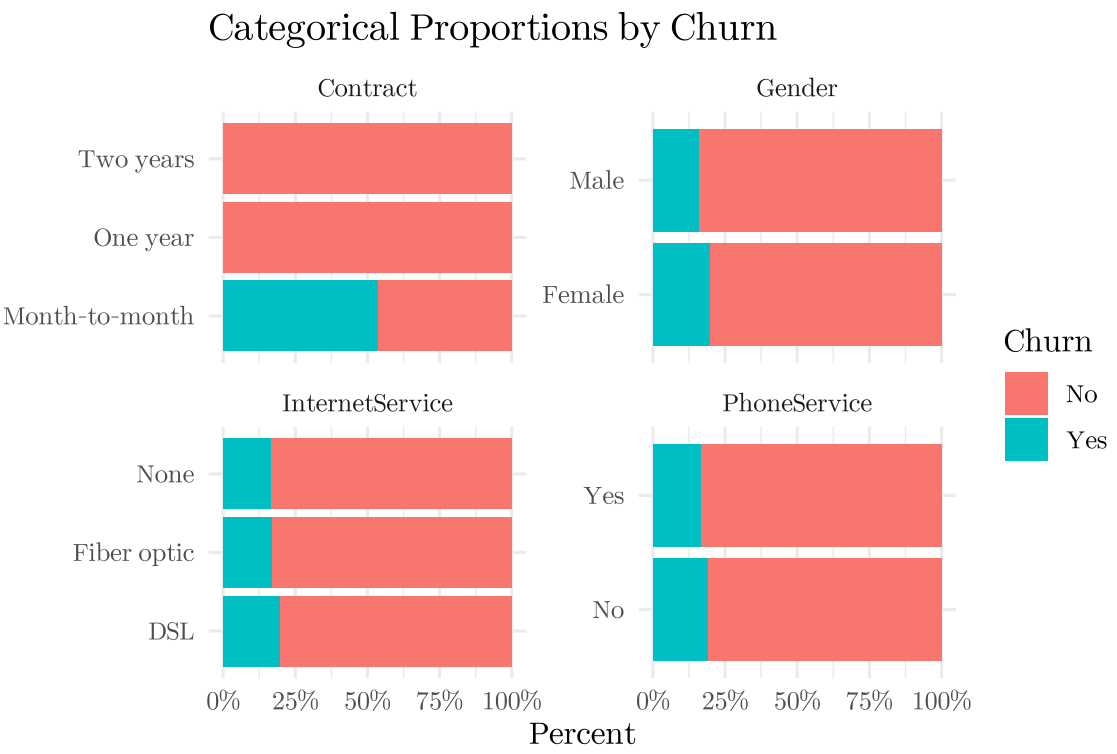


4 Categorical Counts (Phone/Internet/Contract)

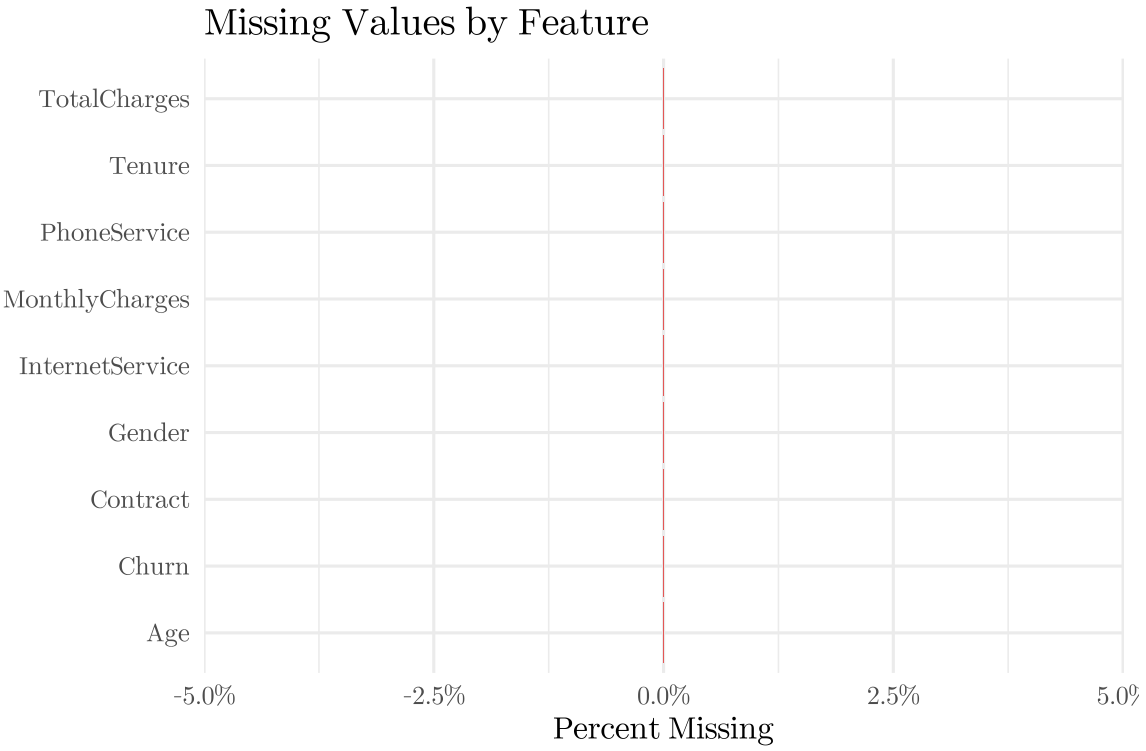
Categorical Feature Counts



5 Categorical Proportions by Churn



6 Missingness Overview

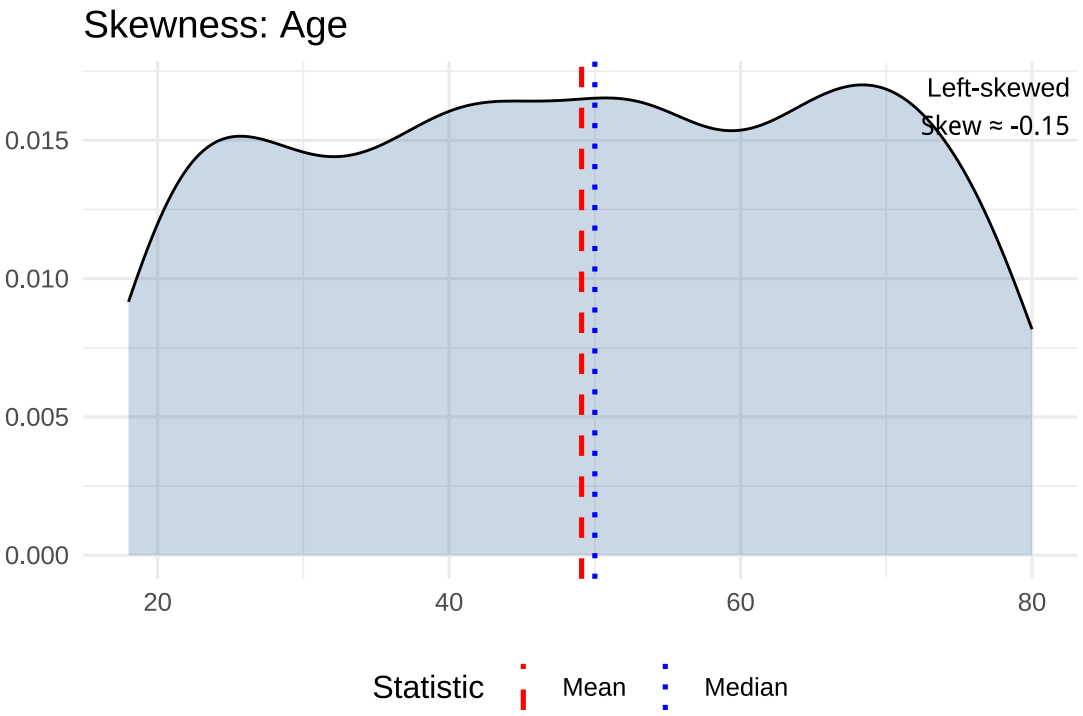


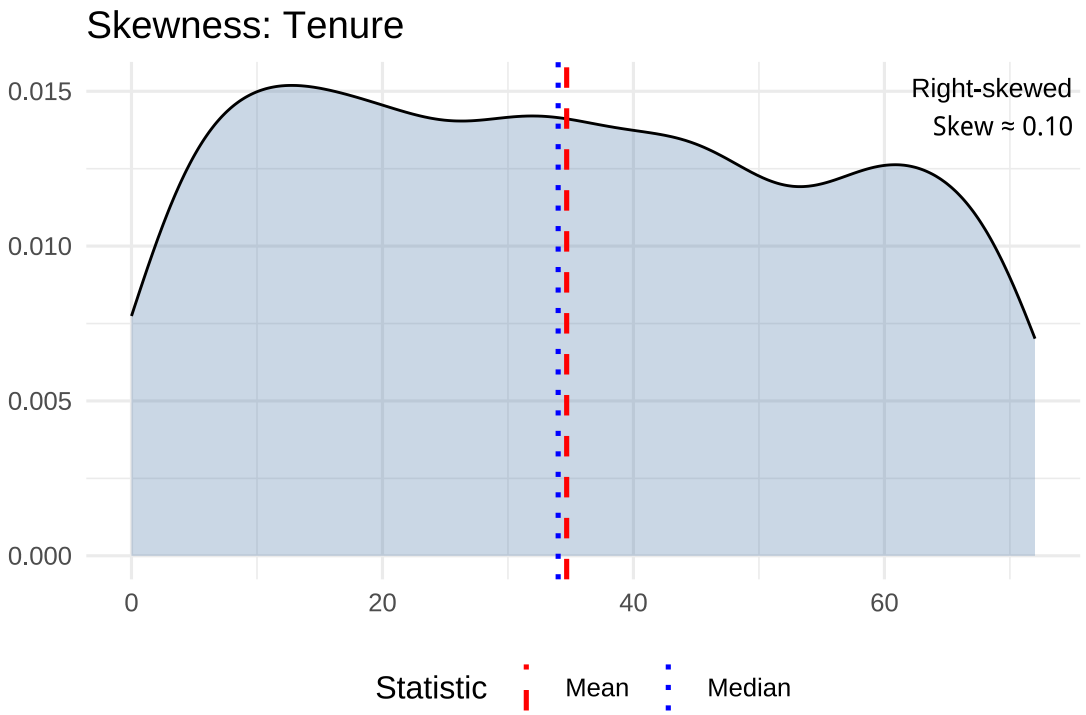
7 Skewness

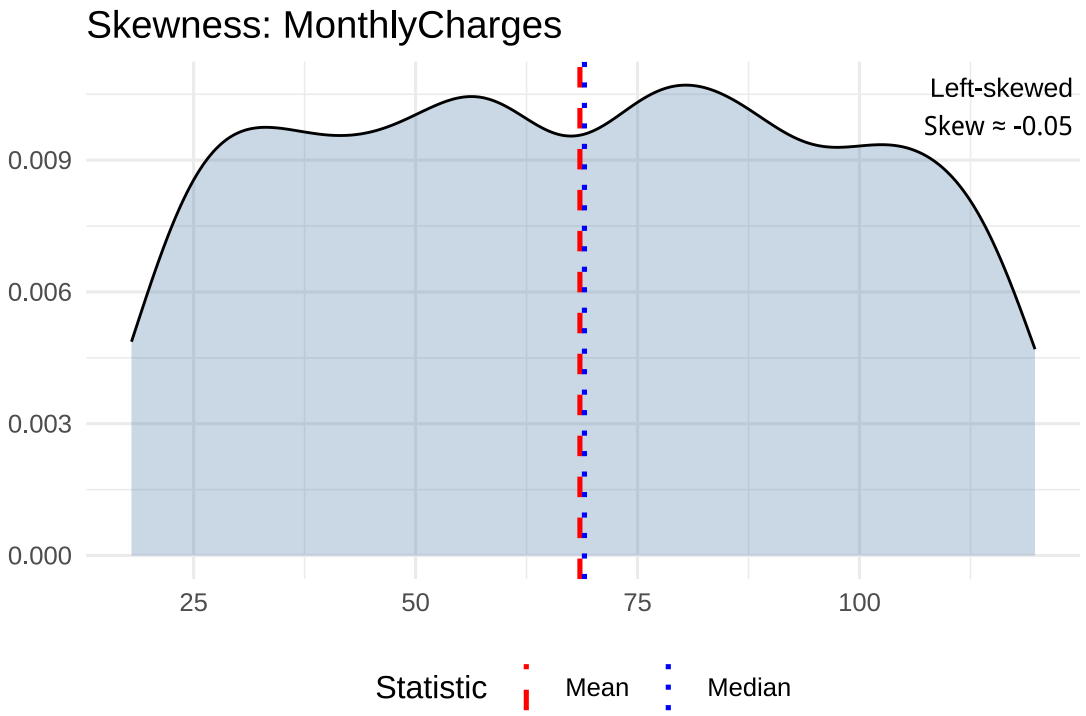
7.1 Quick skew check (numeric)

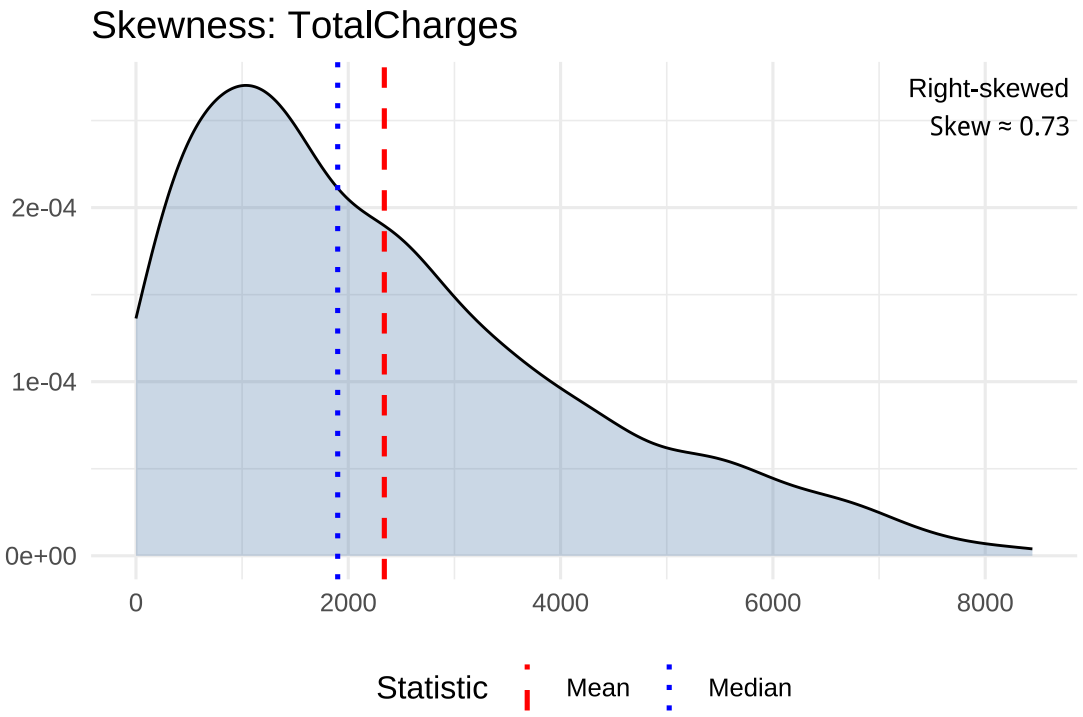
feature	n	mean	median	sd	p99	skew_hint
TotalCharges	1000	2339.68434	1900.125	1808.26360	7247.8838	Right-skewed
Age	1000	49.09300	50.000	18.16751	80.0000	Left-skewed
Tenure	1000	34.67800	34.000	21.03880	72.0000	Right-skewed
MonthlyCharges	1000	68.51068	69.020	29.07392	118.9306	Left-skewed

7.2 Skew check




Skewness: Tenure
Right-skewed
Skew ≈ 0.10
0.015
0.010
0.005
0.000
0
20
40
60
Statistic
Mean
Median


Skewness: MonthlyCharges
Left-skewed
Skew ≈ -0.05
0.009
0.006
0.003
0.000
25
50
75
100
Statistic
Mean
Median

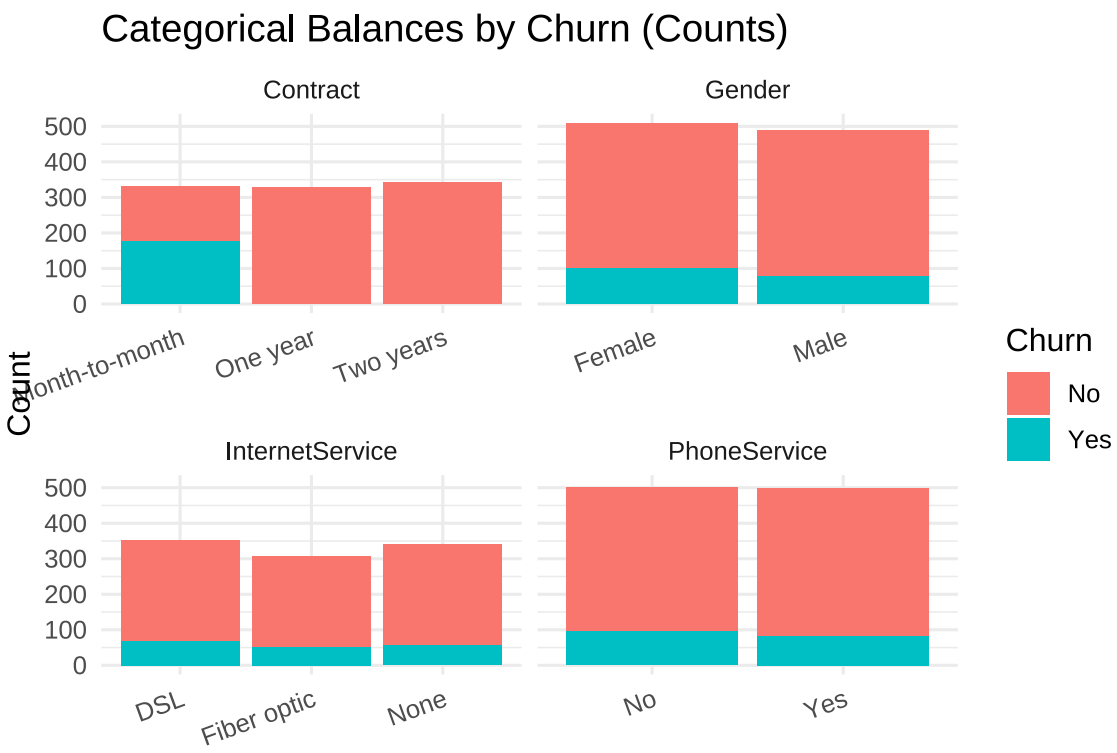


8 Churn vs Non-Churn Proportions

```
# Select the categorical features of interest
cat_features <- c("Gender", "PhoneService", "InternetService", "Contract")

cat_long_churn <- df_use %>%
  select(Churn, all_of(cat_features)) %>%
  pivot_longer(-Churn, names_to = "feature", values_to = "level") %>%
  drop_na(level, Churn)
```

8.1 Stacked bar (counts by category)



8.2 Normalized bar (proportions within each category)