

Customer Churn Analysis – Visualizations

In this notebook, we perform exploratory data visualization for customer churn analysis. We use the following plots:

- **Box Plot:** To compare monthly charges between churned and retained customers.
- **Violin Plot:** To analyze tenure distribution with respect to churn.
- **Pair Plot:** To visualize relationships between numeric features.

We use the dataset `customer_churn_sample.csv` .

In [3]:

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Load the dataset
df = pd.read_csv("customer_churn_sample.csv")

# Convert 'churn' column to numeric: Yes -> 1,
# No -> 0
df['churn'] = df['churn'].map({'Yes': 1, 'No': 0})
df.head()
```

Out[3]:

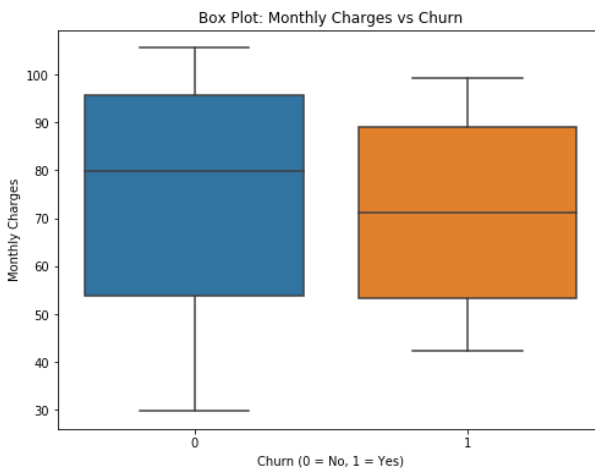
| | customer_id | gender | senior_citizen | par |
|---|-------------|--------|----------------|-----|
| 0 | CUST001 | Male | 0 | |
| 1 | CUST002 | Female | 1 | |
| 2 | CUST003 | Male | 0 | |
| 3 | CUST004 | Female | 1 | |
| 4 | CUST005 | Male | 0 | |

Box Plot: Monthly Charges vs Churn

The box plot helps us compare the monthly charges between customers who churned and those who stayed. This can reveal if customers paying more are more likely to leave.

In [5]:

```
plt.figure(figsize=(8, 6))
sns.boxplot(x='churn', y='monthly_charges', data=df)
plt.title("Box Plot: Monthly Charges vs Churn")
plt.xlabel("Churn (0 = No, 1 = Yes)")
plt.ylabel("Monthly Charges")
plt.show()
```

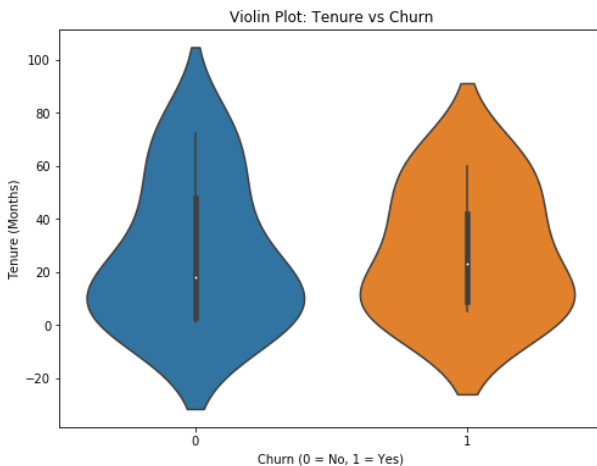


Violin Plot: Tenure vs Churn

The violin plot shows the distribution of tenure for customers who stayed vs those who churned. It reveals whether short-tenure customers are more likely to leave.

In [6]:

```
plt.figure(figsize=(8, 6))
sns.violinplot(x='churn', y='tenure', data=df)
plt.title("Violin Plot: Tenure vs Churn")
plt.xlabel("Churn (0 = No, 1 = Yes)")
plt.ylabel("Tenure (Months)")
plt.show()
```

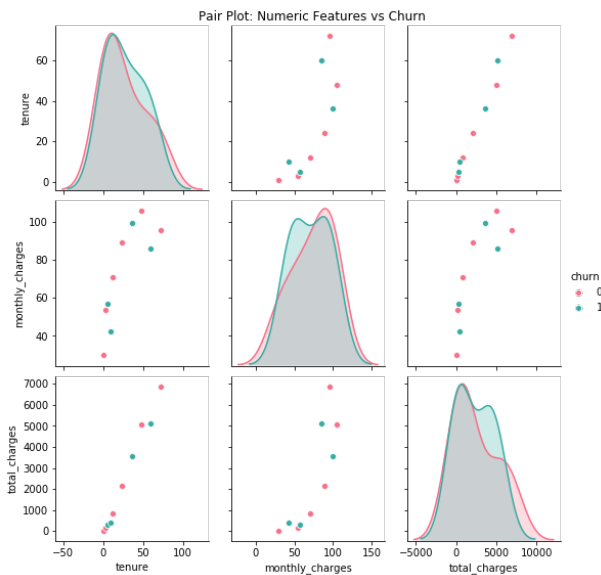


Pair Plot: Numeric Features vs Churn

This plot shows relationships between multiple numeric columns like tenure, monthly charges, and total charges. By coloring by churn status, we can visually detect trends and clusters.

In [8]:

```
pair_df = df[['tenure', 'monthly_charges', 'total_charges', 'churn']]
sns.pairplot(pair_df, hue='churn', palette='husl')
plt.suptitle("Pair Plot: Numeric Features vs Churn", y=1.02)
plt.show()
```



Conclusion

These visualizations help us understand how features like tenure and charges are related to churn. We can use these insights to create better customer retention strategies.