Loading the consolidated dataset

In [ ]:

```
import pandas as pd

df = pd.read_csv('consolidated_dataset.csv')
```

Sample

In [ ]:

```
df.head()
```

Out[ ]:

	customer_id	customer_name	email	transaction_id	amount	transaction_date
0	1	John Smith	john.smith@email.com	101	784	2023-01-31
1	2	Jane Doe	jane.doe@email.com	102	659	2023-02-28
2	3	Micheal Jonson	m.johnson@email.com	103	729	2023-03-31
3	4	Chris Lee	c.lee@email.com	104	292	2023-04-30
4	5	Katherine Davis	k.davis@email.com	105	935	2023-05-31

Grouping Data by Month

In [ ]:

```
# Convert transaction_date to datetime
df['transaction_date'] = pd.to_datetime(df['transaction_date'])

# Extract year and month
df['year_month'] = df['transaction_date'].dt.to_period('M').dt.to_timestamp()

# Aggregate data by month
monthly_data = df.groupby('year_month').agg({
    'amount': ['sum', 'mean', 'count']
}).reset_index()

monthly_data.columns = ['year_month', 'total_amount', 'avg_amount', 'transaction_count']
monthly_data.head()
```

Out[ ]:

	year_month	total_amount	avg_amount	transaction_count
0	2023-01-01	784	784.0	1
1	2023-02-01	659	659.0	1
2	2023-03-01	729	729.0	1
3	2023-04-01	292	292.0	1
4	2023-05-01	935	935.0	1

Data Analysis with Matplotlib and Seaborn

In [ ]:

```
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib.ticker import FuncFormatter
from matplotlib.dates import DateFormatter
```

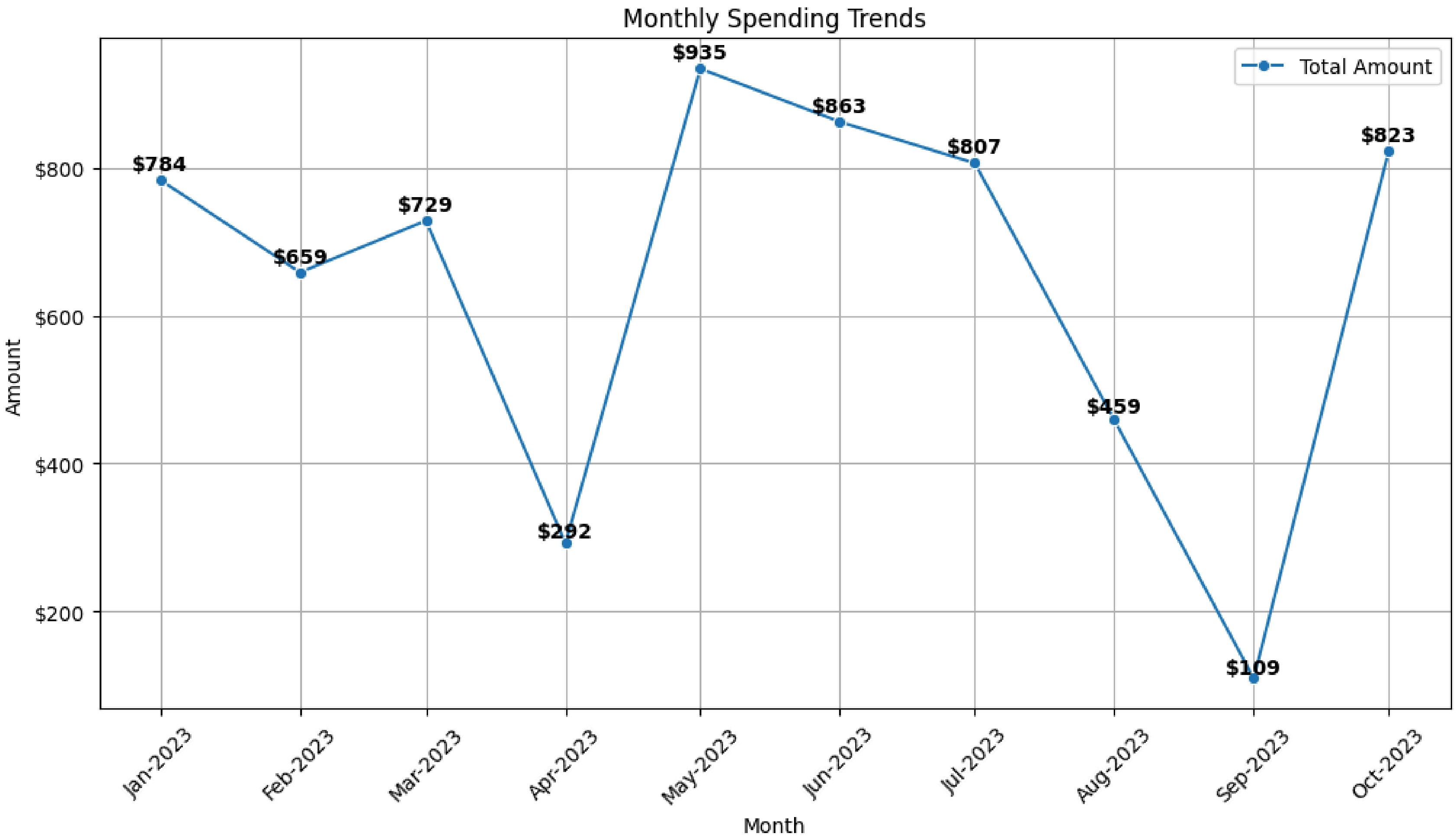
Monthly Spending Trends

In [ ]:

```
plt.figure(figsize=(12, 6))
sns.lineplot(data=monthly_data, x='year_month', y='total_amount', marker='o', label='Total Amount')
formatter = FuncFormatter(lambda x, _: f'${x:,.0f}')
plt.gca().yaxis.set_major_formatter(formatter)
for i in range(len(monthly_data)):
    plt.text(
        monthly_data['year_month'].iloc[i],
        monthly_data['total_amount'].iloc[i]  + monthly_data['total_amount'].iloc[i] * 0.01,
        f'${monthly_data["total_amount"].iloc[i]:,.0f}',
        ha='center',
        va='bottom',
        fontsize=10,
        fontweight='bold'
    )

date_format = DateFormatter('%b-%Y')
```

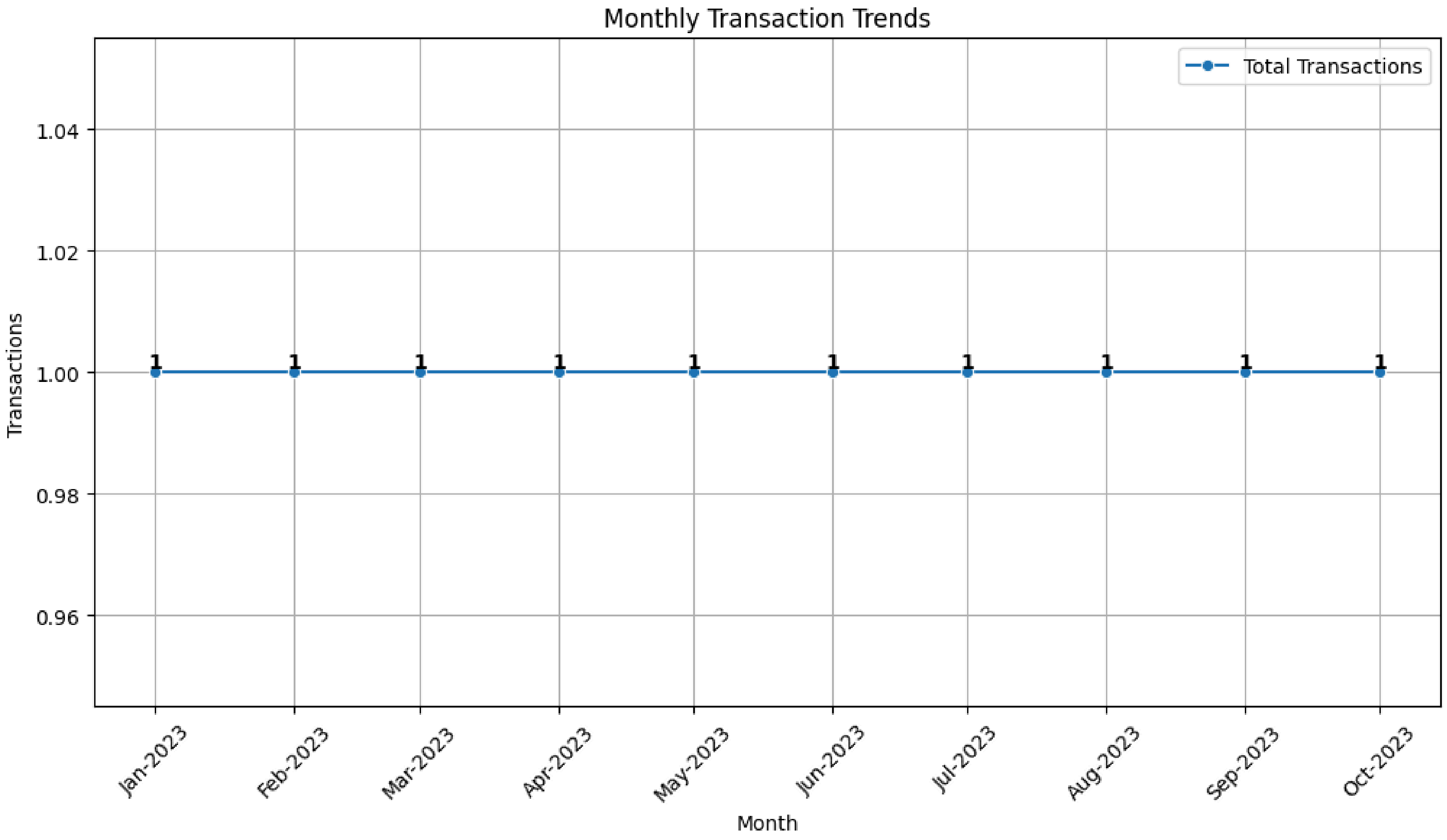
```
plt.gca().xaxis.set_major_formatter(date_format)
plt.xticks(rotation=45)
plt.title('Monthly Spending Trends')
plt.xlabel('Customer', fontweight='bold')
plt.ylabel('Total Spend', fontweight='bold')
plt.legend()
plt.grid(True)
plt.show()
```



Monthly Transaction Trends

In [ ]:

```
plt.figure(figsize=(12, 6))
sns.lineplot(data=monthly_data, x='year_month', y='transaction_count', marker='o', label='Total Transactions')
for i in range(len(monthly_data)):
    plt.text(
        monthly_data['year_month'].iloc[i],
        monthly_data['transaction_count'].iloc[i],
        f'{monthly_data["transaction_count"].iloc[i]}',
        ha='center',
        va='bottom',
        fontsize=10,
        fontweight='bold'
    )
date_format = DateFormatter('%b-%Y')
plt.gca().xaxis.set_major_formatter(date_format)
plt.xticks(rotation=45)
plt.title('Monthly Transaction Trends')
plt.xlabel('Customer', fontweight='bold')
plt.ylabel('Total Spend', fontweight='bold')
plt.legend()
plt.grid(True)
plt.show()
```

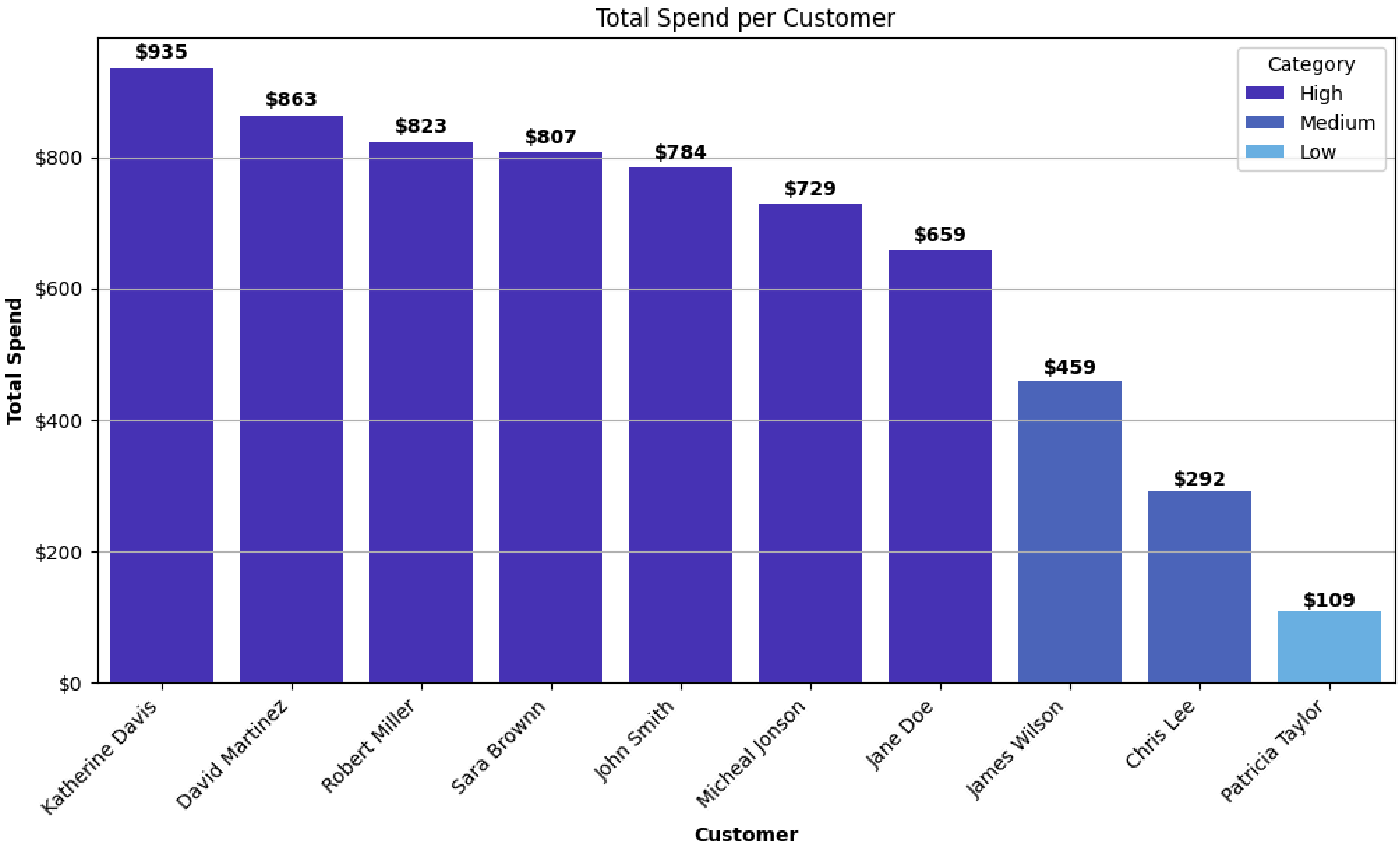


Total Spent by Customer

In [ ]:

```
customer_spend = df.groupby('customer_name')['amount'].sum().reset_index()
customer_spend = customer_spend.sort_values(by='amount', ascending=False).reset_index(drop=True)
customer_spend['Category'] = 'other'  # Add a default category
customer_spend.loc[customer_spend['amount'] >= 500, 'Category'] = 'High'  # Add a category for customers who spent mo
customer_spend.loc[customer_spend['amount'] < 500, 'Category'] = 'Medium'  # Add a category for customers who spent m
customer_spend.loc[customer_spend['amount'] <= 200, 'Category'] = 'Low'  # Add a category for customers who spent 100
palette = {'medium': '#3A1FCD', 'high': '#3A5FCD', 'low': '#56B3FA'}
```

```python
# Plot
plt.figure(figsize=(12, 6))
sns.barplot(x='customer_name', y='amount', hue='Category', data=customer_spend, palette=list(palette.values()))
formatter = FuncFormatter(lambda x, _: f'${x:,.0f}')
for i in range(len(monthly_data)):
    plt.text(
        customer_spend['customer_name'].iloc[i],
        customer_spend['amount'].iloc[i]  + customer_spend['amount'].iloc[i] * 0.01,
        f'${customer_spend["amount"].iloc[i]:,.0f}',
        ha='center',
        va='bottom',
        fontsize=10,
        fontweight='bold'
    )
plt.gca().yaxis.set_major_formatter(formatter)
plt.xticks(rotation=45, ha='right')
plt.title('Total Spend per Customer')
plt.xlabel('Customer', fontweight='bold')
plt.ylabel('Total Spend', fontweight='bold')
plt.grid(axis='y')
plt.show()
```


Total Spend per Customer
Category
High
Medium
Low
Total Spend
$0
$200
$400
$600
$800
$935
$863
$823
$807
$784
$729
$659
$459
$292
$109
Katherine Davis
David Martinez
Robert Miller
Sara Brownn
John Smith
Micheal Jonson
Jane Doe
James Wilson
Chris Lee
Patricia Taylor
Customer