

## Task 5

**ProDigy infotech Analyze traffic accident data to identify patterns related to road conditions, weather, and time of day. Visualize accident hotspots and contributing factors.**

Step 1: Import Required Libraries

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

Step 2: Load Dataset

```
▶ data = pd.read_csv("/content/BMW_car.csv")  
data.head(5)
```

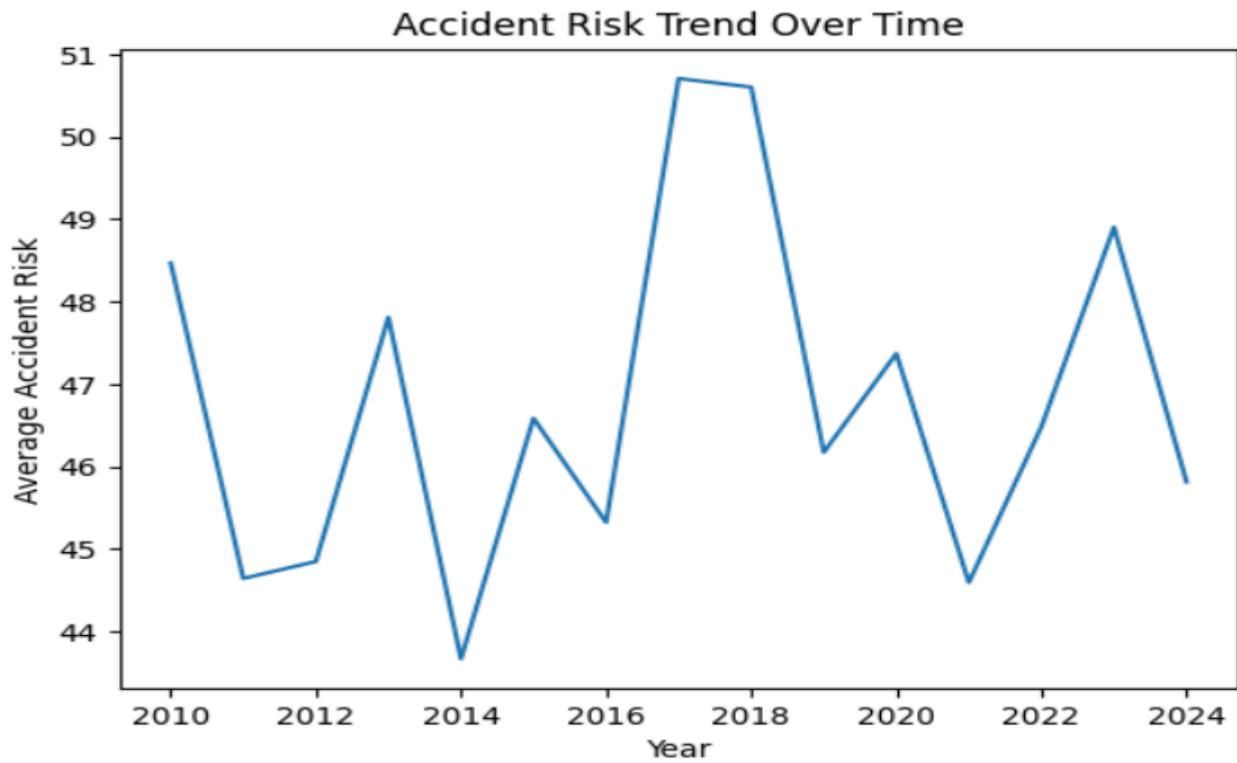
	Model	Year	Region	Color	Fuel_Type	Transmission	Engine_Size_L	Mileage_KM	Price_USD	Sales_Volume	Sales_Classification
0	5 Series	2016	Asia	Red	Petrol	Manual	3.5	151748.0	98740.0	8300.0	High
1	i8	2013	North America	Red	Hybrid	Automatic	1.6	121671.0	79219.0	3428.0	Low
2	5 Series	2022	North America	Blue	Petrol	Automatic	4.5	10991.0	113265.0	6994.0	Low
3	X3	2024	Middle East	Blue	Petrol	Automatic	1.7	27255.0	60971.0	4047.0	Low
4	7 Series	2020	South America	Black	Diesel	Manual	2.1	122131.0	49898.0	3080.0	Low

Step 3: Create Accident Risk Indicator (Derived Column)

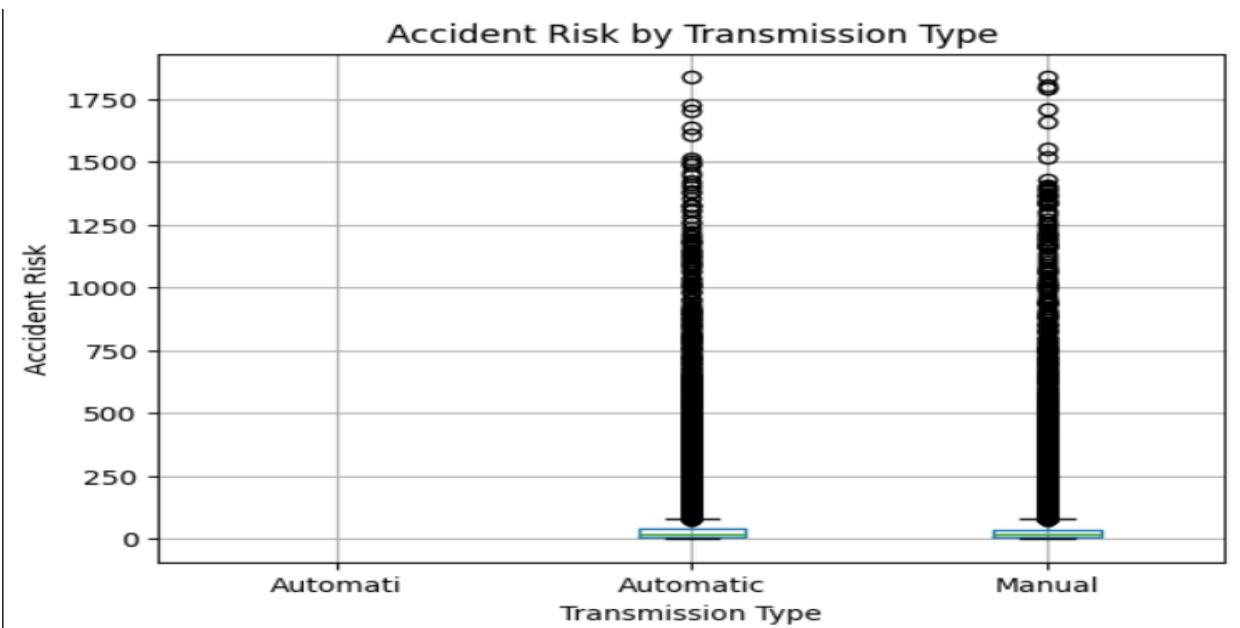
```
data['Accident_Risk'] = data['Mileage_KM'] / data['Sales_Volume']
```

Step 4: Accident Risk Trend Over Time (LINE PLOT)

```
▶ year_risk = data.groupby('Year')['Accident_Risk'].mean()  
plt.figure()  
plt.plot(year_risk.index, year_risk.values)  
plt.xlabel("Year")  
plt.ylabel("Average Accident Risk")  
plt.title("Accident Risk Trend Over Time")  
plt.show()
```



```
data.boxplot(column='Accident_Risk', by='Transmission')
plt.xlabel("Transmission Type")
plt.ylabel("Accident Risk")
plt.title("Accident Risk by Transmission Type")
plt.suptitle("")
plt.show()
```

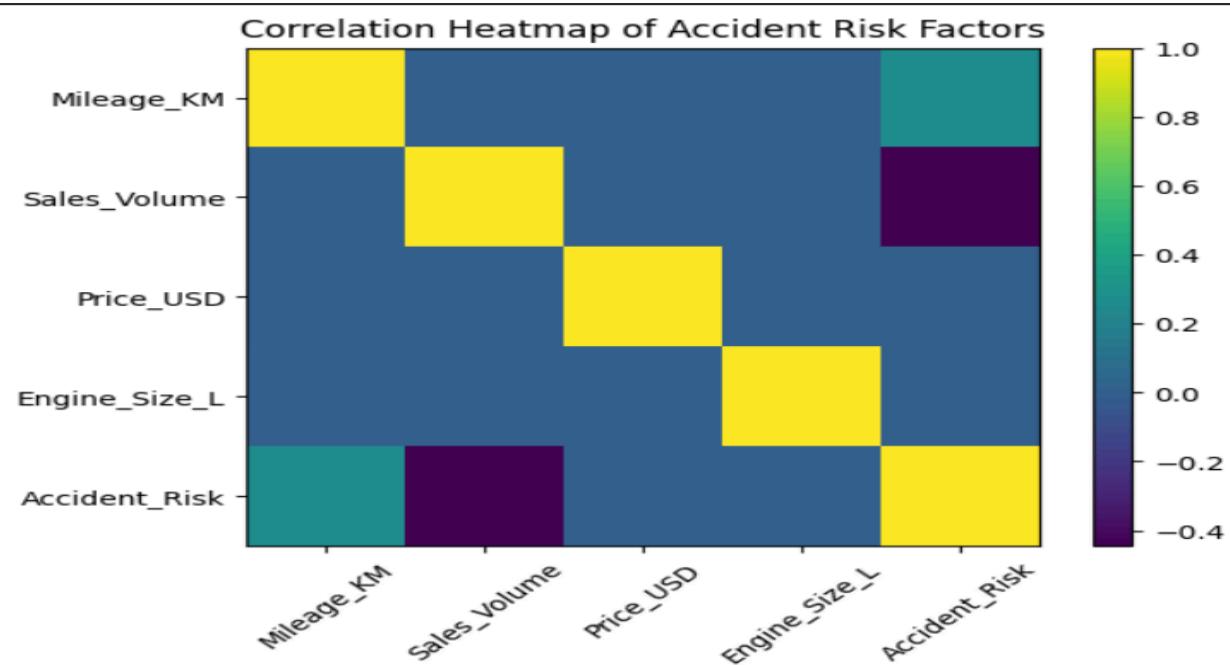


```

▶ corr_data = data[['Mileage_KM', 'Sales_Volume', 'Price_USD',
                   'Engine_Size_L', 'Accident_Risk']].corr()

plt.figure()
plt.imshow(corr_data)
plt.colorbar()
plt.xticks(range(len(corr_data.columns)), corr_data.columns, rotation=45)
plt.yticks(range(len(corr_data.columns)), corr_data.columns)
plt.title("Correlation Heatmap of Accident Risk Factors")
plt.show()

```



```
▶ plt.figure()
  data['Accident_Risk'].plot(kind='kde')
  plt.xlabel("Accident Risk")
  plt.ylabel("Density")
  plt.title("Density Plot of Accident Risk")
  plt.show()
```

