Cybersecurity Threats Analysis

Contents

1 Setup

1.1 Import Packages

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

1.2 Load data

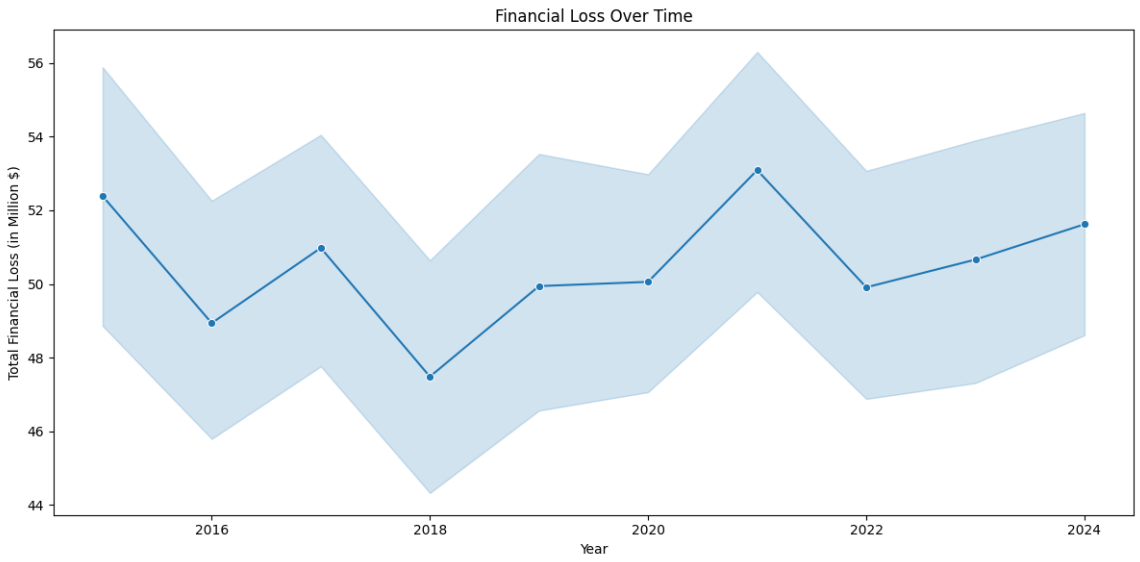
```
df = pd.read_csv('data/Global_Cybersecurity_Threats_2015-2024.csv')
df.head()
```

	Country	Year	Attack Type	Target Industry	Financial Loss (in Million $)	Numb
0	China	2019	Phishing	Education	80.53	
1	China	2019	Ransomware	Retail	62.19	
2	India	2017	Man-in-the-Middle	IT	38.65	
3	UK	2024	Ransomware	Telecommunications	41.44	
4	Germany	2018	Man-in-the-Middle	IT	74.41	

2 Trend Analysis

2.1 Overall

```
plt.figure(figsize=(12, 6))
sns.lineplot(data=df, x='Year', y='Financial Loss (in Million $)', marker='o')
plt.xlabel("Year")
plt.ylabel("Total Financial Loss (in Million $)")
plt.title("Financial Loss Over Time")
plt.tight_layout()
plt.show()
```



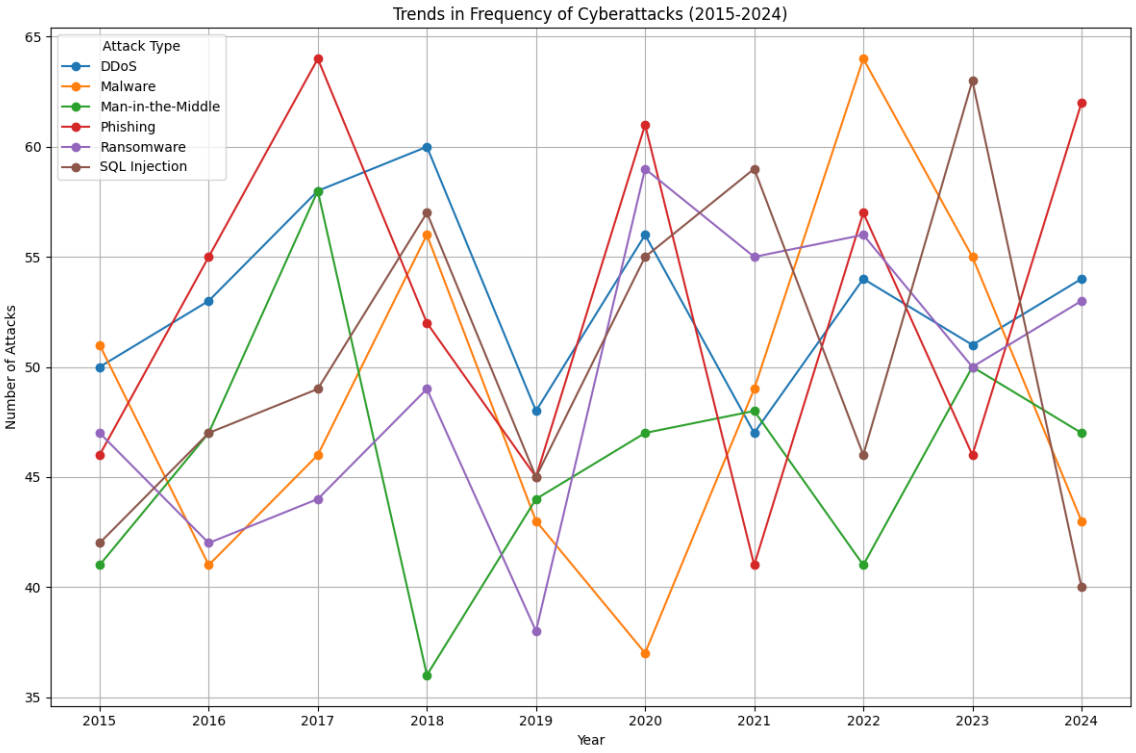
2.2 Trends in the frequency and types of cyberattacks over the years

```
# Group by Year and Attack Type
```

```
trend_df = df.groupby(['Year', 'Attack Type']).size().unstack(fill_value=0)

# Plotting the data
plt.figure(figsize=(12, 8))
for attack_type in trend_df.columns:
    plt.plot(trend_df.index, trend_df[attack_type], marker='o', label=attack_type)

plt.title('Trends in Frequency of Cyberattacks (2015-2024)')
plt.xlabel('Year')
plt.ylabel('Number of Attacks')
plt.legend(title='Attack Type')
plt.xticks(trend_df.index)  # Show all years on the x-axis
plt.grid()
plt.tight_layout()
plt.show()
```

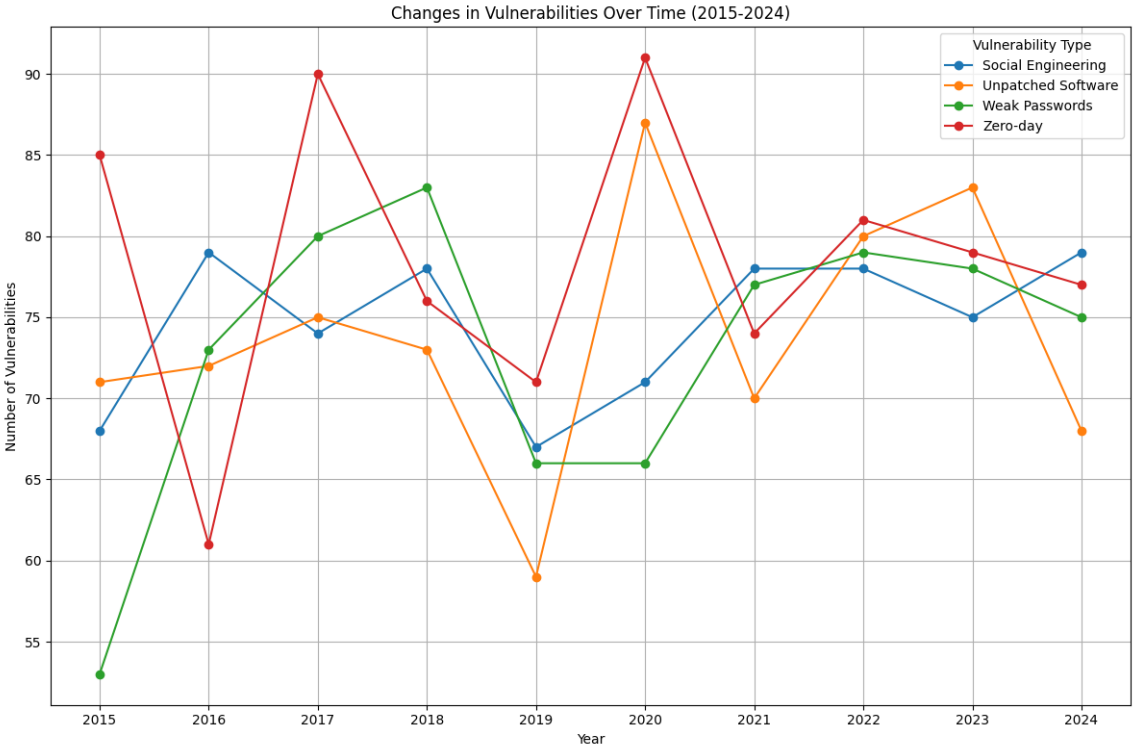


2.3 Changes in vulnerabilities over time

```
# Group by Year and Security Vulnerability Type
vulnerability_df = df.groupby(['Year', 'Security Vulnerability
↪  Type']).size().unstack(fill_value=0)

# Plotting the data
plt.figure(figsize=(12, 8))
for vulnerability in vulnerability_df.columns:
    plt.plot(vulnerability_df.index, vulnerability_df[vulnerability], marker='o',
    ↪  label=vulnerability)
```

```
plt.title('Changes in Vulnerabilities Over Time (2015-2024)')
plt.xlabel('Year')
plt.ylabel('Number of Vulnerabilities')
plt.legend(title='Vulnerability Type')
plt.xticks(vulnerability_df.index)  # Show all years on the x-axis
plt.grid()
plt.tight_layout()
plt.show()
```



3 Geographical Analysis

- Compare the frequency and impact of cyberattacks across different countries.
- Identify which countries are most affected by specific attack types.

4 Financial Impact Analysis

- Assess the total financial losses caused by cyberattacks per year or country.
- Analyze the correlation between attack types and financial losses.

5 Industry Analysis

- Determine which industries are most frequently targeted by cyberattacks.

- Assess the impact of attacks on different sectors, such as healthcare, finance, and education.

6 Vulnerability Analysis

- Identify common security vulnerabilities exploited in attacks.
- Analyze the effectiveness of various defense mechanisms used against attacks.

7 User Impact Analysis

- Assess how many users are affected by different attack types or in different countries.
- Explore the relationship between the number of affected users and financial losses.

8 Response Time Analysis

- Analyze the incident resolution times based on attack types or countries.
- Identify any patterns in response effectiveness.

9 Defensive Mechanism Effectiveness

- Evaluate the success rates of different defense mechanisms against various attack types.