Sales

May 25, 2024

1 Predicting daily sales of country using auto arima

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

Data Collection and Preprocessing

[2]:
```
data = pd.read_csv('Sales.csv', parse_dates=['Date'])
```

[3]:
```
data.head()
```

[3]:

	Date	Article_ID	Country_Code	Sold_Units
0	2017-08-17	1132	AT	1
1	2017-08-18	1132	AT	1
2	2017-08-21	1132	AT	1
3	2017-08-22	1132	AT	1
4	2017-09-06	1132	AT	1

[4]:
```
data.tail()
```

[4]:

	Date	Article_ID	Country_Code	Sold_Units
4844	2018-12-11	5972	SE	1
4845	2019-01-01	5972	SE	3
4846	2019-01-20	5972	SE	1
4847	2019-01-23	5972	SE	1
4848	2019-01-30	5972	SE	1

[5]:
```
data.isnull().sum()
```

[5]:
```
Date            0
Article_ID      0
Country_Code    0
Sold_Units      0
dtype: int64
```

[6]:
```
data.duplicated().sum()
```

[6]:
```
0
```

[7]:
```
data['Article_ID'] = data['Article_ID'].astype('int')
data['Country_Code'] = data['Country_Code'].str.strip()
data['Country_Code'] = data['Country_Code'].astype('str')
```

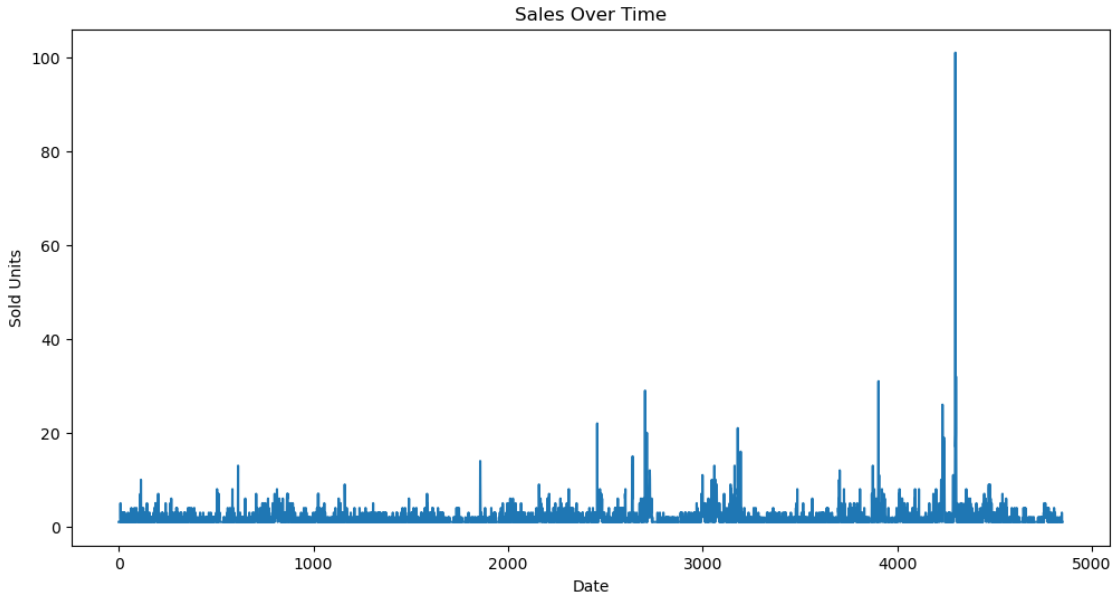
[8]:
```
data.dtypes
```

[8]:
```
Date            datetime64[ns]
Article_ID               int32
Country_Code            object
Sold_Units               int64
dtype: object
```

1.1 Exploratory Data Analysis (EDA)

1.1.1 overall sales over time

[9]:
```
plt.figure(figsize=(12, 6))
plt.plot(data.index, data['Sold_Units'])
plt.title('Sales Over Time')
plt.xlabel('Date')
plt.ylabel('Sold Units')
plt.show()
```

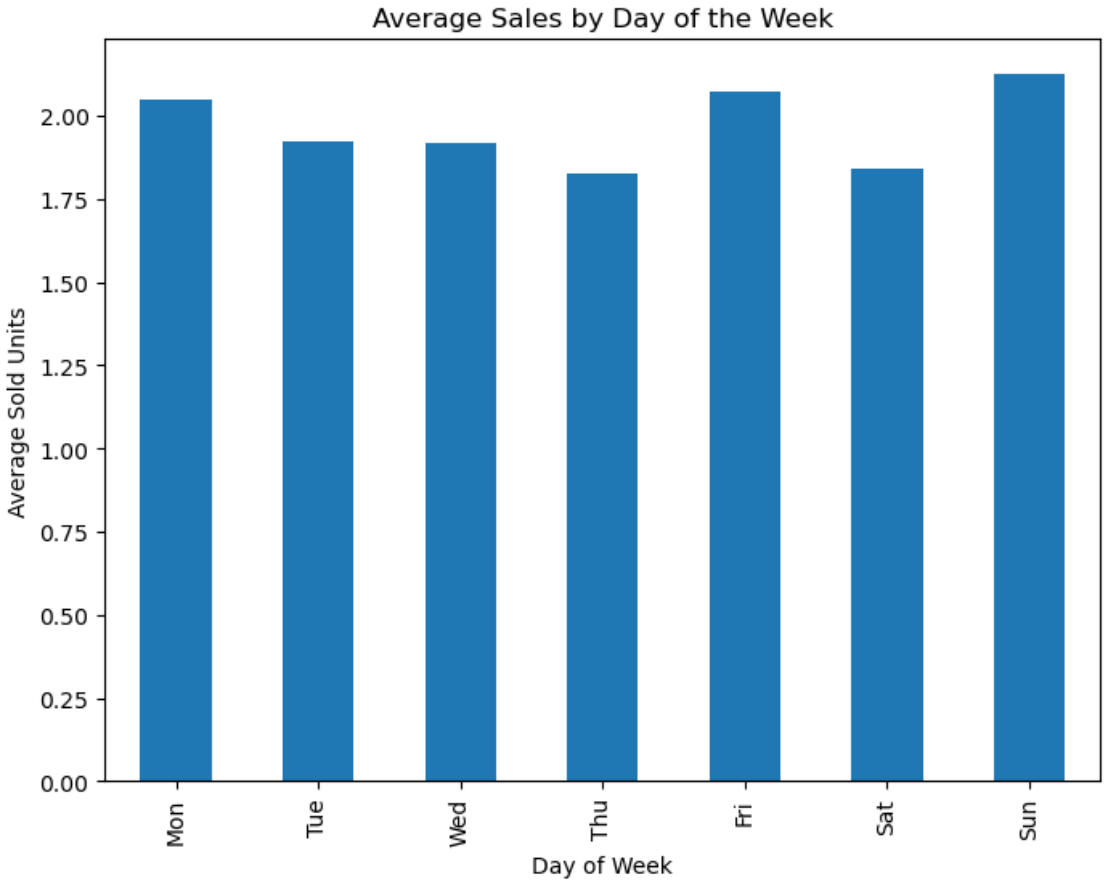


[11]:
```
data['Date'] = pd.to_datetime(data['Date'])
data.set_index('Date', inplace=True)
```

1.1.2 sales by day of the week

[12]:
```
data['day_of_week'] = data.index.dayofweek
```

[13]:
```
plt.figure(figsize=(8, 6))
data.groupby('day_of_week')['Sold_Units'].mean().plot(kind='bar')
plt.title('Average Sales by Day of the Week')
plt.xlabel('Day of Week')
plt.ylabel('Average Sold Units')
plt.xticks(ticks=np.arange(7), labels=['Mon', 'Tue', 'Wed', 'Thu', 'Fri',␣
↪'Sat', 'Sun'])
plt.show()
```



1.1.3 time series

[14]:
```
from statsmodels.tsa.seasonal import seasonal_decompose
```

[15]:
```
monthly_sales = data['Sold_Units'].resample('M').sum()
```

[16]:
```
decomposition = seasonal_decompose(monthly_sales, model='additive')
decomposition.plot()
plt.show()
```