EDA-Trend Analysis

Trend Analysis in Exploratory Data Analysis (EDA)

Trend analysis is a statistical technique used to identify patterns or trends in data over time. In the context of Exploratory Data Analysis (EDA), trend analysis helps to understand how variables change or evolve over time, which can inform business decisions and predictions.

Example:

Suppose we have a dataset containing daily sales of an e-commerce company for the past year:

Date	Sales
2022-01-01	100
2022-01-02	120
2022-01-03	110
...	...
2022-12-31	2000

To perform trend analysis, we can use a simple moving average (SMA) or exponential smoothing (ES) technique.

Code:

```
 import pandas as pd

# Load data
df = pd.read_csv('sales_data.csv')

# Create date column as datetime type
df['Date'] = pd.to_datetime(df['Date'])

# Sort by date
df.sort_values(by='Date', inplace=True)

# Calculate moving average (SMA)
df['Moving_Avg'] = df['Sales'].rolling(window=30).mean()

# Print the first 5 rows of the dataframe
print(df.head())
```

Output:

Date	Sales	Moving_Avg
2022-01-01	100	NaN
2022-01-02	120	NaN
2022-01-03	110	NaN
...	...	...
2022-12-31	2000	154.24

Interpretation:

The trend analysis reveals that the sales have been increasing over time, with a slight dip in June and July. The moving average (SMA) indicates that the sales are generally trending upwards.

Some key takeaways from this example:

1. **Identifying trends:** By analyzing the moving average, we can see that the sales have been increasing over time.
2. **Understanding seasonal fluctuations:** We observed a dip in sales during June and July, which might be due to seasonal factors like holidays or summer vacations.
3. **Informing business decisions:** The trend analysis provides valuable insights for business planning, such as forecasting future sales and adjusting marketing strategies accordingly.

Trend analysis is a fundamental concept in EDA that helps us make informed decisions based on data-driven insights.
