Chapter 1 - Getting Started

Time Series All Around Us

Whenever we are dealing with measurements collected throughout time at specified intervals, it becomes obvious that we are working with time series data and its specific challenges and complexities.

Time series data can take on different properties, by the nature of the data domain, thus requiring the practitioner to be familiar with the different methods and techniques available for analysis. These properties cluster time series data into different buckets or types depending on whether we are dealing with stationary, non-stationary, linear, non-linear, seasonal, non-seasonal, univariate, or multivariate time series data.

Time series data is all around us and in different domains and disciplines. Recent events further sparked interest in learning time series analysis and forecasting techniques, whether classical statistical methods or advanced machine learning algorithms, such as building COVID-19 prediction models, predicting presidential election outcome, or analyzing stock and cryptocurrency data.

Few examples of where time series data can be found:

* Business: Marketing planning , Inventory management, Product Demand Planning, Resource Planning, Churn analysis
* Finance: Stock analysis, Budget forecasting, Sales forecasting, Volatility Modeling
* Government: Election forecast, Economic forecasting, Gross Domestic Product (GDP), Unemployment Rate, Population migration rate, Birth Rate
* Science: Weather forecasting, Earthquake prediction, Air Quality, Species population growth
* Medical: Infectious disease transmission, Electrocardiogram monitoring (ECG or EKG), Healthcare cost prediction, Blood glucose monitoring, Hospital capacity
* Engineering: Predictive maintenance, Signal processing, Production decline analysis, Traffic volume forecasting
* Technology: Log Data, Web Traffic, Internet of Things (IoT), Server Utilization Demand
* Prevention: Credit card anomaly and fraud detection, Non-technical power loss detection, Crime rates