Infosys

Time Series Analysis

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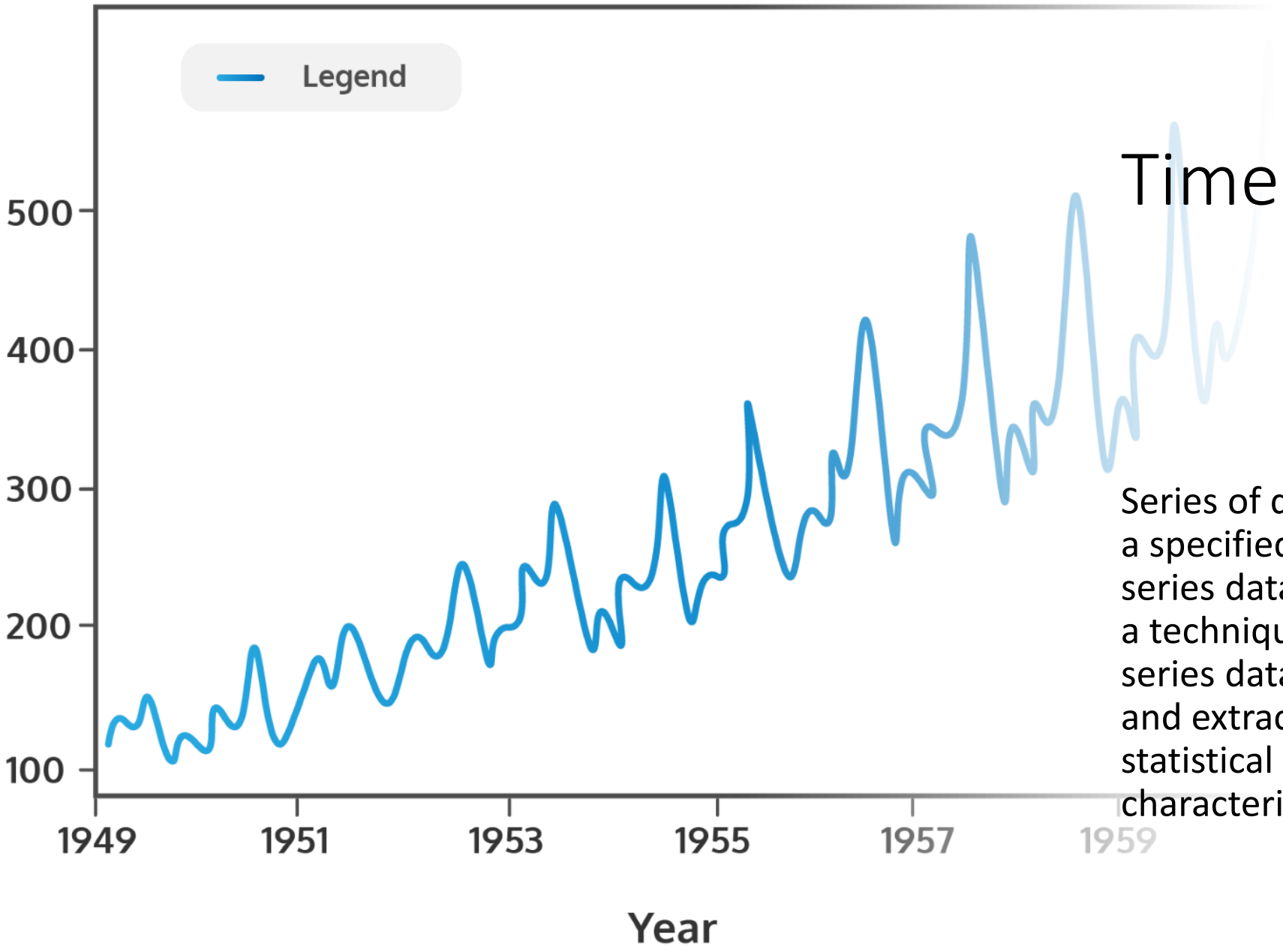

Time Series

Series of data points recorded over a specified period is called a Time series data. Time-series analysis is a technique for analyzing time series data
and extracting meaningful statistical information and characteristics of the data.

Components of Time Series

- **Long term trend**

Long term trend is the overall general direction of the data, obtained ignoring any short-term effects such as seasonal variations or noise.

- **Seasonality**

Seasonality refers to periodic fluctuations that are repeated throughout the whole time series period.

- **Stationarity**

Stationarity is an important characteristic of time series. A time series is said to be stationary if its mean, variance, and covariance do not have significant changes over time. There are many transformations that can extract the stationary part of a non-stationary process.

- **Noise**

Every set of data has noise, that refers to random fluctuations or variations due to uncontrolled factors.

- **Autocorrelation**

Autocorrelation is the correlation between the time series and a lagged version of itself and is used to identify seasonality and trend in time series data.

Metrics to Evaluate Time Series Forecast

- **MAE** (Mean Absolute Error) : Mean of absolute differences between actual value and forecasted value.
- **RMSE** (Root Mean Square Error) : Root of mean of squares of difference between actual value and forecasted value.
- **MAPE** (Mean Absolute Percentage Error) : Mean of absolute differences in percentage of actual value.
- **MASE** (Mean Absolute Scaled Error) : Divide MAE of the forecasting model by MAE of a naive forecasting model (a simple model that always forecasts one previous value).

Stationarity