



Time Series Forecasting

Profile



 [linkedin.com/in/romansyasetyo/](https://www.linkedin.com/in/romansyasetyo/)

Table of Content

What will We Learn Today?

1. Basic concept of Forecasting
2. Statistical approach
3. Machine Learning approach

Hands on using Python







What is Forecasting?



Forecasting

Time series forecasting is a technique for **predicting future events by analyzing past trends**, based on the assumption that future trends will hold similar to historical trends. Forecasting involves using models fit on historical data to predict future values.



Forecasting

Time series forecasts **inform all kinds of business decisions**. Some examples:

- Forecasting power demand to decide whether to build another power generation plant in the next five years
- Forecasting call volumes to schedule staff in a call center next week
- Forecasting inventory requirements to stock inventory to meet demand
- Forecasting infection rates to optimize disease control and outbreak programs



Forecasting

Component of Time Series data :

- Trend : change direction over a period of time
- Seasonality : periodic behavior, spikes or drops caused by different factors, for example:
 - Naturally occurring events, like weather fluctuations
 - Business or administrative procedures, like start or end of a fiscal year
 - Social and cultural behavior, like holidays or religious observances
 - Calendar events, like the number of Mondays per month or holidays shifting year to year
- Residual : irregular fluctuations that we cannot predict using trend or seasonality



Forecasting

- Naturally, there are limitations when dealing with the unpredictable and the unknown
- Data teams should use time series forecasting when they understand the business question and have the appropriate data and forecasting capabilities to answer that question
- Good forecasting works with clean, time stamped data and can identify the genuine trends and patterns in historical data
- Analysts can tell the difference between random fluctuations or outliers, and can separate genuine insights from seasonal variations





Statistical Approach





Statistical Model

- Simple Moving Average (SMA)
- Exponential Smoothing
- Autoregressive Integrated Moving Average (ARIMA)



Machine Learning Approach





Machine Learning Model

- Linear Regression
- Random Forest
- Long Short-Term Memory (LSTM)



Google Colab

<https://colab.research.google.com/>



Thank You

