

Week 2: Introduction to Forecasting (Total video duration= 1.6 hours. You will be required to spend 25 minutes/day along with practicing datasets and quizzes)

Learning Outcomes from the Module:

After learning from this module, learners will be able to understand:



Importance of the range of Forecast and its Types



Model Validation for a Time Series Dataset



Moving Average forecast and performing Hands-On in Python



Exponential Smoothing and its types, introduction to Holt-Winters Model



Comparing different Forecast models and evaluating their performance through errors like MAPE, MSE, RMSE



Mentor Session Duration:

2 hours

Faculty Name:

Dr. Abhinanda Sarkar

No. of videos:

11

Video No.	Video Name	Duration of the video(mins)	Topics Covered	Conceptual or Hands On
1	Forecast Range and Scope	10:12	The range of forecast matters and it should be done for a very long period of time. While gathering historical data, the information should not be from long past or limited in volume.	Conceptual
2	Forecast	4:28	Multiple types of forecasting techniques like Naive Forecast, Moving Average Forecast and Average Forecast.	Conceptual
3	Model Validation	7:51	Understanding Model Validation and how Training data is used to identify a few working models which are tested against observed values of the series for a hold out period.	Conceptual
4	Forecast by Average	0:36	Using Average Forecast ignores Trends and Seasonality and naturally does not work in most cases.	Conceptual
5	Moving Average Code Walkthrough	6:46	Moving Average forecast creates a new series with average values of the raw observations from the original series. Smoothing removes fine grained variations and window width needs to be defined. It is of 2 types- Centred and Trailing. Performing Hands-on in Python with Air Temperature dataset.	Conceptual+Hands-On
6	Exponential Smoothing Introduction	0:51	Incorporates Trends and Seasonality and gives different parameters of interpretation.	Conceptual
7	Exponential Smoothing method	16:21	It is a weighted average of past observations where only recent observations matter and weights decay as observations get older. Understanding Holt Winters model and Double Exponential Smoothing.	Conceptual

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8	Exponential Smoothing Method Code Walkthrough	26:38	Performing Hands-On in Python to forecast using SES Model, calculate RMSE and MAPE, plot forecasted along with original values with Oil production dataset. Using Petrol dataset to build the model, use DES to forecast sales for test data. Using Holt Winters additive ETS method	Conceptual+Hands-on
9	Types of Trend, Accuracy of Prediction Calculation_Hands-on Demo	6:49	Using Shampoo sales dataset to detrend a time series data by differencing. Types of Trends- Deterministic or Stochastic. Different types of Accuracy measures like MAE, RMSE, MAPE, MSE. Using Daily Female Births dataset with moving average forecast of window width 3 to evaluate model measures like RMSE and MAPE	Conceptual+Hands-on
10	Code Walk through of different model comparison	14:25	Hands-on in Python to build different models on Shampoo sales dataset and compare the same using evaluation measures.	Hands-on
11	Concluding Video	0:41	How Time Series is incorporated in Python, how timestamps are created, how seasonal patterns and trends are recovered through decompositions and how they can be directly modelled through differences and linear regression and how they can be measured through RMSE, MAPE etc.	Conclusion

Few textbooks that you can refer to:

1

Time Series Analysis

By James Hamilton

2

Introduction to Time Series and Forecasting

by Brockwell and Davis

