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# TIME SERIES FORECASTING: Week 2

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# DSBA CURRICULUM DESIGN

## FOUNDATIONS

- Data Science Using Python
- Statistical Methods for Decision Making

## CORE COURSES

- Advanced Statistics
- Data Mining
- Predictive Modelling
- Machine Learning
- Data Visualization
- SQL
- Time Series Forecasting (Week-2/4)

## DOMAIN APPLICATIONS

- Finance and Risk Analytics
- Marketing and Retail Analytics

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# LEARNING OBJECTIVE OF THIS COURSE

- Time Series Analysis
- Time Series Forecasting – Introduction to Forecasting
- ARIMA Models

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# LEARNING OBJECTIVES OF THIS SESSION

- Introduction to Time Series Forecasting – Taking advantage of Trend and Seasonality to get better forecasts

- Model Validation using a Train-Test Split

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# TRY ANSWERING THE FOLLOWING

- A more complicated model which estimates a lot of parameters usually always performs better (i.e. gives a better accuracy or a less error) on the training data. – True or False? Discuss.

- For Model Validation in a Time Series Forecasting problem, the train and test data can be randomly sampled. True or False? Discuss.

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# BROAD OVERVIEW

- Time Series Forecasting equips us with a lot of tools which help us to predict the "*future*".
- We do need to remember one thing that the further we predict into the future, the more unreliable or error-prone our forecasts becomes.
- In this session we will look at a case study, build different models on it and select the best model by looking at the accuracy score (i.e. the least error) on the test data.

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# Concept of Confidence Intervals:*

- When we predict certain time points into the future, we might need to have a concept of Confidence Bands/Intervals for our predictions.
- This gives the range of values for our predictions for the future time stamps
- And this range answers the question “How confident are we of our predictions?”
- Usually the range(interval) is calculated for a 95% confidence that the actual values in future will lie within the predicted range

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# Industry Application – Predicting National Income and Government Spending

Time Series Forecasting procedures are often used in Public Policy making. The government has to have to an idea about the national income and the corresponding tax collections. Certain regulations can be changed or altered keeping in mind the upcoming future forecasts. Various economic decisions are taken based on these future predictions. When a model is being fitted for such an application, usually white-box models are preferred.

Video Lecture on using Analytics in Public Policy making.

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# CASE STUDY- Predicting the Monthly Sales of a Particular Store.

In this particular case study, we are going to look at some of the descriptive measures of statistics to understand the data a bit better. Then we will go ahead and split the data into training and test. After this, we will build different models on the data and choose the most optimum model.

The objective of this session is to predict the monthly sales of a particular store for some future time stamps.

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# ANY QUESTIONS

# Data Science @ Work

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Apply **Data Science at your workplace** to gain some instant benefits:

- Get noticed by your management with your outstanding analysis backed by data science.
- Create an impact in your organization by taking up small projects/initiatives to solve critical issues using data science.
- Network with members from the data science vertical of your organization and seek opportunities to contribute in small projects.
- Share your success stories with us and the world to position yourself as a subject matter expert in data science.

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# HAPPY LEARNING