Capacity Building Training on Machine Learning

Dr. Muhammad Imran

Associate Professor

Objectives

- Introducing basic concepts and techniques of machine learning
- Honning skills to develop machine learning models, especially for time series datasets
- Enablling participants to identify the components of time series and to predict its future values

Introduction to Machine learning

Contents

Machine learning Life cycle

- ***Gathering Data***
- ***Data Wrangling***
- ***Analyze Data***
- ***Train the model***
- ***Test the model***
- ***Deployment***

Types of machine learning

- ***Supervised Learning***
  - *Classification*
  - *Regression*
- ***Unsupervised Learning***
  - *Clustering*
  - *Association*
- ***Reinforcement learning***

Introduction to Time Series Analysis

Contents

Components of Time Series Analysis

- ***Trend***
- ***Seasonality***
- ***Cyclical***
- ***Irregularity***

Data Types of Time Series

- Stationary
- Non-Stationary

Methods to Converting Non-stationary into stationary

- Detrending
- Differencing
- Transformation

Univariate Time series forecasting

Contents

Autoregressive and Moving Average Models (ARIMA) and Seasonal ARIMA (SARIMA)

- *How ARIMS works?*
- *How SARIMA works?*
- *Components of ARIMA/SARIMA models*
- *Checks for Stationary*
- *Augmented Dickey-Filler Test*
- *Training and Testing the ARIMA and SARIMA models*

Multivariate time series

Contents

Vector auto-regression (VAR)

- *How the VAR model works?*
- *Implementing Augmented Dickey-Fuller test*
- *Training/ testing the ARIMA/SARIMA model*

Deep learning for time series

- *Time Series Data prep for Models*
- *Develop ANN/LSTMs for Time series forecasting*