Introduction to R for Data Science

Session 01: Introduction to the Data Science and R

What is Data Science? Benefits and Uses of Data Science, What does Data Science involve-Data Science Process?, Era of Data Science, Business Intelligence vs Data Science, Life cycle of Data Science, Tools of Data Science, Why learn R for Data Science?

Installation and Set-Up of R and R Studio?, Overview of R Screen: R Console, R Script, R Environment-Workspace, History, R Documentation, Graphical Output, How to install Packages in R?, Basic Computations in R

Session 02: Introduction to R Basics: Data Input, Management and Manipulations in R

Introduction to R Basics, Arithmetic in R, Variables, R Basic Data Types, Vector Basics, Vector Operations, Vector Indexing and Slicing, Getting Help with R and RStudio, Comparison Operators, R Basics Training Exercise, Reading Data from Files, Reading Datasets from Different Data Format, Creating R Objects: List and Data Frame, Working with Different Data Format Types, Conversion between Different Data Format Types, Data Input, Management and Manipulations

Session 03: Arrays, Matrices, Data Frames in R

R Arrays, Array indexing, subsections of an array, R Matrices, Creating a Matrix, Matrix Arithmetic, Matrix Operations, Matrix Selection and Indexing, Factor and Categorical Matrices, Matrix Training Exercise, R Data Frames, Data Frame Basics, Data Frame Indexing and Selection, Data Frame Operations, Data Frame Exercise

Session 04: R Programming Basics, R Lists, R Markdown

Introduction to Programming Basics, Logical Operators, if, else, and else if Statements, Conditional Statements Training Exercise, Conditional Statements Training Exercise - Solutions, While Loops, For Loops, Functions, Functions Training Exercise, R Lists, Constructing and modifying lists, List – Use and Examples, List - Exercises and Solutions. R Markdown, Generating report in R Markdown.

Session 05: Basic Statistics and Test of Hypothesis in R

Basic Statistics in R-- Find Appropriate Statistics for Data, Summarize Your Data, Quantitative Techniques of Summarization, Summarizing Qualitative Data, Basic Statistics in R, Basic Statistics Training Exercise

Test of Hypothesis in R-- Introduction of Statistical Tests, How to Construct a Hypothesis, Test of Mean: Z-test and t-test, Chi Square Tests, Analysis of Variance (ANOVA), Hypothesis Training Exercises,

Session 06: Data Visualization in R

Data Visualization in R – Visualization Basics, Introduction to Graphical Methods of Presenting Data, Basic Graphical methods – Histogram, Scatter Plot, line plot, boxplot, Bar

plot – Different Types and Applications, Pie Chart in R, Adding Color to Different Plots, Data Visualization Basics Training Exercises, Data Visualization Basics Training Exercises - Solutions

Advanced Data Visualization using ggplot2 – Overview of ggplot2, Histogram, Scatterplot, Bar diagram, Box-Whisker plot, Two Variable Plotting, Coordinates and Faceting, Themes, ggplot2, Exercises, ggplot2 Exercise Solutions

Session 07: Predictive Modeling using Machine Learning with R

Introduction to Machine Learning

Linear Regression Models -- Introduction, Simple Linear Regression, Multiple Linear Regression, Select the Best Model, Understanding the Model Components, Prediction using Model, ML-Linear Regression Training Exercises-Solutions

Logistic Regression Models -- Introduction, Simple Logistic Regression, Multiple Logistic Regression, Select the Best Model, Understanding the Model Components, Adjusted Odds Ratio VS Unadjusted Odds Ratio, Prediction using Model, Logistic Regression Training Exercises, Logistic Regression Training Exercises- Solutions

Session 08: Machine Learning with R- Principal Component Analysis (PCA) & Factor Analysis, Cluster, K-means Clustering, Hierarchical Clustering

Principal Component Analysis (PCA) -- Introduction, PCA, Eigenvalues, Plotting PCA, PCA Training Exercises- Solutions, Factor Analysis -- Introduction, Factor Analysis, Rotated component matrix, Factor Analysis Training Exercises- Solutions

Introduction of Cluster Analysis, Introduction to K-Means Clustering, K Means Clustering with R, K Means Clustering Project - Solutions, Introduction to Hierarchical Clustering, Hierarchical Clustering with R, Hierarchical Clustering Training Exercises

Session 09: Machine Learning with R - K Nearest Neighbors, Decision Trees and Random Forests

Introduction to K Nearest Neighbors (KNN), K Nearest Neighbors with R, K Nearest Neighbors Project Solutions, Introduction to Tree Methods, Decision Trees and Random Forests with R, Tree Methods Project Solutions

Session 10: Machine Learning with R - Support Vector Machines (SVM), Artificial Neural Network (ANN)

Introduction to Support Vector Machines, Support Vector Machines with R, Support Vector Machines Project - Solutions, Introduction to ANN, Artificial Neural Network (ANN), Exercise & solutions

➔ **Overview of the Course, Evaluation of the Course, Certificate Giving Ceremony**