**Advanced Statistical Analytics Course in R**

1. A Brief Introduction to R
2. Installation of R and RStudio
3. Knowledge about different windows
4. Installation of packages
5. Vectors, factors
   1. create vector
   2. Adding and Deleting Vector Elements
   3. Obtaining the Length of a Vector
   4. Common Vector Operations
   5. concatenation with other vectors
   6. use of relational operators
   7. Generate subset of vectors
   8. Missing values
   9. Seq() and rep()
   10. Factors and table
6. Matrices
   1. Creating Matrices
   2. Applying Functions to Matrix Rows and Columns
   3. Adding and Deleting Matrix Rows and Columns
7. Lists and dataframes
   1. Creating Lists
   2. General List Operations
      1. List Indexing
      2. Adding and Deleting List Elements
      3. Getting the Size of a List
      4. Accessing List Components
   3. Creating Data Frames
   4. Import csv/excel files
   5. Accessing Data Frames
   6. Extracting Subdata Frames
   7. Using the rbind() and cbind() Functions
   8. Aggregation
8. Basic plots
   1. Bar Plot
   2. Scatter Plot
   3. Line Chart
   4. Pie chart
9. Descriptive Statistics
   1. Types of Variable
   2. Measure of Central Tendency
   3. Measure of dispersion
   4. Measure of shape
   5. Data summary
   6. Correlation
10. Inferential Statistics
    1. Population and Population parameters
    2. Sampling and sampling parameters
       1. Sampling Methods
       2. Standard error
       3. Central Limit Theorem
    3. Introduction to Hypothesis Testing
    4. A General Procedure for Hypothesis
       1. Formulate the Hypothesis
       2. Select the Appropriate Test
       3. Choose level of significance
       4. Type 1 & Type 2 error
       5. Confidence Interval
       6. Calculate test statistic
       7. Determine Probability Value/Critical Value
       8. Compare the probability and make the decision
11. Cross Tabulation
    1. Introduction to cross Tabulation
    2. Statistics Associated with Cross Tabulation
       1. Contingency Table
       2. Chi-Square
       3. Phi Coefficient
       4. Contingency Coefficient
12. Hypothesis Testing Related to Differences
    1. Parametric Tests
       1. One Sample
       2. Two Sample
       3. Paired Sample
       4. Anova
13. Regression
    1. Product Moment Correlation
    2. Partial Correlation
    3. Bivariate Regression and Multivariate Regression
    4. Statistics Associated with Bivariate Regression
    5. Analysis
       1. Plot Scatter Diagram
       2. Formulate the Bivariate Regression
       3. Estimate the parameters
       4. Test for Significance
    6. Residual
    7. Normalization and Scaling
    8. Prediction
    9. Assessing Prediction Accuracy
       1. Training/Test data
       2. Error Calculation
       3. Cross Validation
    10. Dummy Variable
    11. Multicollinearity
        1. Variable Inflation Factor
        2. Remedies
    12. Dummy Variable Creation
14. Logistic Regression
    1. Formulate the Problem
    2. Estimating the Binary Logit Model
    3. Model Fit
    4. Significance Testing
    5. Interpretation of coefficients
    6. Validation
       1. Precision
       2. Recall
       3. Accuracy
15. Clustering
    1. Basic Concept
    2. Statistics used for Clustering
    3. Distance or Similarity Measure
    4. K-means
    5. Hierarchical Clustering
    6. Decide on the Number of Clusters
    7. Assess Reliability and Validity
16. Association Rule Mining
17. Decision Trees
    1. Gini Index
    2. Information Gain
    3. Classification
    4. Regression
    5. Interpretation
    6. Boosting
18. Time Series Forecasting
    1. Introduction to Time series data
    2. Introduction to Forecasting
       1. Simple forecasting Methods
       2. Time Series Graphics
       3. Autocorrelation
       4. Forecast Residuals
       5. White Noise
    3. Exponential Smoothing
       1. Simple Exponential Smoothing
       2. Trend Methods
       3. Seasonal Methods
       4. ETS
    4. Time Series Decomposition
    5. Making Time Series Stationary
       1. Introduction to Stationary and Nonstationary
       2. Ordinary Differentiation
       3. Seasonal Differentiation
       4. Unit Root Test
    6. Non Seasonal ARIMA Model
    7. Seasonal ARIMA Model