R Programming

Core Analytics & Predictive Modeling

WEEKDAY & WEEKEND BATCHES
CLASSROOM & LIVE ONLINE

72 HOURS
Practical Learning

DexLab Certified

DATA SCIENCE

Training Module

Gurgaon (Head Office)

M. G. Road, Gurgaon 122 002, Delhi NCR.
+91 852 787 2444 / +91 124 450 2444

Pune

Gokhale Road, Model Colony, Pune – 411016.
+91 880 681 2444 / +91 206 541 2444

DexLab

DexLab Solutions Corporation
hello@dexlabanalytics.com
www.dexlabanalytics.com

R PROGRAMMING

❖ Introduction to R

- What is R
- What is S
- History of R
- Features of R
- SAS versus R
- R, S, and S-plus

❖ Obtaining and managing R

- Installing R
- Packages
- Input/output
- R interfaces
- R Library

❖ Functions and R programming

- Data Types
- Factors
- Numbers
- Attributes
- Entering Inputs
- Print
- Missing Objects
- Explicit Coercion
- Data Frame
- Objects
- Vectors

- **Matrix Dimensions, Matrix Design**
- **C Bind and R Bind**
- **Lists**
- **Missing Value**
- **Names**

❖ Data management

- Reading Data
- Writing data
- Reading data files with tables
- Files connection
- Reading lines of Text files

❖ Sorting Data

❖ Subsetting Data

❖ Merging Data

❖ Aggregating Data

❖ Reshaping Data

❖ Control Structures

- If
- For
- Repeat
- While
- Next
- Return

❖ Writing Functions

❖ Function arguments and options

❖ Loops:

- Lappy
- Sappy
- Tappy
- Split
- Mappy
- Apply

❖ Date and time in R

- Dates in R
- Times in R
- Operation on Dates and Time on R

Graphics and Plotting using R

❖ Basic plotting

- Creating a graph
- Density Plot
- Dot Pot
- Bar Plot
- Line charts
- Pie charts
- Box plot
- Scatter Plot
- Histogram
- Normal QQ plot

❖ Advance Plotting

- Graphical Parameters
- Lattice graphs

- Combining Plot
- Ggplots graph
- Probability graphs
- Correlograms

❖ Saving plots

❖ Random Numbers

- Generating Random Numbers
- Random Sampling

❖ Pattern Matching

- Sub
- Grep
- Regular Expression

❖ Data Manipulation & Cleaning Data in R

- Tidy R
- Dplyr

Core Analytics

❖ Introduction to Analytics

- Evolution of Analytics
- Definition of Analytics
- Scope of analytics in different industries

❖ Types of Analytics

- Descriptive Analysis
- Predictive Analysis
- Prescriptive Analysis

❖ Concepts of Analytics

- Confirmatory & Exploratory Analysis
- Different Scale of Measurement-Nominal, Ordinal, Interval
- Ratio Attribute and Variable concept
- Graphical Representation of Data
- Measures of Central Tendency-Mean, Median, Mode
- Measures of Dispersion-Range, Variance, Standard Deviation
- Measures Of Location-Quartiles, Interquartile Range
- Outliers & Box Plot Graphs

❖ Probability

- **Concept of Probability**
- **Probability mass function**
- **Random Variables-Discrete and Continuous**
- **Binomial Distribution**
- **Poisson Distribution**
- **Normal Distribution**

❖ Sampling Theory

- Concept of sampling: Population and Sample
- Types of Sampling
- Probability sampling-Simple, Stratified, Systematic
- Non probability Sampling-Convenience, Judgmental
- Testing Of Hypothesis-Null and Alternative
- Type I error and Type II error
- Significance level
- Confidence Interval

❖ Parametric Test

- Concept of Parametric test
- Z test

- T test
- Two independent sample T test
- Paired sample T test

❖ Association between Variables

- Chi square Test for Independence
- Scatter Plot
- Correlation
- Partial Correlation

❖ Analysis Of Variance (ANOVA)

- One-Way & Two-Way ANOVA

❖ Cluster Analysis

- Approaches to Cluster Analysis
- Agglomerative & Divisive methods
- Non-hierarchical methods or K Means Clustering

❖ Factor Analysis

- Principal Component analysis(PCA)
- Exploratory Factor Analysis(EFA)
- Concept of Eigen Value and Eigen Vector

Predictive Modeling

❖ Linear Regression

- Assumptions of Simple Linear Regression Model
- Method of Least squares
- Goodness of Fit model (R square and Adjusted Rsquare)
- Multiple Linear Regression Model
- Concept of Multicollinearity, Heteroscedasticity & Autocorrelation

❖ Logistic Regression

- Introduction to Logistic Regression
- Concept of Odds and Odds ratio
- The Likelihood Ratio and Wald Test
- Goodness of fit test: Hosmer-Lemeshow test
- Receiver Operating Characteristic (ROC)
- Concordance

❖ Time series Analysis

- Time Series Components: Trend, Cyclical, Seasonal and Random
- Moving Averages Concept
- Exponential Winters Method
- Random Walk Model
- Unit Root problem
- Autocorrelation Function (ACF)
- Autoregressive (AR) and Moving Average (MA) process
- Box-Jenkins Methadology
- ARIMA

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