

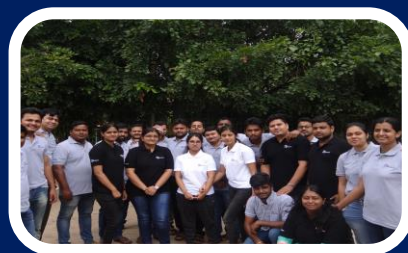
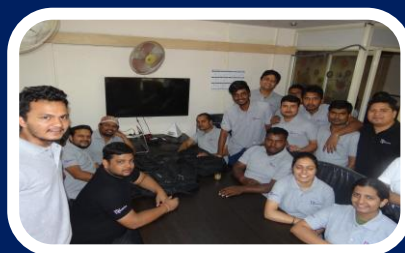
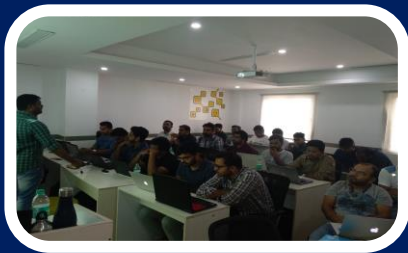


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The World would change drastically post COVID-19. People will live and rely on the digital platform. This would lead to an exponential growth in the adoption of AI and ML technologies. As a result, the demand for skilled data scientists would be sky-high. With their accurate and intelligent decision-making, data scientists would be preferred to lead businesses across domains.

We at DV Analytics train you for a successive career in the data science industry. The course of contents, and our advanced pedagogy provide you the necessary skills to excel in the industry



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OUR SUCCESSFUL STUDENTS DURING Covid-19 PANDEMIC

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DV ANALYTICS SINCE 2010

60+
Batches

1700+
Students

85% +
Success

35 Lacs
Highest and
14 Lacs Avg.
Salary pa.

50+
MNCs

10+
Faculties

Where Our Students Placed



OUR DATA SCIENCE TRAINING PROGRAM

Become a Data Scientist in just 4 months



Learn strong DBMS and Reporting skills, starting with managing of structured and unstructured data, and converting data into meaningful insights and reports. Get well-versed with Big Data, Scala framework and SQL programming. Also, get accustomed to Statistical programming languages like SAS, R, and Python

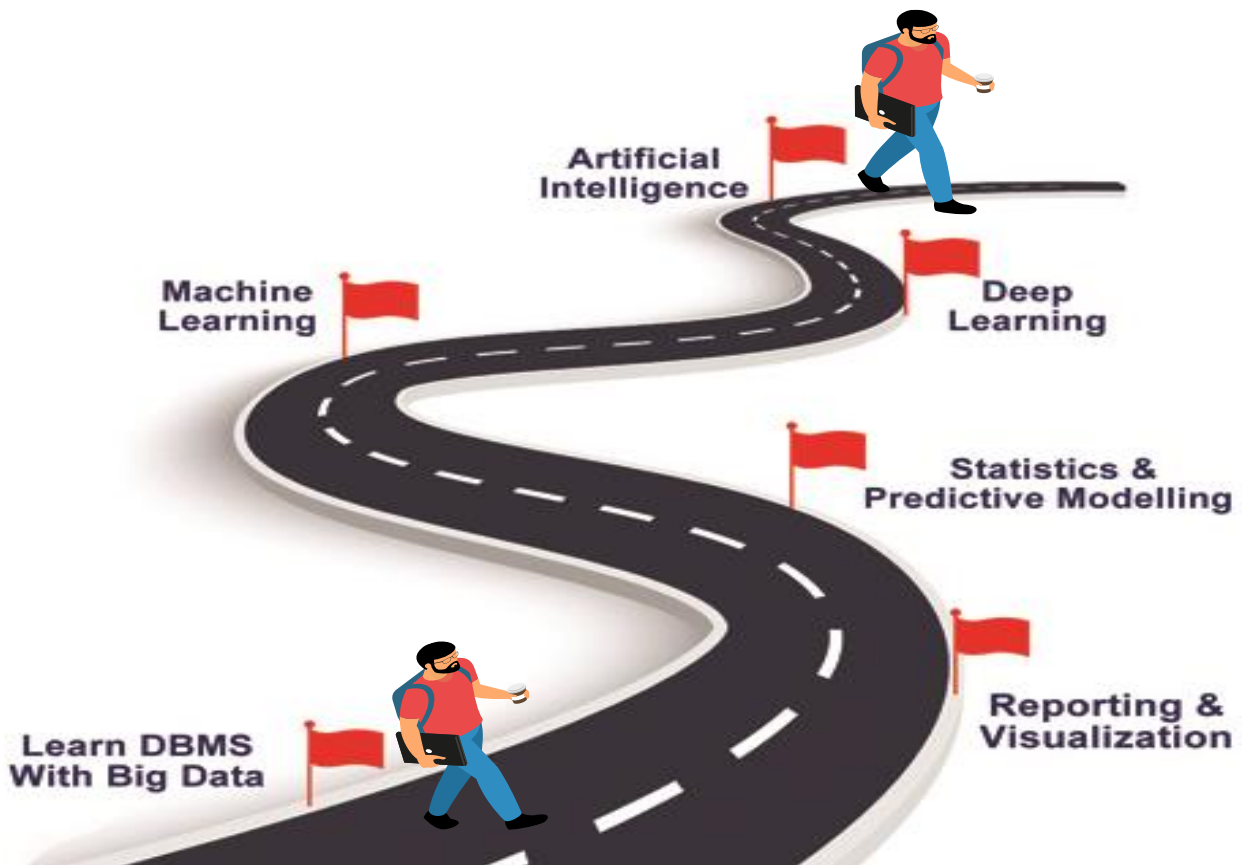


Design Complex data models using the Associative Data Model rules. Understand the KPI metrics, which are based on the measure and dimension fields. Develop your own interactive dashboards using advanced Data Visualization Tools like Tableau, Power BI, QlikView and Qlik Sense



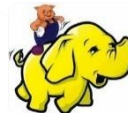
Gain knowledge into developing Predictive and Prescriptive Data Model using SAS, R, and Python. Learn the use of automated Machine Learning Algorithms and Artificial Intelligence

A DATA SCIENTIST JOURNEY WITH US



Business Applications

DBMS Programming Skills



Reporting and Visualization Skills



Data Mining, Machine Learning and AI



Data Science Full Course

DBMS and Programming



- 1 Excel Base and Advanced (VBA)
- 2 SQL server / MS Access
- 3 SAS Base and Advanced
- 4 R Programming
- 5 Python Programming
- 6 Bigdata/Spark Scala

Design complex data model using joins and relationship concept along with manipulation techniques and automation process

Analytics Type:

Managing data to create a summary view of analysis and reporting of what is happening?



Designing of KPI Metrics and prepare drill down and storytelling dashboard using advanced data visualization applications

Analytics Type:

Descriptive and Diagnostic analytics

Describe the insights based on the past information what is happening? And examine the cause of past results as why did it happen?



Data Visualization



- 1 Tableau Data Visualization Beginner to Expert
- 2 Power BI Data Visualization Beginner to Expert
- 3 Qlikview Data Visualization Beginner to Expert
- 4 QlikSense Data Visualization Beginner to Expert

Data Mining & Data Science Program



- 1 Statistics and Mathematics Foundation Program
- 2 Excel Advanced Analytics
- 3 SAS Predictive Modeling and Machine Learning
- 4 R Predictive Modeling and Machine Learning & AI
- 5 Python Predictive Modeling and Machine Learning & AI (Keras/TensorFlow)

Our solution to statistics and its business applications in terms predicting the future outcomes from the history pattern of the data

Analytics Type:

Predictive and Prescriptive analytics
What will happen? When and why? What should we do?

Action Oriented

Learn optimization technique using Machine Learning, Deep Learning and Artificial Intelligence



Excel DBMS Reporting and Visualization

Excel is one of the finest reporting tools in the analytics world. Every analyst is must start with Excel as their first analytics tool to progress further



Session-1

- Excel introduction to excel navigation process
- Excel data reading by identifying dimension and measure fields
- Excel data connection to flat files to database connection

Session-2

- Excel summary analysis using basic and advanced pivot
- Excel summary analysis using advanced pivot 110 options
- Excel slicer dashboard
- Excel power pivot

Session-3

- Excel data manipulation using formula and functions
- Excel expressions using arithmetic expressions and if then logic
- Excel Functions
- Lookup reference functions
- Character functions
- Numeric functions
- Datetime functions

Session-4

- Excel automated dashboard using advanced charts and VBA automation
- Live projects from Realtime industry experience

Excel VBA

Visual Basic for Applications. It's a programming language that enables you to control just about everything in Excel. You'll learn how to create Macros that can be run from things like a button on a spreadsheet.



Session-1

- Excel navigation through developer tab
- Record the first macro using manual process
- Get through excel vba. notation
- Do the first macro programming
- Vba programming variables

Session-2

- VBA conditional logic using If then Else if
- Conditional and logical operators
- Programming Loops and Arrays
- String Functions

Session-3

- Subs and Functions
- VBA code for data importing and connection to db
- Advanced VBA queries for sheet navigation and filters

Session-4

- Excel VBA user forms
- Excel VBA Charts, Embedded Charts, Charts and User Forms etc

MS Access (RDBMS)

Get the first step into Relational Database Management System Knowing access, we can get an understanding of query writing, joining and relationship data model designing. It is good to have access knowledge before entering in SQL, SAS, R and Python



Session-1

- What is Database
- What is table and data types in designing columns
- Concept of RDBMS
- Data Importing and Exporting in Access

Session-2

- Access Queries (select, MakeTable, append, update, delete, crosstab, union and union all)

Session-3

- Joining tables (Inner Join, Left Join, Right Join, Left Null, Right Null, Full join, Un-Matched Join)
- Relationship (one to many, many to one, one to one, many to many). Data Model designing using fact and dimension tables
- Keys (Primary Key, Foreign Keys, Composite/Candidate Keys)
- Referential Integrity

Session-4

- Access Functions and Expression
- If Then Logic, Character/Numeric/Date time functions
- Projects with industry real time data analysis experience

SQL Server

Microsoft SQL Server is a relational database management system. Primary objective is to store data and retrieve data by other software. SQL uses queries to manipulate, design complex data models

Session-1

- **Introduction SQL server and installation procedure**
- Creating database and database objects
- Dropping and using database
- SQL command over DDL, DML, DCL and DQL
- SQL create table and data types in designing table along with constraints.
- Table objects and alteration of table by adding/dropping/renaming columns
- Data importing and exporting using wizard
- Dropping/Deleting and Truncating table



Session-2

- Select Queries, SQL clauses, SQL summary query
- Advanced SQL queries using case and when, pivot and unpivot, update with case and when sub queries

Session-3

- **SQL Joins and Relationship**
 - Vertical Join- Appending
 - Horizontal Join- Merging
 - Inner Join
 - Outer Join
 - Full outer join
 - Un-matched join
 - Left outer join
 - Left null join
 - Right outer join
 - Right null join



SQL Server



Session-3

- Keys and Relationships
- SQL data model designing using fact and dimension table concept for start schema and snowflakes
- SQL sub-queries
- Sub-queries vs partition by vs with clause
- Rank () over, Dense_rank () over, Row() over etc

Session-4

- SQL Functions
 - Character
 - Numeric
 - Datetime

Session-5

- SQL Views
- SQL Store Procedure
- SQL Live projects with designing data model from complex data

SAS Base and Advanced Programming

SAS (Statistical Analysis System). SAS is a business application software which is used for DBMS and reporting, visualization and data mining purpose. To begin with sas we must start with sas data manipulation using sas programming



Session-1

- SAS Jargons and navigation though SAS PC ad SAS EG windows
- Create first dataset using cards and Datelines
- SAS programming step. SAS libraries/datasets and variables followed by criteria
- Get familiar to sas data types and reading sas into sas using proc import and export, infile and file statement. Connecting to database using proc sql connect

Session-2

- SAS Library and Datasets descriptions
- SAS options and statements using keep, drop, rename and where etc
- If then and then do statement
- Sas user defined formats. Data transposing using sas

Session-3

- SAS vertical join- appending tables and scenarios
- SAS joins and relationship. SAS merging vs SAS SQL join
- SAS fact and dimension table data model designing
- SAS relationship concept

Session-4

- SAS loops and arrays
- SAS first. And last.
- SAS functions (Character, Numeric and Datetime)

SAS Base and Advanced Programming

Session-5

- SAS Summary report (Proc means, summary, univariate, freq, report and tabulate)

Session-6 (Advanced SAS)



- Introduction to SAS SQL
- Retrieving data using
- Select, statement and clauses Where, Group by, Order by, Having clause
- Introduction to SAS SQL
- Retrieving data using
 - Select, statement and clauses Where, Group by, Order by, Having clause
- SAS SQL Options
- How to create a new table from an existing table
- Altering table, creating index and views
- Use of case and when statement
- Update query, Updating a Table with Values from Another Table
- Delete query
- Appending Table
- SAS SQL Join, Except and Intersect
- SAS SQL advanced sub-queries by examples
- Creating macro variable using sas sql

SAS Base and Advanced Programming

- SAS MainIntroduction to Macro Facility
- Creating my first macro using parameters
- Understand the concept of macro statement, options and functions
- Creating Macro Variable using %Let, Keyword and Positional parameters, Call symput
- Macro debugging options
- Conditional macro statement
- %if %then
- %do %end
- Macro Expressions
- Macro Quoting
- Macro Functions
- Storing and using of Macros





R Programming

R is a statistical programming language. However, R programming can be used for data manipulation and analysis. Hence, we must get familiar to the programming language in R

Session-1

- What is R
- Installation guide to R
- Basic features of R
- R resources
- Limitation of R
- R Nuts and Bolts
- Entering Input , Evaluation, R Objects, Numbers, Attributes, Creating Vectors, Mixing Objects, Explicit Coercion, Matrices, Lists, Factors, Missing Values, Data Frames, Names, Summary



Session-2

- R data reading importing and exporting
- Reading and Writing Data
- Reading Data Files with read. Table()
- Reading in Larger Datasets with read. Table
- Calculating Memory Requirements for R Objects

Session-3

- R packages
- Using Textual and Binary Formats for Storing Data
- File connections
- Reading Lines of a Text File
- Reading from a URL Connection
- Subsetting R Objects
- Subsetting a Vector, Subsetting a Matrix, Subsetting a Lists, Subsetting Nested Elements of a List, Extracting Multiple Elements of a List, Partial Matching, Removing NA Values

Python Programming

Python is a high-level programming language and it is mainly used in the field of mathematics and complex program designing, web development, software development and system scripting.

However, we will learn Python program uses for data analytics here

Session-1

- Python Overview and Installation steps
- Introduction to Python Editors & IDE's (Canopy, Pycharm, Jupyter, Rodeo, Ipython etc...)
- Work around Jupiter Notebook and its customized settings
- Importing Packages (NumPy, SciPy, scikit-learn, Pandas, Matplotlib, etc)
- Installing & loading Packages & Name Spaces
- Data Types & Data objects/structures
 - Strings
 - Tuples
 - Lists
 - Dictionaries
- Variable Types and Values
- Reading and writing data (Importing and Exporting)
 - Importing Data from various sources (Csv, txt, excel, access etc)
 - Database Input (Connecting to database)
 - Viewing Data objects - Subsetting, methods
 - Exporting Data to various formats
 - Important python modules: Pandas, beautiful soup



Session-2

- Data Manipulation Steps
 - Sorting/ Filtering/Duplicate data handling
 - Sampling/Subsetting/Derived variable
 - Data type conversion/Renaming

R Programming

Session-4

- R Functions (String, Numeric and Datetime)
- Loop Functions
- Looping on the Command Line, lapply(), sapply(), split(), splitting a data frame, tapply(), apply(), Col/Row sums and means, Other ways to apply, Mapply(), Vectorizing a function
- Scoping rules of R



Session-5

Managing Data Frames with the dplyr package

- Data Frames
- Merge Data Frames in R: Full and Partial Match
- The dplyr Package
- dplyr Grammar
- Installing the dplyr Package

Select (), Filter(), Arrange(), Rename(), Mutate(), Group_by(), %>%, Summary

Session-6

- Control structure
 - If Else, For Loops, Nested for Loops, While Loops, Repeat Loops, Next, Break, Summary
- Debugging
- R profiling
 - Generating Random Numbers, Setting the random number seed, Simulation a Linear Model, Random Sampling

Python Programming

Session-3

Joining and Relationship

Session-4

Control flow & conditional statements

If-Else

Loops (For and While)

Python Functions

Built-in

Text, Numeric, Date, Utility

User defined function



Session-5

- Data Analysis and Visualization steps
 - Creating graphs
 - Bar chart
 - Pie chart
 - Line chart
 - Histogram
 - Boxplot
 - Scatter
 - Density
 - Introduction to model building steps
 - Data exploration and validation
 - Descriptive statistics, Frequency Tables and summarization
 - Univariate Analysis (Distribution of data & Graphical analysis)
 - Bivariate Analysis (Cross Tabs, Distributions & Relationships, Graphical analysis)



BIGDATA Hadoop Framework

We live in data world and being a data scientist, we must understand the data structure to be managed and analysed. This course helps you to understanding complex architectures of Hadoop and its components, guide you in the right direction to start with, and quickly start working with Hadoop and its components

Session-1

- Understanding data structure and the concept of Bigdata
- Introduction to Hadoop
- Hadoop Installation process
- Hadoop Eco-system
- Hadoop Vendors in the market and Hadoop on Cloud
- BI and Data warehousing process using ETL vs ELT
- Hadoop vendors and HDFS commands

Session-2

- Introduction to Hive and Hive architect
- Hive data model, file formats in Hive
- Hive Query language vs SQL
- UDF and UDAF in Hive
- Understand modern data architecture: Data Lake
- Live project in data model design and data pipeline

Session-3

- Introduction to Pig and Pig Architect
- Pig data model, file formats in Hive
- Hive Query language vs SQL vs Pig
- UDF in Pig
- Understand how Pig Latin works in Pig
- Understand modern data architecture: Data Lake
- Live project in data model design and data pipeline



Spark and Scala with Bigdata Framework

We live in data world and being a data scientist, we must understand the data structure to be managed and analysed. This course helps you to understanding complex architectures and the skills like Scala and Spark how to manage and analyse bigdata. You will learn here Scala programming and spark2.0 data frames for reading data and manipulation. Using spark managing bigdata process and spark on AWS and Data Bricks

Session-1

- Understanding data structure and the concept of Spark Bigdata framework
- Scala IDE overview and installation process in OS
- My first programming in Scala
- Scala programming step-1
 - Variables and values, data types, Strings and basic regex, operator and expressions, Tuples,
- Scala collections
 - What is collections, Lists, Arrays, Sets, Maps,

Session-2

- Scala Programming step-2
 - Flow control (if the else if), Loops, (for and while), Functions
 - Data reading and accessing various file formats

Session-3

- Spark data frames with Scala step-3
 - Introduction to spark data frames
 - Data frame overview
 - Spark Data frames operations
 - Group by and aggregate functions
 - Missing data treatments
 - Date and time stamps
- **Data frame projects**





Tableau Data Visualization

Tableau is a powerful and fastest growing data visualization tool used in the Business Intelligence Industry. It helps in simplifying raw data into the very easily understandable format. Data analysis is very fast with Tableau and the visualizations created are in the form of dashboards and worksheets

Session-1

- Intro to Data visualization and its growing demand in the business analytics
- Tableau versions and Installation procedure
- Tableau data file for practical's
- Data Preparation
 - Live vs Extract Connection
 - Data Source Editor
 - Pivoting and Splitting Data
 - Data Interpreter
 - Using Blends
 - Unions
 - Associative data model



Session-2

- Data visualization
 - Pivot Table and Heat maps
 - Highlight Table
 - Bar Chart-Aggregate vs Dis-aggregate Data
 - Bar Chart- Bar in Bar
 - Bar Chart- Stacked Bar
 - Bar Chart- Bullet
 - Bar Chart- Combo Chart
 - Bar Charts- Histogram
 - Line Charts- Single Axis
 - Line Charts- Blended Axis
 - Line Charts- Dual Axis

Tableau Data Visualization

Session-5

- Grouping data
 - Groups
 - Set
 - Hierarchies
 - Bins
- Formatting data
 - Size
 - Updating the Axis
 - Colours, Borders and Transparency
 - Adding removing Chart Lines
 - Trend Lines, forecasting and reference lines
 - Mark labels vs annotations
 - Enabling the summary box
 - Chart titles and captions



Session-6

- Dashboard sharing
 - Publishing to PDF
 - Exporting to pivot tables and images
 - Exporting packaged workbook
 - The difference between Tableau Workbooks and Packaged workbooks
 - Publishing to Tableau sever

Tableau Data Visualization

Session-3

- Dashboard Design
 - Canvas Selection and Adjusting Size
 - Tiled and floating Objects
 - Pixel Perfect Alignment
 - Adding Images and Text
 - Adding Background Colour, Shading, Separator Lines
 - Dynamic Chart Title
 - Information Icon
 - Exclude Until Checked
 - Creating Story



Session-4

- Managing Data
 - Filters- Application and Customization
 - Action Filters
 - Action Jumps
 - Sorting your data
 - Top and Bottom N Filtering
 - Modifying Measure Aggregation Type
 - Total and Sub Totals
 - Calculations
 - ✓ **String Functions**
 - ✓ **Basic Arithmetic**
 - ✓ **Date Functions**
 - ✓ **Logic Statement**
 - Table Calculations
 - Date Aggregations
 - Discrete vs Continuous Measure
 - Level of Detail Calculations
 - Parameters – Dimension Swapping

Power BI Data Visualization

Power BI is a business analytics service by Microsoft. It aims to provide interactive visualizations and business intelligence capabilities with an interface simple enough for end users to create their own reports and dashboards

Session-1

- My first dashboard in power bi and a demo
- Introduction to POWER BI as a data visualization tools and its objects for navigation
- Data importing
 - From flat file (.csv and .txt)
 - From database file (.xlsx and .acddb)
 - From Database connection (ODBC and OLEDB)
 - From folders
 - From Web files
- Data preparation
 - Cleansing data
 - Formatting data
 - Removing duplicates
 - Adding columns and creating expression
 - Associative data model designing
- Data Visualization- Designing Interactive dashboard
 - Bar chart, Line Chart, Pie Chart, Stacked Bar Chart, Clustered column chart, Area chart, Combo chart, Scatter chart, Tree map chart, funnel chart, Gauge chart, KPIs, Tables, Slicers and connections, Maps



Session-2

- Data Model
- Joining and relationship
- Data model designing
 - Star schema
 - Snowflakes
- OLTP vs OLAP



Power BI Data Visualization

- Introduction to Data Analysis Expression (DAX)
- DAX data types, DAX operations and syntaxes, M vs DAX, Columns and measures (Aggregate functions)
- DAX time intelligence and master calendar using functions

Session-3



- **Adding Calculated field with DAX**
 - Calculated Columns vs. Measures
 - Row Context vs. Filter Context in Power BI
 - DAX Syntax & Operators
 - Common Power BI Functions
 - Basic Date & Time Formulas
 - Logical & Conditional Statements
 - Text, Math & Stats Functions
 - Joining Data with RELATED
 - CALCULATE, ALL & FILTER Functions
 - DAX Iterators (SUMX, AVERAGEX)
 - Time Intelligence Formulas
 - DAX & Power BI Best Practices

Session-4

- Personal - Enterprise Gateway
- Dashboard sharing and collaboration
 - Sharing and Collaboration
 - Sharing Dashboard
 - Sharing Workspaces
 - Sharing App
 - Publish to Web

Qlikview Data Visualization

QlikView is a powerful tool in the field of business intelligence and analytics. It is an in-memory, business discovery tool. QlikView helps big and small organizations in data discovery and interactive dashboard preparation for decision support

Session-1

- Qlikview software installation procedure
- Qlikview interactive data architect and platforms
- Qlikview windows navigations
- Qlikview data source and connections
- Get started with the main windows
- Qlikview new sheet objects
 - List Box and properties
 - Statistics Box and properties
 - Multi Box and properties
 - Table Box and properties
 - Chart and properties
 - Bar Chart (Vbar and Hbar)
 - Lines Chart
 - Pie Chart
 - Combo Chart
 - Mekko Chart
 - Scatter Chart
 - Pivot Table
 - Straight Table
 - Gauge Chart
 - Input Box and properties
 - Current Selections Boxes and properties
 - Button
 - Text Object
 - Line/Arrow Object and Properties
 - Slider/Calendar Object and properties



Qlikview Data Visualization

- Bookmark Object and properties
- Search Object and properties
- Container and properties
- Custom Objects



Session-2

- Data Source
 - Importing data from flat file like .xlsx,.txt,.csv etc.
 - Creating ODBC and OLE DB drivers
 - Extracting data from MS access
 - QVD and QVX files
- Data Model
 - Dimensions and Measure
 - Associative data model
 - Star Schema
 - Synthetic Key
 - Circular Reference
- Scripting
 - Create table using Inline
 - Importing data and scripting variable name with alias
 - Storing tables
 - Renaming tables and fields
 - Drop table
 - Deleting tables and fields
 - If nested if statement
 - Join statement
 - Keep statement
 - Concatenate and No Concatenate
 - Using mapping tables

Qlikview Data Visualization

Session-3

- Functions
 - String operators
 - String functions
 - Numeric functions
 - Datetime functions
- Advanced Expression
 - Creating Variables using Set and Let
 - Using Variables in Expressions and Charts
 - Calling variables in objects
- Conditional Functions
 - If function
 - Class function
 - Pick function



Session-4

- Security
 - Hidden Script
 - Section Access
 - Section access fields
 - Reduction fields
 - Initial data reduction
 - Omitting fields
 - Document Level Security
 - Sheet Level security



QlikSense Data Visualization

Qlik Sense Desktop is a Windows application that gives individuals the opportunity to use Qlik Sense and create personalized, interactive data visualizations, reports, and dashboards from multiple data sources with drag-and-drop ease

Session-1

- What is Qlik Sense and how does it work
- QlikSense for desktop and installation
- Opening QlikSense Desktop
- Opening App
- Sheet View
- Data loading in Qlik Sense
- Creating a new app
- Data loading from flat files
- Adding connections
- ODBC data connection
- OLEDB data connection
- Editing the data load script
- Debugging the load script



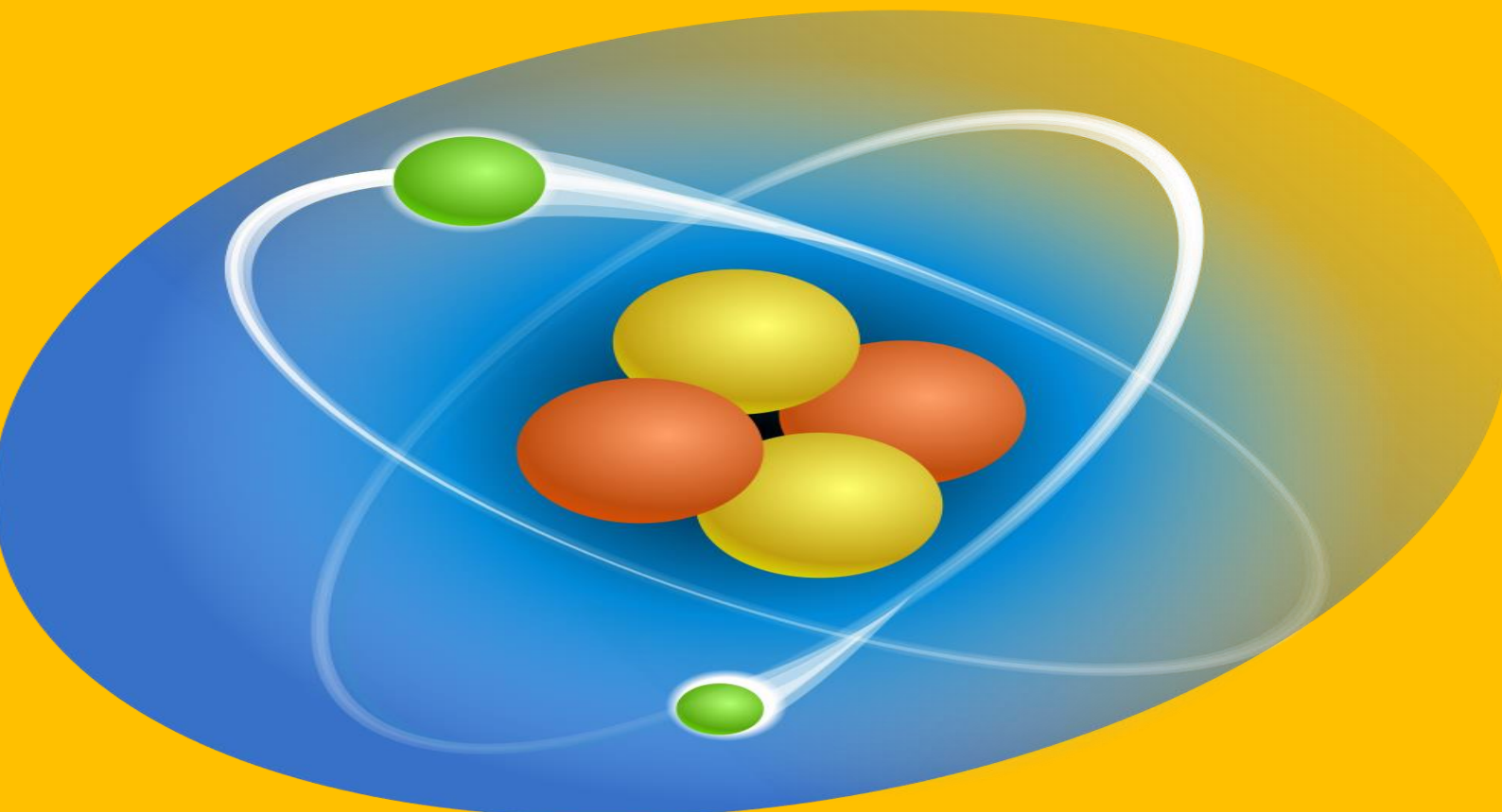
Session-2

Visualization in app

- Measures and dimensions
- Visualizations
 - Filter Panes, Pie Chart, Bar Chart, Combo Chart
 - Text and Image Chart, Gauge, Line Chart, Treemap
- Making selections
 - Click Selection
 - Draw Selection
 - Range Selection
 - Lasso Selection
 - Legend Selection
 - Label Selection

QlikSense Data Visualization

- Selection States
 - Green, White and Gray
 - Making the first selection
 - Selecting regions and product type
 - The excluded values
 - Selected excluded values
 - Stepping back in the selection history
- Storytelling
 - Creating simple story and switching between data storytelling and the app context
 - Label Selection





Introduction to statistics



Excel Basic Statistics and Add-in

- Types of Data
- Qualitative vs Quantitative (Continuous Vs Discrete)
- Measurement Scales (Nominal, Ordinal, Interval Ratio)
- Statistical term (Population and Sample)
- Excel Statistical Formula and functions
- Relative Vs Absolute Reference in Excel

Excel Descriptive Statistics

- Central tendency
- Variation
- Shapes and Arrays

Excel Statistical Charts

- Histogram and Histogram Shapes
- Box and Whisker Chart
- Scatter Diagram

Basic Probability and Distribution

- Basic Probability
- Calculate Factorial, Permutation and Combination
- Probability and Distribution
- Central Limit theorem
- Normal Distribution
- Binomial Distribution
- Poisson Distribution

Introduction to statistics

Excel Hypothesis Testing

- Introduction to Hypothesis Testing
- Hypothesis Testing and Types of error
- Test of mean, variance and proportion
- One sample z-test and two sample z-test
- One sample z-test one tail and two tail test
- Understanding P-value
- One sample p-test
- One sample t-test
- Two sample t-test equal and un-equal variance
- Two sample t-test Paired T-test
- Tests of Variance (F and Chi Square)
- F-test to Compare Variance
- Plotting F Distribution
- Chi square Test of Variance
- Chi Square Distribution



Excel Analysis of Variance (ANOVA)

- Understanding of Analysis of Variance
- Excel formula and calculation in ANOVA

Goodness of Fit and Contingency Table

- Introduction to Goodness of Fit
- Introduction to Contingency Table

Correlation and Regression

- Introduction to Correlation
- Introduction to Correlation and Coefficient Manual Calculation
- Plotting Scatter Plot and Calculating Correlation Coefficient
- Correlation and Coefficient Summary
- Correlation Vs Causation
- Coefficient of Determination
- Regression Equation
- Regression Related Function- Slope and Intercept
- Excel Regression and Time Series Analysis

Data Science in SAS

Session-1

Introduction to Statistical Analysis

What is Statistics?

Basic Statistical Concepts in Business Analytics

- Population
- Sample
- Variable
- Variable Types in Predictive Modeling Context
- Parameter
- Statistic
- Example Exercise



Statistical Analysis Methods

- Descriptive Statistics
- Inferential Statistics
- Predictive Statistics

Solving a Problem Using Statistical Analysis

- Setting Up Business Objective and Planning
- The Data Preparation
- Descriptive Analysis and Visualization
- Predictive Modeling
- Model Validation
- Model Implementation

An Example from the Real World: Credit Risk Life Cycle

- Business Objective and Planning
- Data Preparation
- Descriptive Analysis and Visualization
- Predictive Modeling
- Model Validation
- Model Implementation
- Exercise

Data Science in SAS

Analytics is the use of:

Data, information technology, statistical analysis, quantitative methods, and mathematical computer-based models to help data scientists to gain improved insight about their business operations and make better, fact-based decisions

- ✓ **Descriptive analytics**
- uses data to understand past and present
- ✓ **Predictive analytics**
- analyzes past performance
- ✓ **Prescriptive analytics**
- uses optimization techniques



Session-2

Basic Descriptive Statistics and Reporting in SAS

Rudimentary Forms of Data Analysis

- Simply Print the Data
- Print and Various Options of Print in SAS

Summary Statistics

- Central Tendencies
- Calculating Central Tendencies in SAS
- What Is Dispersion?
- Calculating Dispersion Using SAS
- Quantiles
- Calculating Quantiles Using SAS
- Box Plots
- Creating Boxplots Using SAS

Bivariate Analysis

Session-3

Data Exploration, Validation, and Data Sanitization

Data Exploration Steps in a Statistical Data Analysis Life Cycle

1. Example: Contact Center Call Volumes

Need for Data Exploration and Validation



Data Science in SAS

Issues with the Real-World Data and How to Solve Them

- Missing Values
- The Outliers
- Manual Inspection of the Dataset Is Not a Practical Solution
- Removing Records Is Not Always the Right Way

Understanding and Preparing the Data

- Data Exploration
- Data Validation
- Data Cleaning



Testing of Hypothesis

Testing: An Analogy from Everyday Life

What Is the Process of Testing a Hypothesis?

- State the Null Hypothesis on the Population: Null Hypothesis (H_0)
- Alternate Hypothesis (H_1)
- Sampling Distribution
- Central Limit Theorem
- Test Statistic
- Inference
- Critical Values and Critical Region
- Confidence Interval

Tests

- T-test for Mean
- Case Study: Testing for the Mean in SAS
- Other Test Examples
- Two-Tailed and Single-Tailed Tests
- Exercise

Session-4

Correlations and Linear Regression

What are Correlations?

- Pearson's Correlation Coefficient (r)
- Variance and Covariance
- Correlation Matrix
- Calculating Correlation Coefficient Using SAS
- Correlation Limits and Strength of Association
- Properties and Limitations of Correlation Coefficient (r)
- Some Examples on Limitations of Correlation
- Correlation vs. Causation
- Correlation Example

Correlation Summary

Data Science in SAS

Individual Impact of Independent Variables

Goodness of Fit for Logistic Regression

- Chi-square Test
- Concordance

Prediction Using Logistic Regression

Multicollinearity in Logistic Regression

- No VIF Option in PROC LOGISTIC

Logistic Regression Final Check List

Loan Default Prediction Case Study

- Background and Problem Statement
- Objective
- Data Set
- Model Building
- Final Model Equation and Prediction Using the Model

Session-7

Time Series Analysis and Forecasting

What Is a Time-Series Process?

Main Phases of Time-Series Analysis

Modeling Methodologies

Jenkins Approach

- What Is ARIMA?
- The AR Process
- The MA Process
- ARMA Process

Understanding ARIMA Using an Eyesight Measurement Analogy

Steps in the Box-Jenkins Approach

- Step 1: Testing Whether the Time Series Is Stationary
- Step 2: Identifying the Model
- Step 3: Estimating the Parameters
- Step 4: Forecasting Using the Model
- Case Study: Time-Series Forecasting Using the SAS Example
- Checking the Model Accuracy

Cluster Analysis

What is cluster analysis

Customer segmentation introduction

What is distance matrix

K-Means clustering algorithm

Super market customer segmentation case study

Data Science in SAS

Linear Regression

- Correlation to Regression
- Estimation Example

Simple Linear Regression

- Regression Line Fitting Using Least Squares
- The Beta Coefficients: Example 1
- How Good Is My Model?
- Regression Assumptions

When Linear Regression Can't Be Applied?

Simple Regression: Example

Session-5

Multiple Regression Analysis

Multiple linear regression

- Multiple Regression Line
- Multiple Regression Line Fitting Using Least Squares
- Multiple Linear Regression in SAS
- Example: Smartphone Sales Estimation
- Goodness of Fit
- Three Main Measures from Regression Output
- Multicollinearity Defined

How to Analyze the Output: Linear Regression Final Check List

- Double-Check for the Assumptions of Linear Regression
- F-test
- R-squared
- Adjusted R-Squared
- VIF
- T-test for Each Variable
- Analyzing the Regression Output: Final Check List Example

Session-6

Logistic Regression

Nonlinear Regression

SAS Logistic Regression Output Explanation

- Output Part 1: Response Variable Summary
- Output Part 2: Model Fit Summary
- Output Part 3: Test for Regression Coefficients
- Output Part 4: The Beta Coefficients and Odds Ratio
- Output Part 5: Validation Statistics





Data Science in Python, Keras and TensorFlow

Session-1

Data Preparation & Regression Analysis

- Introduction to Machine Learning
- Introduction to Machine Learning tools
- Introduction to Python
- Tools comparison
- The learning paths

Data Exploration, Validation and Sanitization

- Raw Data - issues
- Data Exploration for continuous variables
- Data Exploration for categorical variables
- Data Validation
- Data sanitization techniques
- Missing value treatment
- Outlier treatment
- Loans data case study and data cleaning

Regression Analysis

- Correlation
- Simple Regression models
- R-Square
- Multiple regression
- Multicollinearity
- Individual Variable Impact
- Air passenger's data case study
- SAT score data case study
- Super market customer segmentation case study

Session-2

Classification using Logistic Regression and Trees

Logistic Regression

- Need of logistic Regression
- Logistic regression models
- Validation of logistic regression models
- Multicollinearity in logistic regression
- Individual Impact of variables
- Confusion Matrix
- Service Provider Attrition data case study



Data Science in Python, Keras and TensorFlow

Decision Trees

- Segmentation
- Entropy
- Information gain
- Building Decision Trees
- Validation of Trees
- Pruning the trees
- Fine tuning the trees
- Prediction using Trees
- Customer retention case study

Session-3

Model Validation Techniques and Neural Networks

Model Selection and Cross validation

- How to validate a model?
- What is a best model?
- Types of data
- Types of errors
- The problem of over fitting
- The problem of under fitting
- Bias Variance Trade-off
- Cross validation
- Boot strapping
- Attrition data case study

Neural Networks

- Neural network Intuition
- Neural network and vocabulary
- Neural network algorithm
- Math behind neural network algorithm
- Building the neural networks
- Validating the neural network model
- Neural network applications
- Image recognition using neural networks



Data Science in Python, Keras and TensorFlow

Session-4

Random Forest, Boosting and NLP

Random Forest and Boosting

- Introduction
- Ensemble Learning
- How ensemble learning works
- Bagging
- Building models using Bagging
- Random Forest algorithm
- Random Forest model building
- Finetuning parameters and model selection
- Boosting Introduction
- Boosting algorithm
- GBM Model building and Validating in python

Text Mining and NLP

- What is text mining
- The NLTK package
- Preparing text for analysis
- Step by step guide to prepare text data
- Text summarisation
- Sentiment analysis
- Naïve Bayes technique for sentiment analysis
- Movie review sentiment analysis

Session-5

Introduction to TensorFlow and CNN

Deep Learning tool – Tensor Flow and Keras (Wrapper on Tensor Flow)

- Deep Learning tool TensorFlow
- Comparison with python libraries
- Introduction to TensorFlow
- TensorFlow made easy with Keras
- Setting up Keras
- Keras on TensorFlow
- Keras Basic Commands



Data Science in Python, Keras and TensorFlow

Session-5

- CNN
- CNN Introduction
- Issues with Standard ANN
- Kernel filter
- Convolution layer
- Pooling layer
- Fully connected dense layer
- Weights and number of parameters
- Back propagation
- CNN Model building
- CNN Hyperparameters
- CNN tips and tricks

List of Case Studies used in the course

1. Bank loans data cleaning – Data exploration and cleaning
2. Air passenger prediction and driver analysis -Regression
3. SAT score prediction and driver analysis -Regression
4. E-com Website sales prediction case study -Regression
5. Product sales analysis – Logistic Regression
6. Customer attrition analysis -Logistic Regression
7. Customer Survey Segmentation and Drivers – Decision Trees
8. Internet service provider customer segmentation – Decision Trees
9. Customer attrition analysis – Model selection and cross validation
10. Productivity data -Neural networks
11. Image recognition -Neural networks
12. Car Sensor IOT data -Random forest
13. E-com product classification - Boosting
14. Movie review data – Sentiment Analysis - NLP
15. Restaurants review data analysis – NLP
16. News group review text classification – NLP
17. Object Recognition problems – CNN
18. Digit recognizer – CNN





Data Science in R

Session-1

Introduction to R

- Installation procedure
- Getting Started in R
- R Environment
- R Packages
- R Data Types Vectors
- R Dataframes
- List in R
- Factor and Matrices
- R History and Scripts
- R Functions
- Errors in R



Data Handling in R

- Data handling introduction
- Importing the Datasets
- Checklist
- Subsetting the Data
- Subsetting Variable Condition
- Calculated Fields _ ifelse
- Sorting and Duplicates
- Joining and Merging
- Exporting the Data

Basic Descriptive Statistics & Reporting

- Basic Statistics, Plots and Reporting in R
- Introduction and Sampling
- Descriptive Statistics
- Percentiles and Quartiles
- Box Plots
- Creating Graphs and Conclusion

Data Science in R

Session-3

Logistic Regression

- Logistic Regression in R
- Need of Non-Linear Regression
- Logistic Function and Line
- Multiple Logistic Regression
- Goodness of Fit for a Logistic Regression
- Multicollinearity in Logistic Regression in R
- Individual Impact of Variables in R
- Model Selection in R
- Logistic Regression Conclusion



Decision Tree

- Handout – Decision Tree in R
- Introduction to Decision Tree & Segmentation
- The Decision Tree Philosophy & The Decision Tree Approach
- The Splitting criterion & Entropy Calculation
- Information Gain & Calculation
- The Decision tree Algorithm
- Split for Variable & The Decision tree-lab (Part 1)
- The Decision tree-lab (Part 2) & Validation
- The Decision tree -lab (Part3) & Overfitting
- Pruning & Complexity Parameters
- Choosing Cp & Cross Validation Error
- Two types of Pruning
- Tree Building & Model Selection-Lab

Data Science in R

Session-2

Data Cleaning and Treatment in R

- Data Cleaning Intro and Model Building Cycle
- Model Building Cycle
- Data Cleaning Case Study
- CS lab Step1 Basic Content of Dataset
- Variable Level Exploration Categorical
- Reading Data Dictionary
- Step2 lab Categorical Variable Exploration
- Step3 lab Variable level Exploration – Continuous
- Data Cleaning and Treatments
- Step 4 Treatment – Scenario 1
- Step 4 Treatment – Scenario 2
- Data Cleaning – Scenario 3



Machine Learning using R

- Regression Analysis
- Introduction and Correlation
- LAB Correlation Calculation in R
- Beyond Pearson Correlation
- From Correlation to Regression
- Regression Line Fitting in R
- R Squared
- Multiple Regression
- Adjusted R Squared
- Issue with Multiple Regression
- Multicollinearity
- Regression Conclusion

Data Science in R

Session-4

Model Selection and Cross Validation

- Model Selection and Cross Validation in R
- Introduction to Model Selection
- Sensitivity Specificity
- Sensitivity Specificity Continued
- ROC AUC
- The Best Model
- Errors
- Overfitting Underfitting
- Bias Variance Treadoff
- Holdout Data Validation
- Ten-Fold CV
- Kfold CV



Neural Network

- Neural Networks in R
- Introduction and LogReg Recap
- Decision Boundary
- Non-Linear Decision Boundary NN
- Non-Linear Decision Boundary and Solution
- Neural Network Intuition
- Neural Networks Algorithm
- Neural Network Algorithm Demo
- Building a Neural Network
- Local vs Global Min
- Lab Digit Recognizer
- Digit Recognizer Second Attempt Part 1
- Digit Recognizer Second Attempt Part 2



Data Science in R

Session-5

Support Vector Machine – SVM

- Support Vector Machine
- Introduction To SVM
- The Classifier and Decision Boundary
- SVM – The Large Margin Classifier
- The SVM Algorithms and Results
- SVM on R
- Non-Linear Boundary
- Kernel Trick
- Kernel Trick on R
- Soft Margin and Validation
- SVM Advantages, Disadvantages and Applications
- Lab Digit recognize
- SVM Conclusion

Random Forest and Boosting

- Random Forest and Boosting in R
- Introduction to Bagging RF Boosting
- Wisdom of Crowd
- Ensemble Learning
- Ensemble Models
- Bagging
- Bagging Models LAB
- Random Forest
- Random Forest LAB
- Boosting
- Boosting Illustration
- Boosting LAB



Data Science in R

Session-6

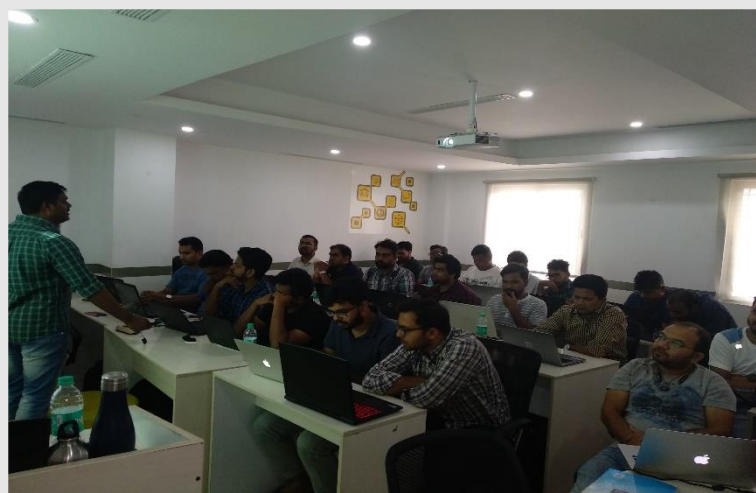
Cluster Analysis

- Handout – Cluster Analysis
- Introduction to Clustering via Segmentation
- Types of Clusters
- Similarities and Dissimilarity
- Calculating the Distance
- Calculating Distance in R
- Clustering Algorithms – Kmeans
- Kmeans Clustering on R
- More on Kmeans
- Data Standardisation and Non-numeric Data

Machine Learning Projects using R

- Consumer Loan Default Prediction
- Bank Tele Marketing
- Automobile Pricing Strategy
- Census Income
- Direct Mail Marketing
- Credit Card Ratings





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2nd Floor, CMV Tower, Maruthi Nagara,
KH Road, MalleshPalya
Karnataka, Bangalore-560075

Bhubaneswar Branch:

Govind Tower, 2nd Floor, Raghunathpur, Nandankanan
Road, Near HP Petrol Pump, Odisha,
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