Learnbay

# Advanced Data Science & AI Certification Program

**300+ Hiring** Partners

**Hybrid Model** for Project Sessions

**175% Average** Salary Hike

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Learnvista Pvt. Ltd.

# Context


About the program 01

Program highlights 02

Why learn data science? 03

Program details 04

Domain electives 05

Check out what our alumni has to say 06

Career service 07

Learning path 08

Program syllabus 09

Real-time projects and case-studies 10

Certification 11

**2cr**

Worth Scholarships awarded

**600+**

professionals secured jobs after a career break

**30k+**

Trusted Learners

# About The Program

Our Advanced Data Science and AI program is designed for professionals seeking to advance their careers in the fast-changing field. It offers a holistic learning experience with practical applications and real-world case studies. The program covers cutting-edge technologies and ethical considerations in AI to prepare working professionals for success.

**We exist to provide accessible, reasonable, and industry-relevant education that empowers India's workforce to grow and develop.**

4.79/5 | 4.66/5 | 4.8/5

Great Place To Work. Certified MAR 2023 - MAR 2024 INDIA

Thousands of student reviews on Switchup, Course Report, Google and more

# Program Highlights

### Industry-Relevant & Updated Syllabus

Learn new tools, techniques & trends. Gain app development experience

### 360 Degree Knowledge Building

Develop practical skills through real-world projects and assignments

### One on one Dedicated Mentorship

Personalized learning experience from experienced industry professionals.

### Multiple Career Opportunities

Advance in data science career by pursuing roles like data scientist, engineer, etc

# Why Learn Data Science?

60% rise in data science jobs

250% highest salary hike

300+ partner companies

Average annual salary of Data Scientist by experience

** Avg Salary in Lakhs

Demand for data science skills increased by 327%

Data Science popularity in last 5 years

## Placement Report

**30K+**
Trusted Learners

**9K+**
Successfully Placed

**50K+**
Job Interviews Cracked

Book a free consultation with expert

Contact Us

# Program Details

## ELIGIBILITY:

- **Working professional** having more than 6 months of experience in any domain (Technical/Non-Technical)

**Qualification:**

BE/B.Tech (from any branch), BBA/MBA, MCA/M.Tech, B.Com, B.Sc (in any branch)

**Course duration:** 250+ hours

**Weekday Batch:** 7 months

**Monday to Friday:** 2 hrs/day

**Weekend Batch:** 9 months

**Saturday & Sunday:** 3.5 hrs/day

## About instructors:

Experienced software development instructors share valuable practical knowledge and effective solutions, preparing students for success in the industry.

**TOTAL FEES**

₹ 99,000/- + 18% GST

**₹ 1,16,820/-**

**EASY EMI**

**₹ 9,735/month**

Financing partners

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# Domain Electives

Select any 1 domain and become a domain expert

## BFSI

Master financial analysis for strategic development success

## Healthcare

Use advanced tools & methods to gain a competitive edge

## Manufacturing

Explore advanced tech for strategic skill development

## Energy, Oil & Gas

Excel in data analysis, craft dynamic dashboard for insights

## Supply chain, E-com & Retail

Master supply chain domain with data-driven insights and strategies

# What Our Alumni's say

Shravanthi A

Data Scientist

Learnbay has helped me a lot to learn data science applications in the e-commerce industry. The live class concept was really helpful in receiving proper DS training. Thanks to all my mentors and the placement team.

**230%**
Salary Hike

Ritesh Kumar

Associate Consultant

I knew nothing about data science before I joined Learnbay. But through a variety of instructors, I steadily developed my notion and received solid knowledge and conceptual training in data science with hike of 150%.

**150%**
Salary Hike

Saurabh Kumar

Data Scientist & Statistician

When I joined Learnbay I did not have any knowledge apart from the very basics. I gradually build my concept via various trainers and get trained in data science with strong knowledge/ concepts.

**135%**
Salary Hike

# What Our Alumni's say

Preksha Mishra

Lead Data Scientist

HCL

The course structure is excellent with emphasis on concept building and tools & software at the same time. The support team is excellent and supportive and quite agile to respond to doubts.

**140%**
Salary Hike

Mohd. Israr

Data Scientist

tcs

Thanks to the Learnbay data science course & excellent guidance, I was able to ace the TCS interview and secure a job with a 210% pay raise. The real-world time projects helped me develop my concepts as a data scientist.

**210%**
Salary Hike

Ankit Biswas

Data Scientist

TheMathCompany

I come from a non-technical background. However, with Learnbay's well-structured course, amazing mentorship, and consistent support, I was able to not only enhance my skills but also land my dream career.

**180%**
Salary Hike

# Career Service

### Get 1 year of job and placement support

Unleash your career potential with 1 year of unlimited job access, interview support, and profile review.

### Get 3 mock interviews with industry leaders

Master the art of data science interviews and stay ahead of the curve with mockups and industry insights

### Resume build up session

Craft a powerful resume showcasing your expertise in data science and AI to stand out from the competition.

### Get 5-8 interview calls

Receive 5-8 interview calls from a diverse pool of interested employers/recruiters.

# Learning Path

**01 START**

**02 Python Programming**

NumPy pandas

and more...

**03 Statistics**

**04 Machine Learning**

SciPy scikit learn

and more...

**05 SQL, MongoDB**

SQL mongoDB

**06 Tableau & PowerBI**

tableau

**07 Big Data & Spark Analytics**

Spark hadoop

and more...

**08 Time Series**

**09 Deep Learning, NLP**

**10 AWS, Azure**

aws

**11 Real-time Projects**

**12 Certification**

Get globally recognized with

IBM & Microsoft

Certifications

## Career Services

**5-8 Interview Calls**

with companies that are looking for skilled professionals

# Others Vs Learnbay

| Benefits | Learnbay | Others |
|---|---|---|
| Guaranteed Interview Calls | ✓ | ✗ |
| Industry capstone project certificate from IBM | ✓ | ✗ |
| Domain specialized programs for professionals | ✓ | ✗ |
| 100% live interactive sessions with industry experts | ✓ | ✗ |
| On demand video call with industry experts | ✓ | ✗ |
| Personalized Resume Review Session | ✓ | ✗ |

# Program Syllabus

## Preparatory Session

## Module - 0 (8 hrs)

### Cohort Orientation

- A brief introduction to tools related to data
- Learn about particular real-time projects and Capstone projects
- Data and its impact on career opportunities
- Fundamental relevance of projects using data
- Role of data in businesses
- Significance of data in decision-making
- Scope of data in research and development
- Utilizing data, to enhance industrial operations and management
- Data in performance evaluation
- Data in customer segmentation

### Fundamentals of Statistics

- Mean, Median, Mode
- Standard Deviation, Average.
- Probability, permutations, and combinations
- Introduction to Linear Algebra

### Fundamentals of programming

- Types of code editors in python
- Introduction to Anaconda & Jupyter notebook
- Flavors of python
- Introduction to Git, GitHub
- Python Fundamentals
- Source code vs Byte code vs Machine code
- Compiler & Interpreter
- Memory Management in Python

**Tools Covered**

ANACONDA jupyter git GitHub

# Program Syllabus

TERM 1

## Python Programming

Module - 1 (50 hours)

### Programming Basics & Environment Setup

- Installing Anaconda, Anaconda Basics and Introduction
- Get familiar with version control, Git and GitHub.
- Basic Github Commands.
- Introduction to Jupyter Notebook environment. Basics Jupyter notebook Commands.
- Programming language basics.

### Strings, Decisions & Loop Control

- Working With Numbers, Booleans
- and Strings, String types and formatting, String operations
- Simple if Statement, if-else Statement
- if-elif Statement.
- Introduction to while Loops, for Loops, Using continue and break.

**Class hands-on :**

- 6 programs/coding exercise on string, loop and conditions in classroom

### Functions And Modules

- Introduction To Functions
- Defining & Calling Functions
- Functions With Multiple Arguments.

### Python Programming Overview

- Python Overview
- Python 2.7 vs Python 3
- Writing your First Python Program
- Lines and Indentation, Python Identifiers
- Various Operators and Operators Precedence
- Getting input from User, Comments, Multi line Comments

### Python Data Types

- List, Tuples, Dictionaries
- Python Lists, Tuples, Dictionaries Accessing Values, Basic Operations
- Indexing, Slicing, and Matrixes
- Built-in Functions & Methods
- Exercises on List, Tuples And Dictionary

### Functions And Modules

- Anonymous Functions - Lambda
- Using Built-In Modules, User-Defined Modules, Module Namespaces,
- Iterators And Generators

**Class hands-on :**

- 8+ Programs to be covered in class of functions, Lambda, modules, Generators and Packages.

# Program Syllabus

TERM 1

## Python Programming

Module - 1 (50 hours)

### File I/O An d Exceptional Handling and Regular Expression

- Opening and Closing Files
- open Function,file Object Attributes
- close() Method ,Read,write,seek.
- Exception Handling, try-finally Clause
- Raising an Exceptions,User-Defined Exceptions
- Regular Expression- Search and Replace
- Regular Expression Modifiers
- Regular Expression Patterns

**Class hands-on :**

- 10+ Programs to be covered in class from File IO, Reg-ex and exception handling.

### Data Analysis Using Pandas

- Pandas : Introduction to Pandas
- Importing data into Python
- Pandas Data Frames, Indexing Data Frames ,Basic Operations With Data frame, Renaming Columns, Subsetting and filtering a data frame.

### Data Analysis Using Numpy

- Introduction to Numpy. Array Creation, Printing Arrays, Basic Operation - Indexing, Slicing and Iterating, Shape Manipulation - Changing shape, stacking and splitting of array
- Vector stacking, Broadcasting with Numpy, Numpy for Statistical Operation.

**Assignment 1 (Week 2):**

10 Coding exercises on Python Basics - Variables, Operators, Strings, Loops, Control Statement

**Assignment 2 (Week 3):**

10 Python programs and practice set on List, Tuples, Dictionaries & Matrices operations

**Assignment 3 (Week 4):**

10 Coding exercises on Functions, Lambda, Input-Output, File and Regular Expression

# Program Syllabus

TERM 1

## Python Programming

Module - 1 (50 hours)

### Data Visualization using Matplotlib

- **Matplotlib:** Introduction, plot(), Controlling Line Properties, Subplot with Functional Method, Multiple Plot, Working with Multiple Figures, Histograms

### Data Visualization using Seaborn

- **Seaborn:** Intro to Seaborn And Visualizing statistical relationships , Import and Prepare data. Plotting with categorical data and Visualizing linear relationships.
- Seaborn Exercise

## CASE STUDY

**3 Case Study on Numpy, Pandas, Matplotlib**

**1 Case Study on Pandas And Seaborn**

**Assessment Test in Python :**

- 2 hour of Assesment Test in Python ( Coding & Objective Questions )

Real time Use cases in Python to be Covered in Class with 5 assignments

NumPy pandas matplotlib seaborn

# Program Syllabus

TERM 2

## Statistics

Module - 1 (30 hours)

### Fundamentals of Math and Probability

- Probability distributed function & cumulative distribution function. Conditional Probability, Baye's Theorem
- Problem solving for probability assignments
- Random Experiments, Mutually Exclusive Events, Joint Events, Dependent & Independent Events

### Introduction to Statistics, Statistical Thinking

- Variable and its types
- Quantitative, Categorical, Discrete, Continuous,
- *all with examples

**Five Point Summary and Box Plot**

- Outliers, Causes of Outliers, How to treat Outliers, I-QR Method and Z-Score Method

### Inferential Statistics

- Central Limit Theorem
- Point estimate and Interval estimate
- Creating confidence interval for population parameter

### All about Population & Sample

- Population vs Sample, Sample Size
- Simple Random Sampling, Systematic Sampling, Cluster Sampling, Stratified Sampling, Convenience Sampling, Quota Sampling, Snowball Sampling and Judgement Sampling

### Descriptive Statistics

- Measures of Central Tendency – Mean, Median and Mode
- Measures of Dispersion – Standard Deviation, Variance, Range, IQR (Inter-Quartile Range)
- Measure of Symmetricity/ Shape – Skewness and Kurtosis

### Inferential Statistics

- Characteristics of Z-distribution and T-Distribution.
- Type of test and rejection region.
- Type of errors in Hypothesis Testing

# Program Syllabus

TERM 2

## Statistics

## Module - 1 (30 hours)

### Fundamentals of Math and Probability

- Probability distributed function & cumulative distribution function. Conditional Probability, Baye's Theorem
- Problem solving for probability assignments
- Random Experiments, Mutually Exclusive Events, Joint Events, Dependent & Independent Events

### Linear Algebra

- Dot Product, Projecting Point on Axis.
- Matrices in Python, Element Indexing, Square Matrix, Triangular Matrix, Diagonal Matrix, Identity Matrix, Addition of Matrices, Scalar Multiplication, Matrix Multiplication, Matrix Transpose, Determinant, Trace
- T-Test, Analysis of variance (ANOVA), and Analysis of Covariance (ANCOVA) Regression analysis in ANOVA

### Class Hands-on:

- Problem solving for C.L.T Problem solving Hypothesis Testing Problem solving for T-test, Z-score test Case study and model run for ANOVA, ANCOVA

### Hypothesis Testing

- Type of test and Rejection Region
- Type o errors-Type 1 Errors, Type 2 Errors. P value method, Z score Method. The Chi-Square Test of Independence.
- Regression. Factorial Analysis of Variance. Pearson Correlation Coefficients in Depth. Statistical Significance
- Null and Alternative Hypothesis One-tailed and Two-tailed Tests, Critical Value, Rejection region, Inference based on Critical Value
- **Binomial Distribution:** Assumptions of Binomial Distribution, Normal Distribution, Properties of Normal Distribution, Z table, Empirical Rule of Normal Distribution & Central Limit Theorem and its Applications

### Data Processing & Exploratory Data Analysis

- What is Data Wrangling
- Data Pre-processing and cleaning?
- How to Restructure the data?
- What is Data Integration and Transformation

# Program Syllabus

TERM 2

## Statistics

Module - 1 (30 hours)

### EDA

- Finding and Dealing with Missing Values.
- What are Outliers?
- Using Z-scores to Find Outliers.
- Bivariate Analysis, Scatter Plots and Heatmaps.
- Introduction to Multivariate Analysis

Note: Problem-Solving Techniques and Case Studies using Statistics will be covered in class from week 2.

**Statistics Assignments : Total 4 practice set and Assignments from Statistics**

# Program Syllabus

TERM 2

## Machine Learning

Module - 2 (40 hours)

### Machine Learning Introduction

- Definition, Examples, Importance of Machine Learning
- Definition of ML Elements: Algorithm, Model, Predictor Variable, Response Variable, Training - Test Split, Steps in Machine Learning,
- **ML Models Type: Supervised Learning, Unsupervised Learning and Reinforcement Learning.**

### Data Preprocessing

- Encoding the data: Definition, Methods: OneHot Encoding, Mean Encoding, Label Encoding, Target Guided Ordinal Encoding

### Evaluation Metrics for Classification model

- Confusion Matrix, Accuracy, Misclassification, TPR, FPR, TNR, Precision, Recall, F1 Score, ROC Curve, and AUC. Using Python library Sklearn to create the Logistic Regression Model and evaluate the model created

### Data Preprocessing

- Types of Missing values (MCAR, MAR, MNAR) , Methods to handle missing values
- Outliers, Methods to handle outliers: IQR Method, Z Method
- Feature Scaling: Definition , Methods: Absolute Maximum Scaling, Min-Max Scaler , Normalization, Standardization, Robust Scaling

### Logistic Regression Model

- Definition. Why is it called the "Regression model"?
- Sigmoid Function, Transformation & Graph of Sigmoid Function

### K Nearest Neighbours Model

- Definition, Steps in KNN Model, Types of Distance: Manhattan Distance, Euclidean Distance, 'Lazy Learner Model'.
- Confusion Matrix of Multi Class Classification
- Using Python library Sklearn to create the K Nearest Neighbours Model and evaluate the model

# Program Syllabus

TERM 2

## Machine Learning

Module - 2 (40 hours)

### Decision Tree Model

- Definition, Basic Terminologies, Tree Splitting Constraints, Splitting Algorithms:
- CART, C4.5, ID3, CHAID
- Splitting Methods:
- GINI, Entropy, Chi-Square, and Reduction in Variance
- Using Python library Sklearn to create the Decision Tree Model and evaluate the model created

### Hyperparameter Tuning

- GridSearchCV, Variable Importance.
- Using Python library Sklearn to create the Random Forest Model and evaluate the model created.
- Use cases

### Random Forest Model

- Ensemble Techniques: Bagging/ bootstrapping & Boosting.
- Definition of Random Forest, OOB Score
- K-Fold Cross-Validation

### Naive Baye's Model

- Definition, Advantages, Baye's Theorem Applicability, Disadvantages of Naive Baye's Model, Laplace's Correction, Types of Classifiers: Gaussian, Multinomial and Bernoulli
- Using Python library Sklearn to create the Naive Baye's Model and evaluate the model created

## CASE STUDY

- **Business Case Study for Kart Model**
- **Business Case Study for Random Forest**
- **Business Case Study for SVM**
- **To classify an email as spam or not spam using logistic Regression.**
- **Application of Linear Regression for Housing Price Prediction**

# Program Syllabus

TERM 2

## Machine Learning

Module - 2 (40 hours)

### K Means and Hierarchical Clustering

- Definition of Clustering, Use cases of Clustering
- K Means Clustering Algorithm, Assumptions of K Means Clustering
- Sum of Squares Curve or Elbow Curve

### Hierarchical Clustering

- Dendrogram, Agglomerative Clustering, Divisive Clustering, Comparison of K Means Clustering and Hierarchical Clustering
- Using Python library Sklearn to create and evaluate the clustering model

### Principal Component Analysis(PCA)

- Definition, Curse of Dimensionality, Dimensionality Reduction Technique, When to use PCA,
- Use Cases
- Steps in PCA, EigenValues and EigenVectors, Scree Plot.
- Using Python library Sklearn to create Principal Components

### Support Vector Machine(SVM)

- Model: Definition, Use Cases, Kernel Function, Aim of Support Vectors, Hyperplane, Gamma Value, Regularization Parameter
- Using Python library Sklearn to create and evaluate the SVM Model

**Summary of all Machine Learning Models and Discussion about the Capstone Project**

Note : All Machine Learning Algorithms are covered in depth with real time case studies for each algorithm. Once 60% of ML is completed, Capstone Project will be released for the batch.

# Program Syllabus

TERM 2

## CASE STUDY

- Recommendation Engine for e-commerce/retail chain
- Twitter data analysis using NLP

# Program Syllabus

TERM 3

## SQL

## Module - 1 (14 hours)

### SQL and RDBMS

- RDBMS And SQL Operations.
- Single Table Queries - SELECT, WHERE,
- ORDER BY, Distinct, And, OR
- Multiple Table Queries: INNER, SELF,
- CROSS, and OUTER, Join, Left Join, Right
- Join, Full Join, Union

### NoSQL, HBase & MongoDB

- NoSQL Databases
- Introduction to HBase
- HBase Architecture, HBase
- Components, Storage Model of HBase.
- HBase vs RDBMS
- Introduction to Mongo DB, CRUD
- Advantages of MongoDB over RDBMS

### Programming with SQL

- Mathematical Functions
- Variables
- Conditional Logic
- Loops
- Custom Functions
- Grouping and Ordering

### Advance SQL

- Advance SQL Operations
- Data Aggregations and summarizing the data
- Ranking Functions: Top-N Analysis
- Advanced SQL Queries for Analytics

### JSON Data & CRUD

- Basics and CRUD Operation
- Databases, Collection & Documents
- Shell & MongoDB drivers
- What is JSON Data
- Create, Read, Update, Delete
- Finding, Deleting, Updating, Inserting Elements
- Working with Arrays
- Understanding Schemas and Relations

### Programming with SQL

- Partitioning
- Filtering Data
- Subqueries

# Program Syllabus

TERM 3

## SQL

### Module - 1 (14 hours)

**Assignments**

- Working with multiple tables
- Practice Joins, Grouping and Subqueries
- Using GROUP BY and HAVING Clauses
- Practice Aggregation Queries

# Program Syllabus

TERM 3

## MongoDB

## Module - 2 (14 hours)

### Introduction to MongoDB

- What is MongoDB
- Characteristics and Features
- MongoDB Ecosystem
- Installation process
- Connecting to MongoDB database
- Introduction to NoSQL
- Introduction of MongoDB module
- What are Object Ids in MongoDB

**Assignment**

- Obtain the data in the format you want by formulating queries that are both effective and high-performing.

### MongoDB (Advance)

- MongoDB Use cases
- MongoDB Structures
- MongoDB Shell vs MongoDB Server
- Data Formats in MongoDB
- MongoDB Aggregation Framework
- Aggregating Documents
- Working with MongoDB Compass & exploring data visually
- Understanding Create, Read, Update, Delete
- Schemas & Relations
- Document Structure
- Working with Numeric Data
- Working on Scheme Designing

**Tool Covered**

mongoDB

# Program Syllabus

TERM 3

## Tableau

## Module - 3 (14 hours)

### Introduction to Tableau

- Connecting to data source
- Creating dashboard pages
- How to create calculated columns
- Different charts

### Dashboard and Stories

- Working in Views with Dashboards and Stories
- Working with Sheets
- Fitting Sheets
- Legends and Quick Filters
- Tiled and Floating Layouts, Floating Objects

**Hands-on Assignments**

- Connecting data source and data cleansing
- Working with various charts
- Deployment of Predictive model in visualization

### Visual Analytics

- Getting Started With Visual Analytics
- Sorting and grouping
- Working with sets, set action
- Filters: Ways to filter, Interactive Filters
- Forecasting and Clustering

### Tableau (Advance)

- Mapping
- Coordinate points
- Plotting Latitude and Longitude
- Custom Geocoding
- Polygon Maps
- WMS and Background Image

### Tool Covered

tableau

# Program Syllabus

TERM 3

## PowerBI

## Module - 4 (14 hours)

### Getting Started With Power BI

- Installing Power BI Desktop and Connecting to Data
- Overview of the Workflow in Power BI Desktop
- Introducing the Different Views of the Data Mode
- Query Editor Interface
- Working on Data Model

### Assignments

- Create Bar charts
- Create Pie charts
- Create Tree maps
- Create Donut Charts
- Create Waterfall Diagrams
- Creating Table Calculations for Gender

### Programming with Power BI

- Working with Time Series
- Understanding aggregation and granularity
- Filters and Slicers in Power BI Maps
- Scatterplots and BI Reports
- Connecting Dataset with Power BI Creating a Customer Segmentation Dashboard Analyzing the Customer Segmentation Dashboard

### Tool Covered

Power BI

# Program Syllabus

TERM 3

## Big Data & Sparks Analytics

## Module - 5 (16 hours)

### Introduction To Hadoop & Big Data

- Distributed Architecture - A Brief Overview. Understanding Big Data
- Introduction To Hadoop, Hadoop Architecture
- HDFS, Overview of MapReduce Framework
- Hadoop Master: Slave Architecture
- MapReduce Architecture
- Use cases of MapReduce

### What is Spark

- Introduction to Spark RDD
- Introduction to Spark SQL and Data frames
- Using R-Spark for machine learning
- Hands-on:
- Installation and configuration of Spark
- Using R-Spark for machine learning programming

### Hands-on

Map reduce Use Case 1: Youtube data analysis

Map reduce Use Case 2: Uber data analytics

Spark RDD programming

Spark SQL and Data frame programming

### Tools Covered

# Program Syllabus

TERM 3

## Time Series

Module - 6 (14 hours)

### Introduction to Time Series Forecasting

- Basics of Time Series Analysis and Forecasting
- Method Selection in Forecasting
- Moving Average (MA) Forecast Example
- Different Components of Time Series Data
- Log Based Differencing, Linear Regression for Detrending

### Introduction to ARIMA Models

- ARIMA Model Calculations, Manual ARIMA Parameter Selection
- ARIMA with Explanatory Variables
- Understanding Multivariate Time Series and their Structure
- Checking for Stationarity and Differencing the MTS

## CASE STUDY

- **Time series classification of smartphone data to predict user behavior**
- **Performing Time Series Analysis on Stock Prices**
- **Time series forecasting of sales data**

Note: All the assignments and case studies will be covered in-depth with real-time examples

# Program Syllabus

TERM 4

Deep Learning Using Tensorflow

## Module - 1 (20 hours)

### Introduction to Deep Learning And TensorFlow

- Neural Network
- Understanding Neural Network Model
- Installing TensorFlow
- Simple Computation, Constants, and Variables
- Types of file formats in TensorFlow
- Creating A Graph – Graph Visualization
- Creating a Model – Logistic Regression
- Model Building using tensor flow

### Understanding Neural Networks With TensorFlow

- Basic Neural Network
- Single Hidden Layer Model
- Multiple Hidden Layer Model
- Backpropagation – Learning Algorithm and visual representation
- Understand Backpropagation – Using Neural Network Example
- TensorBoard

### TensorFlow Classification Examples

- Introduction to TensorFlow
- Installing TensorFlow
- Simple Computation, Contents
- and Variables
- Types of file formats in TensorFlow
- Creating A Graph - Graph Visualization
- Creating a Model - Logistic Regression Model Building
- TensorFlow Classification Examples

### Convolutional Neural Network (CNN)

- Convolutional Layer Motivation
- Convolutional Layer Application
- The architecture of a CNN
- Pooling Layer Application
- Deep CNN
- Understanding and Visualizing a CNN

**Project**

- Building a CNN for Image Classification
- Project on backpropagation using Neural Networks with Tensor Flow

# Program Syllabus

TERM 4

## Natural Language Processing

## Module - 2 (24 hours)

### Natural Language Processing

- Text Analytics
- Introduction to NLP
- Use cases of NLP algorithms
- NLP Libraries
- Need for Textual Analytics
- Applications of NLP
- Word Frequency Algorithms for NLP Sentiment Analysis

### Important

- Applications of Levenshtein distance
- LCS(Longest Common Sequence )
- Problems and solutions, LCS Algorithms.

**Use cases on NLP**

- Sentiment analysis for marketing
- Toxic comments classification
- Language identification
- Generating research papers titles
- Application to translate and summarize the news
- RESTful API for similarity check

### Text Analysis

- Distance Algorithms used in Text Analytics
- String Similarity
- Cosine Similarity Mechanism -
- The similarity between two text documents
- Levenshtein distance - measuring the difference between two sequences.

### KNN

- Information Retrieval Systems
- Information Retrieval - Precision, Recall,F- score TF-IDF
- KNN for document retrieval
- K-Means for document retrieval
- Clustering for document retrieval

# Program Syllabus

TERM 4

## Deployment AWS+Azure

## Module - 3 (10 hours)

### Introduction to AWS and Azure Machine Learning Services

- Overview of AWS SageMaker and Azure Machine Learning
- Key features and benefits of using these platforms
- Understanding different types of machine learning algorithms and use cases

### Data Preparation and Feature Engineering

- Understanding the data requirements for machine learning models (e.g. structured vs unstructured data, data size, data quality)
- Data cleaning and preprocessing techniques (e.g. missing value imputation, feature scaling, encoding categorical variables)
- Feature selection and engineering techniques (e.g. PCA, feature importance)

### Setting up the Environment

- Creating AWS and Azure accounts
- Configuring the required tools and SDKs (e.g. AWS CLI, Azure CLI, Azure PowerShell)
- Understanding the infrastructure requirements for training and deploying models (e.g. EC2 instances, GPU instances, Azure ML Compute)

### Model Training and Evaluation

- Choosing the right machine learning algorithm and model (e.g. regression, classification, clustering)
- Training models using AWS SageMaker and Azure Machine Learning (e.g. using built-in algorithms, custom code)
- Evaluating model performance and tuning hyperparameters (e.g. cross-validation, hyperparameter optimization)

# Program Syllabus

TERM 4

## Deployment AWS+Azure

## Module - 3 (10 hours)

### Model Deployment and Management

- Deploying trained models on AWS SageMaker and Azure Machine Learning (e.g. creating endpoints, batch inference)
- Monitoring model performance and managing versions (e.g. model drift, A/B testing)
- Integration with other services and applications (e.g. AWS Lambda, Azure Functions) techniques (e.g. PCA, feature importance)

### Advanced Topics in Machine Learning on AWS and Azure

- Deep learning techniques and architectures (e.g. neural networks, convolutional neural networks, recurrent neural networks)
- Natural Language Processing (NLP) use cases (e.g. text classification, sentiment analysis, language translation)
- Understanding the costs and pricing models for machine learning on AWS and Azure (e.g. instance pricing, storage pricing, model deployment pricing)

# Real-Time Projects

1

Domain: BFSI

### Learn and develop classification techniques for the digital transformation of banking

JPMorgan offers tax-friendly insurance choices. You can help them forecast insurance premiums. Targeted marketing using your random forest algorithm skills can help obtain better premium values.

Data Analytics, Matplotlib, Logical Regression

2

Domain: Media

### Building a content recommendation model on the basis of regional viewer categorization

Netflix is a global entertainment video streaming site. They offer content in various regional languages. Build a local recommendation engine for Netflix customers residing in south Bangalore on their weekend and weekdays activities, utilizing NLP.

ML Customer Segmentation, Python (Data-Preprocesssing)

3

Domain: Transportation

### Reduction of waiting time via a highly precise forecasting model

Make a demand forecasting model based on specific time period rider demands. Such a model will help both riders and cab drivers to ensure the least possible waiting time. You can include measures like latitude and longitude identification.

Machine Learning, Hadoop, Time Series Analysis

4

Domain: Oil, Gas and energy

### Understanding in-depth about logging while drilling (LWD) technique

Saudi Aramco company is working on the development of high-efficiency drilling models. Use the bright sides of big data analytics to identify the most cost-effective and highly productive drilling sites.

Matplotlib in Python, Big Data

# Real-Time Projects

5

Domain: HR

### Career progression planning of employees with workforce defections & efficiency

IBM intends to boost its HR department by identifying employees' masked inconsistency. They need models to identify the graphical variations in their 14000+ employees' performances. Help them build models with your regressions and other ML abilities.

Machine Learning, Python, SQL, PySpark

6

Domain: Marketing

### Descriptive study of trends and irregularities with prediction analysis for conversion

Swiggy seeks a broad marketing campaign. But they need automated keyword generation tools & proper message preparation and delivery of the same to the right audience at the right time. Help them with text analytics and NLP-based keyword research.

Exploratory Data Analysis, Big Data, NLP

7

Domain: Sales

### Forecasting future sales with trends and price maximization

BMW customers can sell old vehicles, but rivals provide superior resale prices. BMW's data science-powered software will deliver the greatest market value for used vehicles based on Km travelled, daily price changes, production dates, etc. Such tasks build analytical abilities.

Scikit-learn, XG Boos, Customer Segmentation

8

Domain: Oil, Gas and energy

### Understanding covid-19 cases and fatality rate by time series forecasting

Samsung will launch a new healthcare app soon. The key goal of this app is an accurate human activity tracking and providing relevant health-related recommendations. Continuous analysis of a massive amount of mobile data is required for such an app.

Supervised Machine Learning, Python (Pandas Library)

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