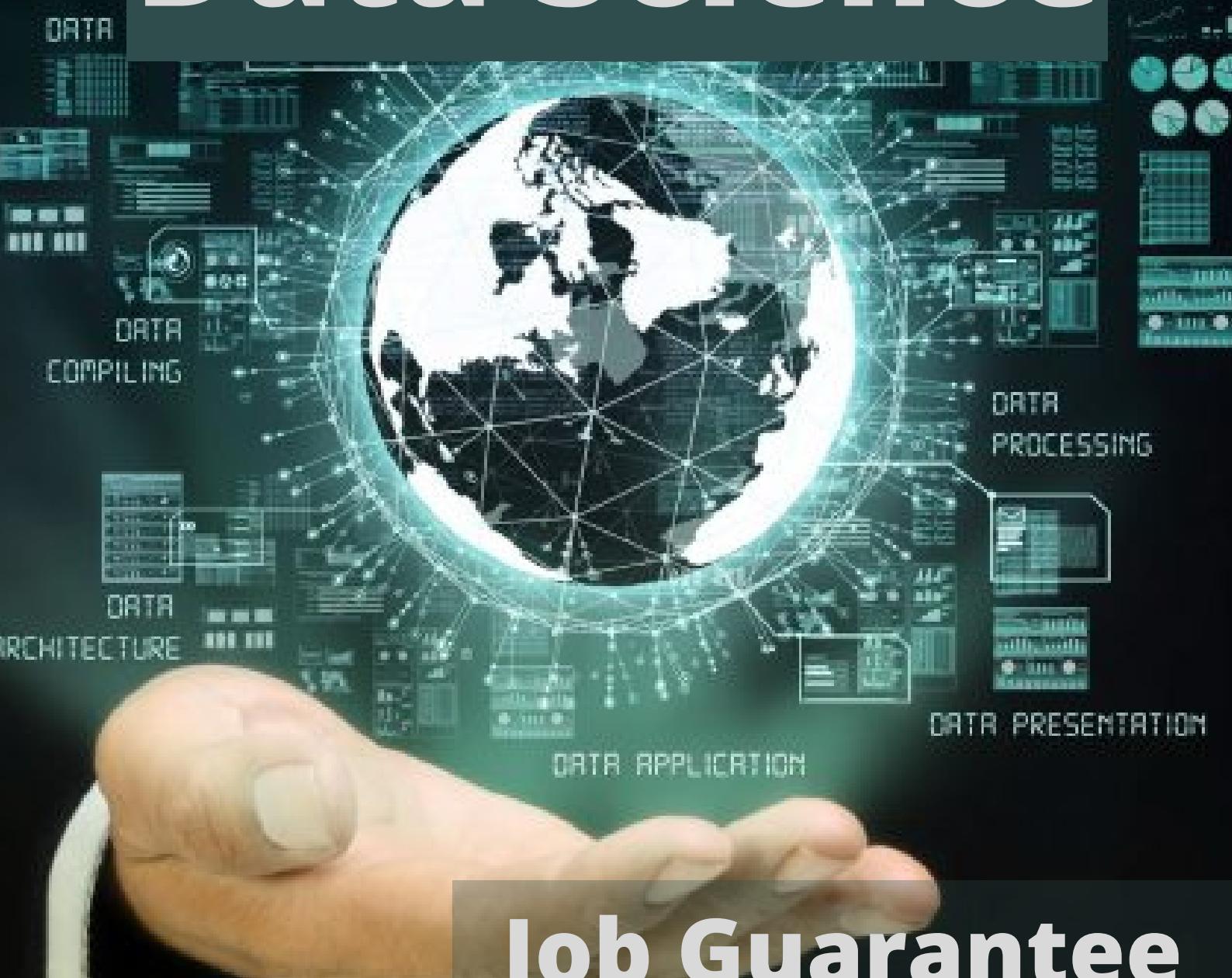




Full Stack Data Science



**Job Guarantee
Program**

Module 1 - Python



Course Introduction and

Python Basics

- Course overview and Dashboard description.
- Introduction to Data science and its application in day to day life.
- Programming language overview, installation (Tools: Sublime, Vs Code, PyCharm, Anaconda, Atom, Jupyter notebook, Kite).
- Virtual ENV.
- Introduction to Python and comparison with other programming language.
- Installation of Anaconda Distribution and other python IDE.
- Python Objects, Numbers and Booleans, Strings.
- Container objects, Mutability of objects.
- Operators - Arithmetic, Bitwise, Comparison and assignment operators, Operators precedence and associativity.
- Condition (if else, if- elseif- else), loops (While, for)

- Break and Continue statement and Range Function.

String Objects

- Basic data structure in python.
- String object basics.
- String Inbuilt methods.
- Splitting and Joining strings.
- String format functions.

List

- List object basics.
- List methods.
- List as stack and queues.
- List comprehensions.

Tuples, Set, Dictionaries and functions

- Tuples, Sets, Dictionary object.
- Dictionary Object methods.
- Dictionary Comprehensions.
- Dictionary View objects.

- Function basics, Parameter passing, Iteratos.
- Generator functions.
- Lambda functions.
- Map, Reduce, Filter functions.

Memory Management

- Memory management.
- Multi-threading.
- Multi-processing.

OOP's Concept

- OOP's basic concepts.
- Creating classes.
- Pilers of OOP's.
- Inheritence.
- Polymorphism, Encapsulation, and Abstraction.
- Decorator.
- Class methods and Static Methods.
- Special (Magic/Dunder) Methods.
- Property decorators - Getters, Setters, and Deleters.

Files

- Working with files.
- Reading and writing files.
- Buffered read and write.
- Other file methods.
- Logging, debugger.
- Modules and statements.

Exception Handling

- Difference between exceptions and error.
- Exceptions Handling with try-except.
- Custom exception handling.
- List of general use exceptions.
- Best practice exception handling.

GUI Framework

- What is Desktop and standalone application?
- Use of desktop app.
- Examples of desktop app.
- Tkinter.
- Kivy.

Database

- SQLite.
- MySQL.
- MongoDB.
- NOSQL - Cassandra.

WebAPI

- What is Web API?
- Difference b/w API and Web API?
- Rest and soap architecture.
- Restful services.

Flask

- Flask Introduction.
- Flask application.
- Open-link Flask.
- App Routing Flask.
- URL Building Flask.
- HTTP Methods Flask.

Flask project - Food app,
postman, Swagger

Django

- Django introduction.
- Django project : Weather app.
- Django Project : Memes Generator.
- Django project: Blog App.
- Django project in cloud.

Streamlit

- Streamlit introduction.
- Streamlit project structure.
- Streamlit project in cloud.

Pandas Basic

- Python pandas - Series.
- Python Pandas - Dataframe.
- Python Pandas - Panel.
- Python Pandas - Basic functionality.
- Reading data from different file system.

Pandas Advance

- Python Pandas - Reindexing Python.
- Pandas – Iteration.
- Python Pandas – Sorting.
- Working with Text Data Options & Customization.
- Indexing & Selecting.
- Data Statistical Functions.
- Python Pandas - Window Functions.
- Python Pandas - Date Functionality.
- Python Pandas - Timedelta.
- Python Pandas - Categorical Data.
- Python Pandas – Visualization.
- Python Pandas - IOTools.

Python Numpy

- NumPy - Ndarray Object.
- NumPy - Data Types.
- NumPy - ArrayAttributes.
- NumPy - Array Creation Routines.
- NumPy - Array from Existing.
- Data Array From Numerical Ranges..

- NumPy - Indexing & Slicing.
- NumPy – Advanced Indexing..
- NumPy – Broadcasting.
- NumPy - Iterating Over Array.
- NumPy - Array Manipulation.
- NumPy - Binary Operators.
- NumPy - String Functions.
- NumPy - Mathematical Functions.
- NumPy - Arithmetic Operations.
- NumPy - Statistical Functions.
- Sort, search and counting functions.
- NumPy - Byte Swapping.
- NumPy - Copies &Views.
- NumPy - Matrix Library.
- NumPy - Linear Algebra.

Visualisation

- Matplotlib.
- Seaborn.
- Cufflinks.
- Plotly.
- Bokeh.

- NumPy - Indexing & Slicing.
- NumPy – Advanced Indexing..
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Visualisation

- Matplotlib.
- Seaborn.
- Cufflinks.
- Plotly.
- Bokeh.

- Weeding Scripts
- Image resizing.
- Jupyter Notebook merging, reading etc.
- Sending emails.
- Weather app.
- Memes Generator.
- Food Log App.
- Web Scrapping.
- Web crawlers for image data sentiment.
- Analysis and product review sentiment analysis.
- Integration with web portal.
- Integration with rest Api ,Web portal and Mongo DB on Azure.
- Deployment on web portal on Azure.
- Text mining.
- Social media data churn, mass copy and paste.

Module 1 - It's a wrap

- All module multiple choice question.
- All modules practice set.
- All module Theoretical assignment.
- All module Blog.

Module 2 - Statistics.



- Introduction to basic Statistics terms.
- Types of Statistics.
- Types of data.
- Levels of measurement.
- Measures of Central Tendency.
- Measure of dispersion.
- Random Variables.
- Set.
- Skewness.
- Covariance and Correlation.

Probability distribution function.

- Probability density/distribution function.
- Types of the probability distribution.
- Binomial Distribution.
- Poisson distribution.
- Normal Distribution (Gaussian Distribution).
- Probability Density Function and Mass Function.

- Cumulative Density Function.
- Examples of Normal Distribution.
- Bernoulli Distribution.
- Uniform Distribution.
- Z Stats.
- Central Limit Theorem.
- Estimation .

Statistics - 2

- Hypothesis.
- Hypothesis Testing's Mechanism.
- P-Value.
- T-Stats.
- Student T distribution.
- T-Stats vs. Z-Stats: Overview.
- When to use a t-tests vs. z-tests.
- Type 1 & Type 2 Error.
- Bayes Statistics (Bayes Theorem).
- Confidence Interval(CI).
- Confidence Intervals and the Margin of Error.
- Interpreting confidence levels and confidence intervals

- Chi-Square Test.
- Chi-Square Distribution using Python.
- Chi-Square for Goodness of Fit Test.
- When to use which statistical distribution?.
- Analysis Of Variance (ANOVA).
- Assumptions to use ANOVA.
- Anova three types.
- Partitioning of Variance in the ANOVA.
- Calculating using Python.
- F-Distribution.
- F-Test (variance ratio test).
- Determining the Values of F.
- F Distribution using Python.

Linear Algebra

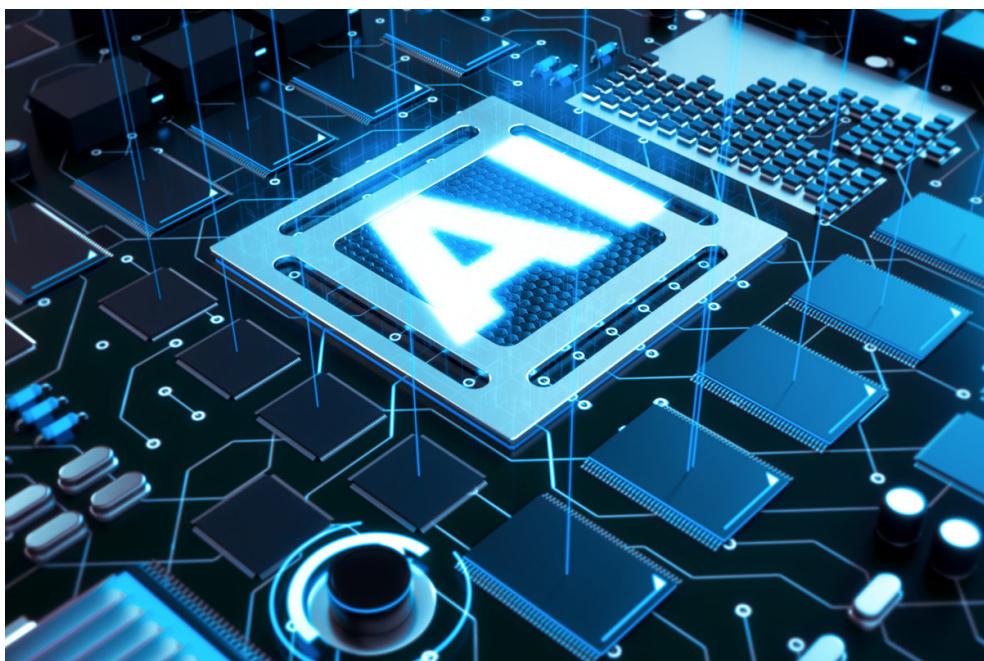
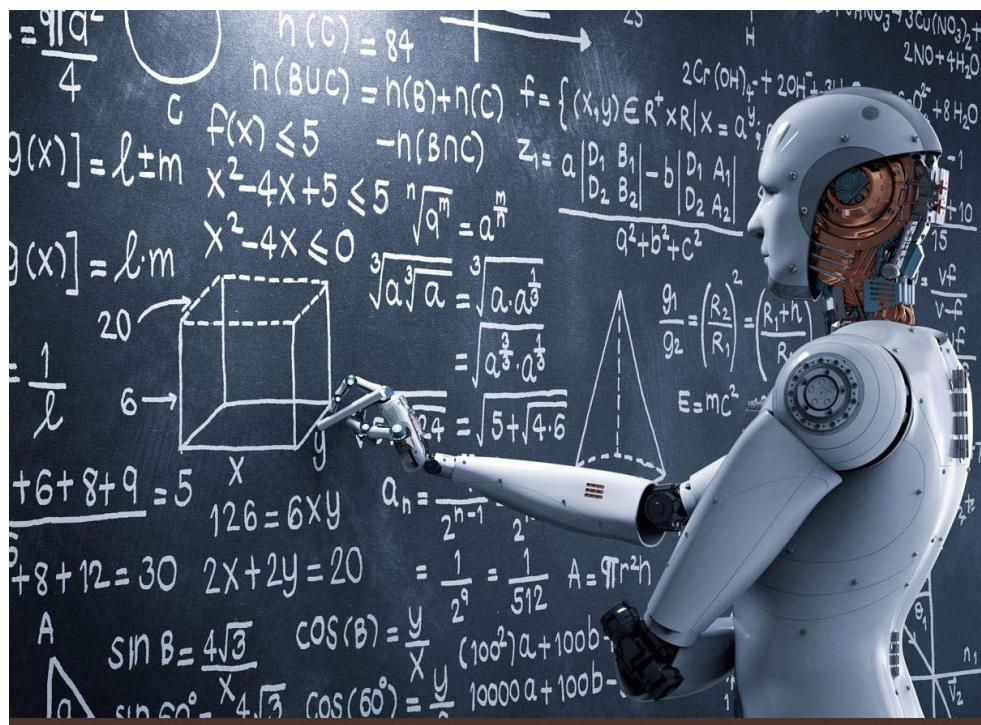
- Linear Algebra.
- Vector.
- Scaler.
- Matrix.
- Matrix Operations and Manipulations.
- Dot product of two vectors.
- Transpose of a Matrix.

- Linear Independence of Vectors.
- Rank of a Matrix.
- Identity Matrix or Operator.
- Determinant of a Matrix.
- Inverse of a Matrix.
- Norm of a Vector.
- Eigenvalues and Eigenvectors.
- Calculus.
- Solving stats problem with python.
- Stats problem implementation with scipy.

Module 2 - It's a wrap

- All module multiple choice question.
- All modules practice set.
- All module Theoretical assignment.
- All module Blog.

Module 3 - Machine Learning



- AI vs ML vs DL Vs DS.
- Supervised, Unsupervised, Semi-supervised, Reinforcement Learning.
- Train, Test, Validation Split performance.
- Overfitting, Underfitting.
- Bias vs Variance.

Feature engineering

- Handling Missing Data.
- Handling imbalance, data up-sampling.
- Down-Sampling.
- Smote.
- Data interpolation.
- Handling Outliers.
- Filter Method.
- Wrapper method.
- Embedded Methods
- Feature Scaling
- Standardization
- Mean Normalization.

- Min-Max Scaling
- Unit Vector
- Feature Extraction
- PCA (Principle Component Analysis)
- Data Encoding
- Nominal Encoding
- One hot encoding
- One hot encoding with multiple categories
- Mean Encoding
- Ordinal Encoding
- Label Encoding
- Target guided ordinal encoding
- Covariance
- Correlation Check
 - Pearson correlation coefficient
 - Spearman's Rank correlation
 - VIF.

Feature Selection

- Feature Selection.
- Recursive Feature Elimination.
- Backward Elimination.
- Forward Elimination.

Exploratory Data Analysis

- Feature Engineering and Selection .
- Analyzing Bike Sharing Trends.
- Analyzing Movie Reviews Sentiment.
- Customer Segmentation and Effective Cross Selling.
- Analyzing Wine Types and Quality.
- Analyzing Music Trends and Recommendations.
- Forecasting Stock and Commodity Prices.

Regression

- Linear Regression.
- Gradient Descent.
- Multiple Linear Regression.
- Polynomial Regression.
- R square and Adjusted R square.
- RMSE , MSE, MAE comparision.
- Regularized Linear Models.
- Ridge Regression.
- Lasso Regression.
- Elastic Net
- Complete end-to-end project with deployment on cloud and UI.

Logistics Regression

- Logistics Regression indepth intuition
- Indepth mathematical intuition.
- Indepth geometrical intuition.
- Hyper parameter tuning.

- Grid search CV.
- Randomize search CV.
- Data Leakage.
- Confusion Matrix.
- Precision, recall, F1 score, ROC, AUC.
- Best metric selection.
- Multiclass classification in LR.
- Complete end-to-end project with deployment in multi cloud platform.

Decision tree

- Decision Tree Classifier.
- Indepth mathematical intuition.
- Indepth geometrical intuition.
- Confusion Matrix.
- Precision, Recall,F1 score, ROC, AUC.
- Best metric selection.
- Decision Tree Regressor.
- Indepth mathematical intuition.
- Indepth geometrical intuition.
- Performance metrics.

- Complete end-to-end project with deployment in multi cloud platform.

Support Vector Machines

- Linear SVM Classification.
- Indepth mathematical intuition.
- Indepth geometrical intuition.
- Soft Margin Classification.
- Nonlinear SVM Classification.
- Polynomial Kernel.
- Gaussian, RBF Kernel.
- Data Leakage.
- Confusion Matrix.
- presion,recall,F1 score, ROC, AUC.
- Best metric selection.
- SVM Regression.
- Indepth mathematical intuition.
- Indepth geometrical intuition.
- Complete end-to-end project with deployment.

Naïve Bayes

- Bayes Theorem.
- Multinomial Naïve Bayes.
- Gaussian Naïve Bayes.
- Various Type of Bayes theorem and its intuition.
- Confusion Matrix.
- Precision, Recall, F1 score, ROC, AUC.
- Best metric selection
- Complete end-to-end project with deployment

Ensemble Techniques

and its types

- Definition of Ensemble techniques.
- Bagging Technique.
- Bootstrap Aggregation.
- Random Forest (Bagging Technique).
- Random Forest Regressor.
- Random Forest Classifier.
- Complete end-to-end project with deployment.

Boosting

- Boosting Technique
- ADA Boost
- Gradient Boost
- XG Boost
- Complete end-to-end project with deployment

Stacking techniques

- Stacking Technique.
- Complete end-to-end project with deployment.

KNN

- KNN Classifier.
- KNN Regressor.
- Variants of KNN.
- Brute Force KNN.
- K-Dimension Tree.
- Ball Tree.
- Complete end-to-end project with deployment.

Dimensionality Reduction

- The curse of Dimensionality.
- Dimensionality Reduction Technique.
- PCA (Principle Component Analysis).
- Mathematics Behind PCA.
- Scree Plots.
- Eigen-decomposition Approach.

Clustering

- Clustering and their types
- K-Means Clustering
- K-Means++
- Batch K-Means
- Hierarchical Clustering
- DBSCAN
- Evaluation of Clustering
- Homogeneity, completeness and V-measure
- Silhouette Coefficient
- Davies-Bouldin Index
- Contingency Matrix
- Pair Confusion Matrix.

- Extrinsic Measure.
- Intrinsic Measure.
- Complete end-to-end project with deployment.

Anomaly Detection

- Anomaly Detection Types
- Anomaly Detection Applications
- Isolation Forest Anomaly Detection Algorithm
- Density-Based Anomaly Detection (Local Outlier Factor) Algorithm
- Support Vector Machine Anomaly Detection Algorithm
- DBSCAN Algorithm for anomaly Detection
- Complete end-to-end project with deployment

Time Series

- What is a time series?
- Old Techniques
- ARIMA
- ACF and PACF.

- Time-dependent seasonal components.
- Auto regressive (AR), moving average (MA) and mixed ARMA-modeller.
- The Random Walk Model.
- Box-Jenkins methodology.
- Forecasts with ARIMA and VAR models.
- Dynamic models with time-shifted explanatory variables.
- The Koyck transformation .
- Partial adjustment and adaptive expectation models.
- Granger's causality tests.
- Stationarity, unit roots and cointegration
- Time series model performance
- Various approach to solve time series problem
- Complete end-to-end project with deployment
- Prediction of NIFTY stock price and deployment

NLP Basic

- Tokenization
- POS Tags and Chunking
- Stop Words
- Stemming and Lemmatization
- Named Entity Recognition (NER)
- Word Vectorization (Word Embedding)
- TFIDF
- Complete end-to-end project with deployment

Machine Learning Pipeline

- AWS Segmaker.
- Aure ML Studio.
- ML Flow.
- Kube Flow.

Model retraining approach

Auto ML

- H2O
- Pycaret
- Auto SKLearn
- Auto TimeSeries
- Auto ViML
- Auto Gluon
- Auto Viz
- TPOT
- Auto Neuro

ChatBot Projects

- Chatbot using Microsoft Luis.
- Chatbot using Google Dialog flow.
- Chatbot using Amazon Lex.
- Chatbot using Rasa NLU.
- Deployment of chatbot with web , Telegram , Whatsapp, Skype.

Major projects

- Healthcare analytics prediction of medicines based on FITBITband.
- Revenue forecasting for startups.
- Prediction of order cancellation at the time of ordering inventories.
- Anomaly detection in inventory packaged material.
- Fault detection in wafers based on sensor data.
- Demand forecasting for FMCG product.
- Threat identification in security system.
- Defect detection in vehicle engine.
- Food price forecasting with Zomato dataset.
- Fault detection in wafers based on sensor data.
- Cement Strength reg.
- Credit Card Fraud.
- Forest Cover Classification.
- Fraud Detection.

- Income Prediction.
- Mushroom classifier.
- Phising Classifier
- Thyroid_Detection.
- Visibility climate

Module 3 - It's a wrap

- All module multiple choice question.
- All modules practice set.
- All module Theoretical assignment.
- All module Blog.

Module 4 - Deep Learning



Neural Network

- A Simple Perception.
- Detail mathematical Explanation
- Neural Network overview and its use case.
- Various Neural Network architect overview.
- Use case of Neural Network in NLP and computer vision.
- Activation function -All name
- Multilayer Network.
- Loss Functions. - all 10
- The Learning Mechanism.
- Optimizers. - All 10
- Forward and Backward Propagation.
- weight initializatoin technique
- vanishing gradient problem
- Exploding gradient problem
- Visualization of NN

Hardware setup - GPU

- GPU Introduction.
- Various type of GPU configuration.
- GPU provider and its pricing.
- Paper space GPU setup.
- Running model in GPU.

TensorFlow Installation

- Environment setup for Deep learning
- Collab pro setup
- Tensorflow Installation 2.0 .
- Tensorflow Installation 1.6 with virtual environment.
- Tensorflow 2.0 function.
- Tensorflow 2.0 neural network creation.
- Tensorflow 1.6 functions.
- Tensorflow 1.6 neural network and its functions.
- Keras Introduction.
- Keras in-depth with neural network creation.
- Mini project in Tensorflow.

- Tensorspace.
- Tensorboard integeration.
- Tensorflow playground.
- Netron.

Pytorch

- Pytorch installation.
- Pytorch functional overview.
- Pytorch neural network creation.

MXNet

- Mxnet installation
- Mxnet in depth Function overview
- Mxnet model creation and Training

KERAS Tuner

- Keras Tuner installation and overview.
- Finding best parameter from Keras tuner.
- Keras tuner application across various neural network.

CNN overview

- CNN definition
- various CNN based architecture
- explanation end to end CNN network
- CNN Explainer
- Training CNN
- deployment in Azure cloud
- performance tuning of CNN network

Advance Computer Vision - Part 1

- Various CNN architecture with Research paper and mathematics.
- LeNet-5 variants with research paper and practical.
- AlexNet variants with research paper and practical.
- GoogleNet variants with research paper and practical.

Advance computer Vision -

Part 2

- Object Detection Indepth.
- Transfer Learning.
- RCNN with research paper and practical.
- Fast RCNN with research paper and practical
- Faster R CNN with research paper and practical
- SSD with research paper and practical
- SSD lite with research paper and practical

Training of custom Object

Detection

- TFOD introduction.
- Environment setup with TFOD.
- GPU vs TPU vs CPU
- Various GPU comparison
- Paper-space and local system setup for Object detection.
- End to end Training and model conversion.
- End to end Testing with live camera.
- End to end testing with live image.

Advance computer Vision -

Part 3

- yolo v1 with research paper and practical
- yolo v2 with research paper and practical
- yolo v3 with research paper and practical
- yolo v4 with research paper and practical
- yolo v5 with research paper and practical
- Retina net.
- Facenet.
- Detectron2 with practical and live testing.

Object segmentation

- Semantic segmentation.
- Panoptic segmentation.
- Masked RCNN.
- Practical with detection.
- Practical with TFOD.

Object Tracking

- Detail of object tracking.
- Kalman filtering.
- SORT.
- Deep sort.
- Object tracking live project with live camera testing.

OCR

- Introduction to OCR.
- Various framework and API for OCR.
- Practical implementation of OCR.
- Live Project deployment for bill parsing.

Image Captioning

- Image captioning overview.
- Image captioning project with deployment.

TensorFlow Js

- Tensorflow js overview.
- TensorFlow Js implementation.

Model Conversion

- TensorFlow Js.
- TensorFlow Lite.
- TensorFlow Rt.
- Torch to TensorFlow Model.
- MXNet to TensorFlow Conversion.

Module 4 - It's a wrap

- All module multiple choice question.
- All modules practice set.
- All module Theoretical assignment.
- All module Blog.

Module 5 -Computer Vision Projects

- Traffic Surveillance System.
- Object Identification.
- Object Tracking.
- Object Classification.
- TensorFlow Object Detection.
- Image to Text Processing.
- Speech to Speech analysis.
- Vision Based Attendance System

Module 5 - It's a wrap

- All module multiple choice question.
- All modules practice set.
- All module Theoretical assignment.
- All module Blog.

Module 6 - Natural language processing



- Computational Linguistic.
- History of NLP.
- Why NLP.
- Use of NLP

Text processing

- Importing Text.
- Web Scrapping.
- Text Processing.
- Understanding Regex.
- Text Normalisation.
- Word Count.
- Frequency Distribution.
- Text Annotation.
- Use of Annotator.
- String Tokenization.
- Annotator Creation.
- Sentence processing.
- Lemmatization in text processing.
- POS.
- Named Entity Recognition.

- Dependency Parsing in text.
- Sentimental Analysis

Spacy

- Spacy Overview.
- Spacy function.
- Spacy function implementation in text processing.
- POS tagging, challenges and accuracy.
- Entities and named entry Recognition,
- Interpolation, Language models.
- Nltk.
- Text blob.
- Standford nlp.

RNN

- Recurrent Neural Networks.
- Long Short Term Memory (LSTM)
- Bi LSTM.
- stacked LSTM.

- GRU implementation.
- Building a Story writer using character level RNN.

Word Embedding

- Word embeddings.
- Co-occurrence vectors.
- Word2vec.
- Doc2vec.

Attention Based model

- Seq 2 Seq.
- Encoders and Decoders.
- Attention Mechanism.
- Attention Neural Networks
- Self Attention.

Transfer learning in NLP

- Introduction to transformers.
- BERT Model.
- ELMo Model.
- GPT1 Model.

- GPT2 Model.
- ALBERT Model.
- DistilBERT Model

Mini NLP project

- Machine Translation.
- Abstractive Text Summarization.
- Keyword Spotting.
- Language Modelling.
- Document Summarization.

Deployment of Model and Performance tuning

- Deep Learning Model Deployment Strategies.
- Deep Learning Project Architecture.
- Deep Learning Model Deployment Phase.
- Deep Learning Model retraining Phase.
- Deep Learning Model Deployment in AWS.
- Deep Learning Model Deployment in Azure.
- Deep Learning Model Deployment in GCloud.

NLP Transfer learning.project

with deployment and integration with UI

- Machine Translation.
- Question Answering (like Chat – Bot)
- Sentiment Analysis IMDB.
- Text Search (with Synonyms).
- Text Classifications.
- Spelling Corrector.
- Entity (Person, Place or Brand) Recognition.
- Text Summarization.
- Text Similarity (Paraphrase).
- Topic Detection.
- Language Identification.
- Document Ranking.
- Fake News Detection
- Plagiarism Checker.
- Text Summarisation extractive.
- Text Summarisation abstractive.

NLP end to end project with architecture and deployment

- Movie Review using BERT.
- NER using BERT.
- POS BERT.
- Text generation gpt 2.
- Text summarisation xlnet.
- Abstract BERT.
- Machine Translation.
- NLP text summarisation custom keras/tensorflow.
- Language Identification.
- Text classification using fast BERT.
- Neuralcore.
- Detecting fake text using GLTR with BERT and GPT2.
- Fake News Detector using GPT2.
- Python Plagiarism Checker type a message.
- Question answering

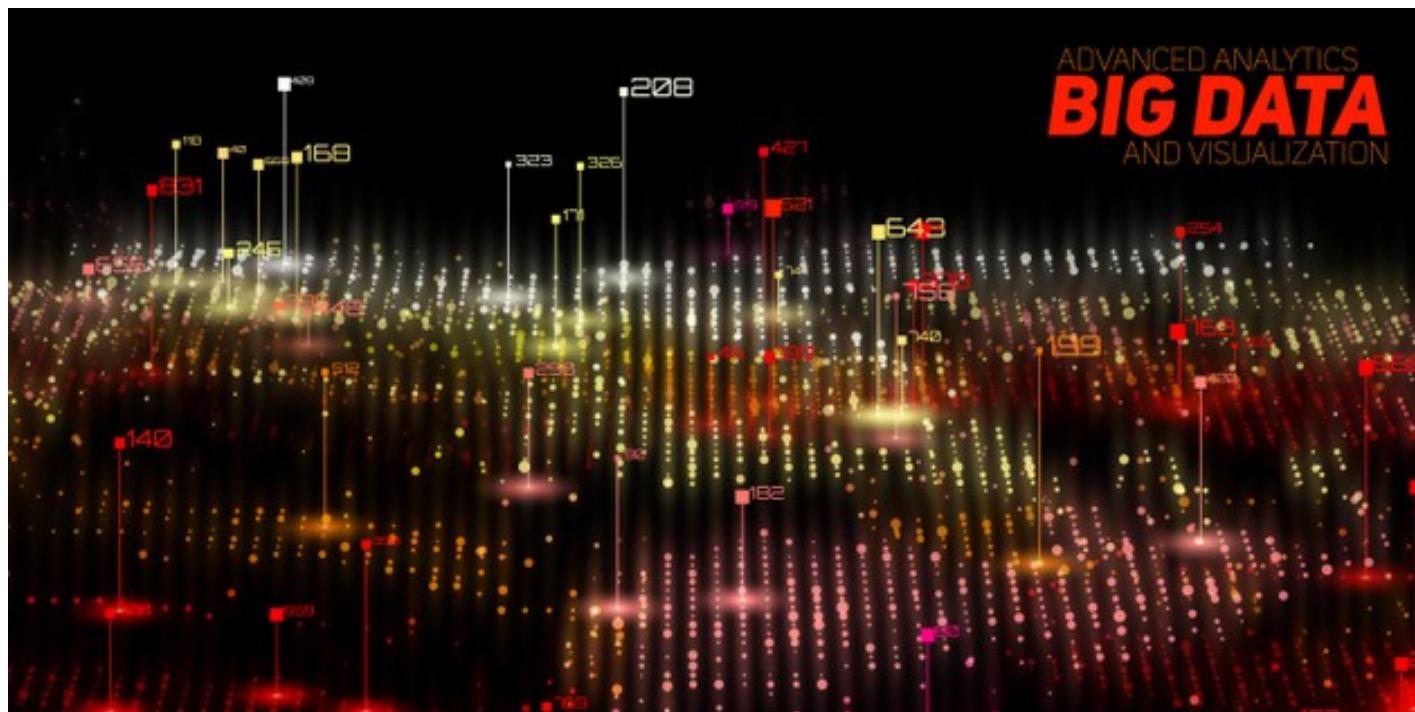
NLP project end to end with deployment in various cloud and UI integration

- Topic Modeling.
- Word sense disambiguation.
- Text to speech.
- Keyword Spotting.
- Document Ranking.
- Text Search (with Synonyms)
- Language Modeling.
- Spam Detector.
- Image Captioning.

API for speech and vision

- AWS.
- AZURE.
- GCP.

Module 7 - Big Data



Spark

- Spark
- Spark overview.
- Spark installation.
- Spark RDD.
- Spark dataframe.
- Spark Architecture.
- Spark ML lib.
- Spark Nlp.
- Spark linear regression.
- Spark logistic regression.
- Spark Decision Tree.
- Spark Naive Bayes.
- Spark xg boost .
- Spark time series.
- Spark Deployment in local server
- Spark job automation with scheduler.

Module 8 - ML Ops

- AWS
- AZURE
- GCP