BITBYTE ROBOTRONX
The Creativity of your Mind

Artificial Intelligence & Machine Learning Using Python



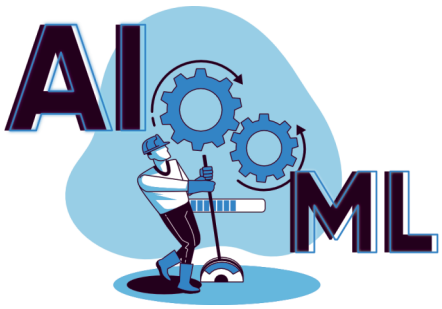
2000+ Trainings in IT & IoT

5000+ Participants and Interns

12+ years of Experience

Working in **3** Most demanding Domains

Artificial Intelligence and Machine Learning Using Python



Why Learn AI -ML with Python

1. AI is now one of the fastest-growing technologies in the job market.
2. Average salary base for a AI ML Engineer is Rs. 10,20,926
3. Demand For AI & ML Engineer Will Soar 75% By 2023
4. Job Openings are expected to increase to 700,000

You will get from us

- 20+ Modules
- 140+ Training Hours
- 50+ Assignment Hours
- 15+ Projects
- 20+ Assignments

ROBOTRONIX ENGINEERING TECH PVT. LTD.

Salient Features

- Individual Attention to Each Learner
- Doubt Clearing Sessions
- Multiple Tools Covered
- Class Labs/ Home Assignment
- Placement Support
- Industry Relevant Curriculum
- Hands-on Approach

Program Outcomes

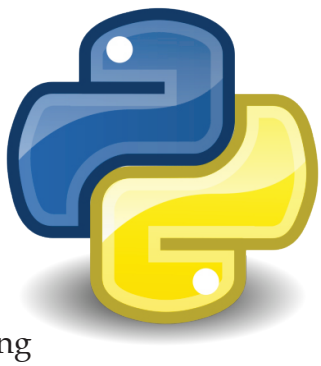
1. **Gain understanding of data structure and data manipulation**
2. **Understand and apply linear and non-linear regression models and classification techniques for data analysis and predictive modeling.**
3. **Data analysis, manipulation and visualization using data structures and tools provided in the Pandas and matplotlib packages.**
4. **Understanding of supervised and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, K-NN**
5. **Gain expertise in Machine Learning using the Scikit-Learn package**
6. **Get real life work experience in AI using tensorflow and keras**

Introduction to Programming Language and Python (2 Day)

- What is a programming language?
- What is python?
- Why is python?
- Comparison between various programming languages C, Java and Python
- History of Python
- Features – Dynamic, Interpreted, Multiparadigm, Object oriented, Embeddable, Extensible, Large standard libraries, Free and Open source,
- Introduction to Translators - Compiler and Interpreter
- Versions of Python
- Installation of Python 3.X
- Installation of jupyter notebook
- Installation of Anaconda
- Installation of VS Code

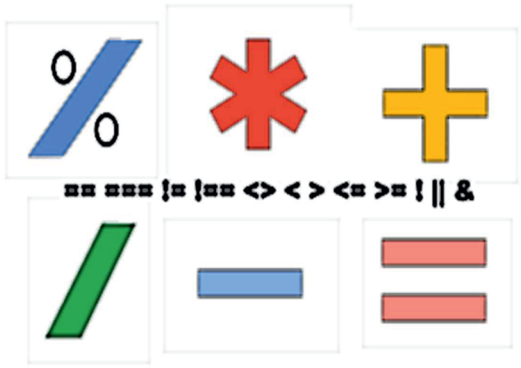
Variables, Datatypes and Comments (1 Day)

- What is variable?
- Rules to declare variables
- Reserve keywords in python
- Pascal case and Camel Case
- Data types – (primitive) - int(), float(), str(), bool()
- Data types – (collection) – list( ), tuple( ), set( ), dict( )
- Data type conversion
- Types of Data Type conversion
- What is Comment and its type Single Line, Multi Line & doc string
- Input() function



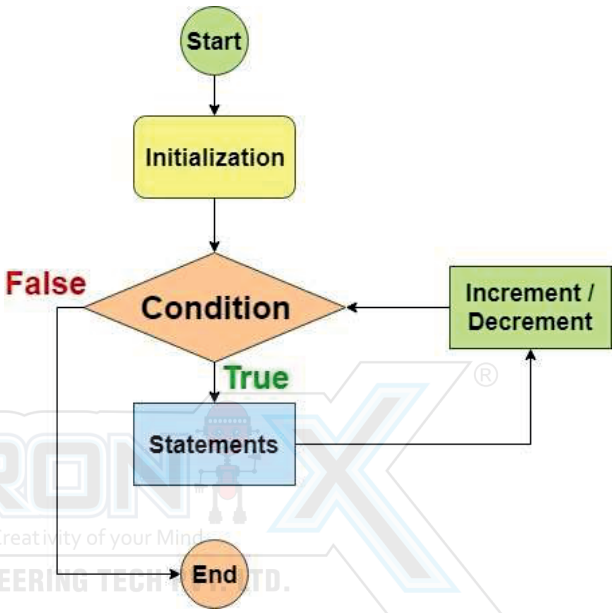
Python Operators (2 Day)

- What are operators
- Arithmetic operators
- Assignment operators
- Relational operators
- Logical operators
- Membership operators
- Identity operators
- Bitwise operators
- Operator precedence
- Difference between “is” and “==”



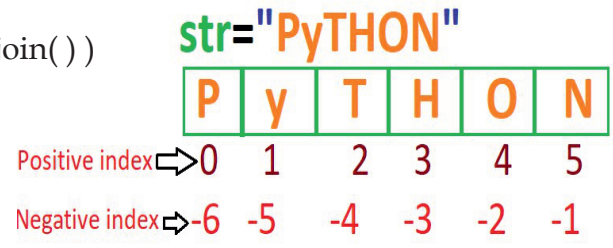
Flow control statements (2 Day)

- What is block of code
- Indentation in python
- Conditional Statements
  - if
  - if…. else
  - if….elif
  - if….elif….else
  - Nested if
- Loop Statements (Control Statements)
  - for loop
  - for ….. else
  - while loop
  - while … else
  - Nested Loops
  - break
  - continue
  - pass



Strings in Python (2 Day)

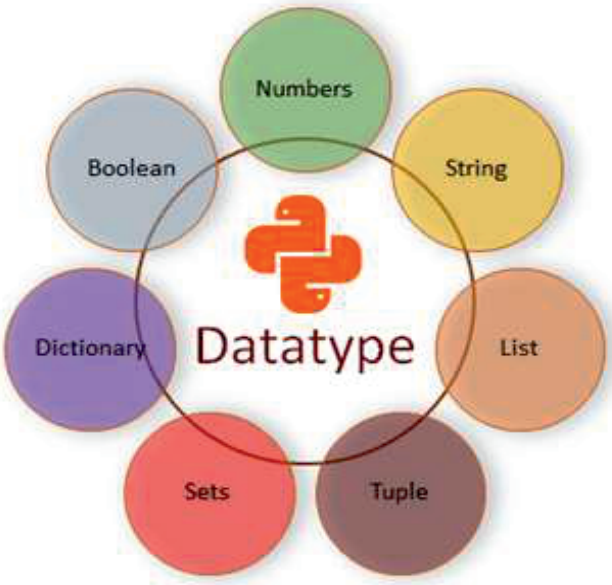
- Creating Strings
- String indexing [ ]
- String slicing [:]
- String Concatenation
- String Comparison
- String Immutability
- String splitting and joining (split( ) and join( ))
- Finding Sub Strings
- String Case Change
- Split strings
- String methods
- Escape sequence character
- \n, \t, \b, \r, \\
- .format methods and its type
- f strings



ROBOTRONIX ENGINEERING TECH PVT. LTD.

List in Python (2 Day)

- List properties
- List Creation
- Different ways of creating lists
- List indexing and slicing
- List mutability
- List Operations
- Nested Lists
- List modification
- List insertion and deletion
- List Methods
- Unpacking of List
- zip( ) function
- List comprehensions
- What is the range?
- range creation
- operation through range( ) function



Tuple in Python (1 Day)

- Tuple properties
- Differences between List and Tuple
- Tuple Creation
- Different ways of creating tuples
- Tuple indexing and slicing
- Tuple immutability
- Tuple Operations
- Nested Tuples
- Tuple Methods
- Unpacking of Tuple
- zip() function

BITBYTE
BOTRONIX
The Creativity of your Mind
ROBOTRONIX ENGINEERING TECH PVT. LTD.

Sets in Python (1 Day)

- Set properties
- Set Creation
- Different ways of creating sets
- Set Operations
- Set Mathematical Operations
- Set Methods
- Insertion and Deletion operation

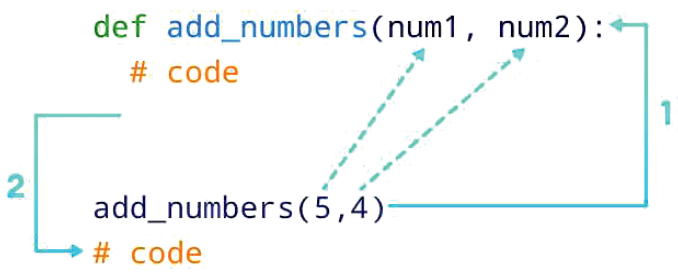
Dictionary in Python (2 Day)

- Dictionary properties
- Dictionary Creation
- Different ways of creating dictionary
- Iteration of values in Dictionary
- get( ) function
- Dictionary Operations
- Nested Dictionaries

{ 'key_name' : 'value' }

- Dictionary Methods
- Insertion and Deletion of elements
- Differences between list, tuple, set and Dictionary
- JSON data format (create & use)

Function in Python (3 Day)



- What is Function?
- Advantages of functions
- Syntax and Writing function
- Calling of function
- Non local variables, global variables
- Use of print and return
- User Defined Functions
  - Positional arguments function
  - Keywords arguments function *
  - Keywords arguments function **
  - Default argument functions
  - Recursive Function
  - 'pass' keyword in functions

- **Generator (yield)**

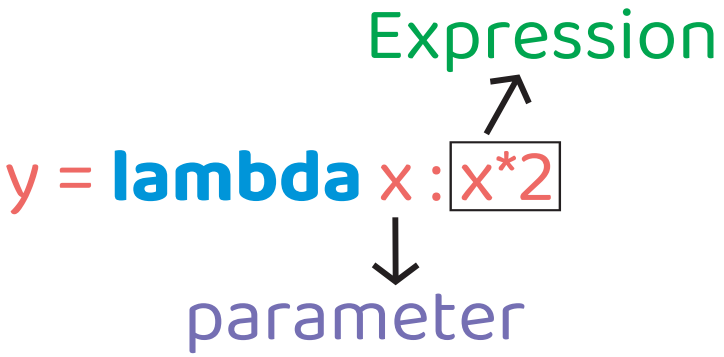
- **Difference between return and yield**

- **Anonymous Functions (lambda)**
  - lambda with if condition

- **Some Important Functions**
  - map()
  - zip()
  - filter()

- **Built-in functions**
  - bin()
  - chr()
  - dir()
  - divmod()
  - enumerate()
  - eval()
  - id()
  - iter()
  - hex()
  - max()
  - min()
  - ord()
  - oct()
  - pow()

ROBOTRONIX
The Creativity of your Mind
ROBOTRONIX ENGINEERING TECH PVT. LTD.



Modules in Python (2 Day)

- Importance of modular programming
- What is module
- Types of Modules – built-in, User defined.
- User defined modules creation
- Import module
- From … import
- **Creation of Virtual Environment**
- **Some pip commands and creation of requirement file**
- **Working with Standard modules –**
  - Math,
  - Random,
  - Date time
  - os modules

Exception Handling & Types of Errors (1 Day)

- Why exception handling?
- Exception codes – AttributeError, ValueError, IndexError, TypeError…
- Handling exception – try except block
- Try – except - else
- Try-except- else - finally
- Try with multi except
- Finally block
- Raise Statement



File Handling (1 Day)

- Creating File in Python
- Opening a file
- Creating File in python with
- Closing a file
- Writing data to files
  - “a” , “w”, “x”, “w+”
- Tell( ) and seek( ) methods
- Reading a data from files
  - readline, readlines
  - log file creation

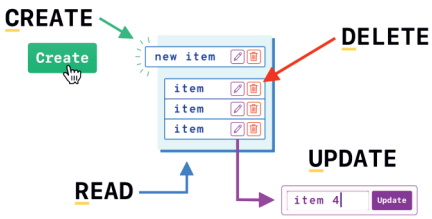
OOPs Concepts (2 Day)

- Class
- Object
- Defining methods
- Constructors
- Parameterized Constructors
- Encapsulation
- Abstraction
- Inheritance
- Types of Inheritances
- Polymorphism

ROBOTRONIX ENGINEERING TECH PVT. LTD.

Connectivity with Database (MySql) (5 Days)

- Connection
- Database Creation
- Create tables in Database
- Insert values in tables
- fetch values (data) from tables
- Updation in data of tables
- Deletion of tables



Git and Github (3 Days)

- Git account creation
- Creation of repository and project folder
- Commit, push and pull of code
- Connection with local machines.

Pickeling / Unpickeling

BITBYTE ROBOTRONIX The Creativity of your Mind ROBOTRONIX ENGINEERING TECH PVT. LTD.



Machine Learning



NumPy (4 Day)

- Difference between List and NumPy Array
- Numpy array generation
- Indexing in arrays
- Basic Slicing and Advanced Indexing
- Numpy operations
- Array Reshaping
- Sorting, Searching and Counting
- Joining of Arrays
- Statistical Functions
- random module with numpy



Pandas (6 Day)

- Creation of Series
- Indexing and slicing in Series
- Filtering in Series
- Creation of Dataframe
- Reading data from different file system (csv, html, excel, mysql)
- Reindexing in DataFrame
- Indexing & Slicing
- Working with Missing Data in Pandas
- Iterating over rows and columns in Pandas DataFrame
- Group by Method
- Statistical Functions.
- Merging, Joining and Concatenating



ROBOTRONIX The Creativity of your Mind ROBOTRONIX ENGINEERING TECH PVT. LTD.

Exploratory Data Analysis and Data Visualization (4 Day)

- Distribution plots
- Categorical plots
- Matrix plots
- Regression plots
- Histograms
- Box plots
- Visualizing linear relationships
- Finding and Dealing with Missing Values.
- What are Outliers?
- Z-scores to Find Outliers.
- Data Pre-processing and cleaning?



Machine Learning (18 Day)

- Introduction to Machine Learning and it types
- Regression Algorithm
  - Linear Regression
    - Model Evaluation
    - Tuning of Model
    - Save the model and use in deployment (Flask)
    - Creation of Flask API
  - **PROJECT : Share price prediction, Old car price prediction**

- Classification Algorithm
  - Logistic Regression Model
    - Sigmoid Function
    - Handling Non-Numerical Data for Machine Learning
    - One-Hot Encoding, Label Encoding, get_dummies
    - Simple Imputer (Deal with NaN values)
    - Model Evaluation
    - Confusion Matrix
    - TPR, FPR, TNR, Precision, Recall, F1 Score,
    - Classification Report
  - **PROJECT : Lung Cancer Prediction, Customer Churn Prediction**

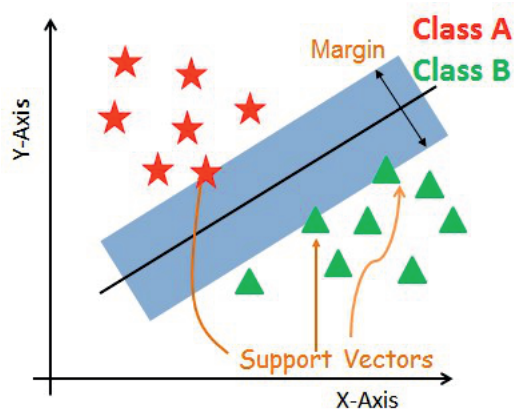
  - K Nearest Neighbours Model
    - Euclidean Distance,
    - Confusion Matrix of Multi Class Classification
    - Standard Scaling, Standardization, Normalization
    - Model Tuning for Best value of K
    - Model Evaluation
  - **PROJECT : IRIS flower Classification, Weather Prediction**

ROBOTRONIX ENGINEERING TECH PVT. LTD.

- Support Vector Machine (SVM) Model
  - Kernel Function
  - Support Vectors and Hyperplane
  - Regularization Parameter
  - Effect of Parameter Values on Classification
  - Confusion Matrix of Multi Class Classification
  - Tuning of Hyperperameter using Grid Search CV
  - Model Tuning with best parameter
  - Model Evaluation

- **PROJECT : Wine Quality Classification,**

- Decision Tree Model
  - Splitting Methods: GINI, Entropy
  - Information Gain
  - Max_depth
  - Model Evaluation
- Random Forest Model
  - Bagging & Boosting.
  - K-Fold Cross-Validation
  - Model Evaluation
- ROC Curve, and AUC



- **PROJECT : Handwriting Digit recognition, Heart Disease Classification**

• Unsupervised Learning

- K Means
  - Definition of Clustering
  - Assumptions of K Means Clustering
  - Elbow Curve
  - Concatenation of Clustering Output and its Evaluation
- **PROJECT : Customer Segmentation**

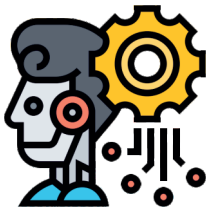
- Dimensionality Reduction (PCA)
  - Definition,
  - Curse of Dimensionality,
  - When to use PCA
  - EigenValues and EigenVectors
  - Scree Plot
- **PROJECT : Breast Cancer Dataset for Dimension re**



- **PROJECT : Recommendation Systems for Movie or**

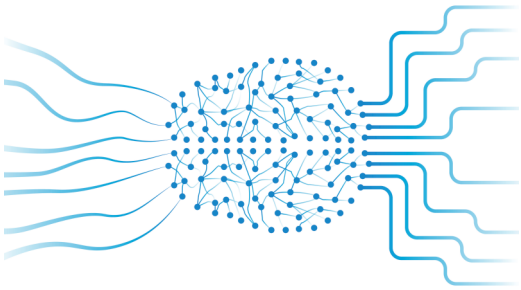
BITBYTE ROBOTRONX The Creativity of your Mind ROBOTRONIX ENGINEERING TECH PVT. LTD.

Deep Learning / Artificial Intelligence



Introduction to Artificial Neural Network (8 Day)

- Understanding Neural Network Model
- What is Neuron
- Basic Neural Network with Single Hidden Layer Model
- Logistic Regression Model Building Using ANN
- Types of Activation Function
- Types of Different Optimizer
- Types of Loss Function / Cost Function
- Batch Normalization
- Neural Network with Multiple Hidden Layer
- Achieving Global minima and Early Stoppage
- Hyper Parameter Tuning
- Effect of Epoch and Batch
- Data Augmentation



PROJECT : Handwritten digit Recognition, Bank Customer Churn prediction

Computer Vision (10 Day)

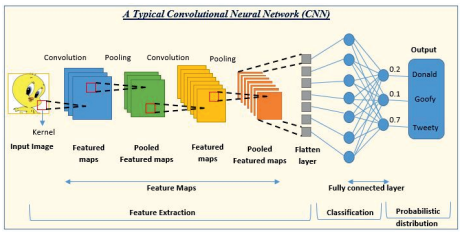
- Introduction to Image Basics
- Reading / Opening of different images
- Resizing and Flipping
- Draw shapes and write text on Images
- Blending and pasting on images
- Region of Interest and Masking
- Thresholding
- Simple, Binary, Truncate, to zero, Adaptive, Adaptive Mean, Adaptive Gaussian
- Morphological Transformation

PROJECT : Mood Detection based on Face, Car Number Plate Detection and extraction

OpenCV

Convolutional Neural Network (10 Days)

- Introduction CNN and its architecture
- Convolution Layer : Types of Convolution
- Kernel
- Padding and strides
- Type of pooling and Strides : max pooling, average pooling, Sum pooling
- Generation of new matrix after pooling
- Flattening of matrix
- Fully Connected Layers
- output layer and activation functions.
- parameter tuning
- Transfer Learning
- Use of Different pretrained model : YOLO, VGGnet,

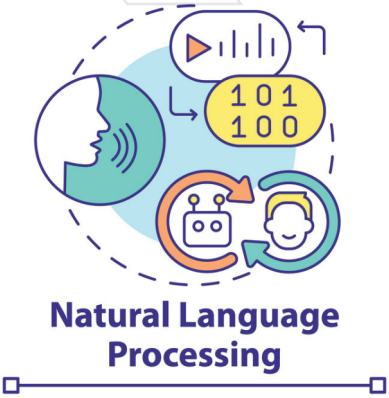


PROJECT : CIFAR and Animal identifier

Recurrent Neural Network (4 Day)

- Introduction RNN and its architecture
- Types of RNN : One to one, one to many, many to one, many to many
- Creation of RNN Long ShortTerm Memory (LSTM)
- Vanishing and Exploding Gradient
- Forecasting a Time Series

PROJECT : Stock price forecasting, Sales forecasting of a store



ROBOTRONIX ENGINEERING TECH PVT. LTD.
An ISO 9001 : 2015 Certified Company
Corporate Identity No.: U72200MP2011026171

Reg. Address
"अतुल्य" IT Park, Madhya Pradesh Industrial Development Corporation
Khandwa Road, Indore (M.P.)
Contact : 0731-2970998, 77248-52726
Website: www.robotronix.co.in, Email: info@robotronix.co.in