AI USING PYTHON

Duration: 6 Weeks

6 days in a week & 2 hrs a day

Introduction To Python

- Writing and Executing First Python Program
- Python Language Fundamentals
- Python Conditional Statements
- Looping Statements
- Standard Data Types
- String Handling
- List ,Tuple ,Set ,Dictionary
- Python Functions
- Modules & Packages
- File I/O
- Object Oriented Programming
- Exception Handling
- GUI Programming
- Regular Expressions(Regex)

Installing Anaconda

- Understanding Jupyter

Numpy Package

- Difference between list and numpy
- Vector and Matrix operations
- Array indexing and slicing

Pandas Package

- Series and DataFrame Objects
- Understanding loc and iloc

- Groupby(),map(),apply()
- Handling missing values
- Handling Categorical data
- Label and One Hot Encoding

Data Visualization using matplotlib

- Scatter plot, line plot, bar plot
- Histogram, pie chart, etc.

Introduction To Machine Learning

- Traditional v/s Machine Learning Programming
- Real life examples based on ML
- Steps of ML Programming
- Data Preprocessing
- Data Transformation
    - MinMaxScalar
    - MaxAbsScalar
    - StandardScalar
    - Binarizer

Types of ML

- Supervised Learning
    - Classification
    - Regression

- Unsupervised Learning
    - clustering

Terminology Related To ML

- Attributes ,Features ,Target ,Instances
- Sklearn package
- Algorithms, Model
- Train Set, Validation Set, Test Set

KNN Classification

- Math behind KNN
- KNN implementation
- Understanding hyper parameters

Performance metrics for classification

- Confusion Matrix
- Accuracy Score

- Recall & Precision
- F-1 Score

Regression

- Math behind Regression
- Simple Linear Regression
- Multiple Linear Regression
- Polynomial Regression
- Boston Price Prediction
- Cost or Loss Functions
    - Mean absolute error
    - Mean squared error
    - Root mean squared error
    - Least Square Error
- Regularization
    - Ridge Regression
    - Lasso Regression

Performance metrics for regression

- R2 Score

Bias and Variance Trade-Off

- Overfitting
- Underfitting
- Best Fit

Logistic Regression for classification

- Theory of Logistic Regression
- Binary and Multiclass classification
- Implementing titanic dataset
- Implementing iris dataset
- Sigmoid and softmax functions
- Cross Entropy Loss

Decision Tree Classification

- Theory of Decision Tree
- Node Splitting
- Implementation with iris dataset
- Visualizing Tree
- max_features , max_depth

- min_sample_leaf , min_sample_split

- **Ensemble Learning**
  - Random Forest
  - Bagging and Boosting
- **Model Selection Techniques**
  - Cross Validation
  - Grid and Random Search for hyper parameter tuning
- **Text Analysis**
  - Install NLTK
  - Tokenize words
  - Tokenizing sentences
  - Stop words customization
  - Stemming and Lemmatization
  - Speech tagging
  - Feature Extraction
  - Sentiment Analysis
  - Count Vectorizer
  - Tfidf Vectorizer
  - Naive Bayes Algorithms
    - GaussianNB
    - MultinomialNB
    - BernoulliNB

- **Dimensionality Reduction**
- **Open CV**
  - Reading images
  - Understanding Gray Scale Image
  - Resizing image
  - Understanding Haar Classifiers
  - Face , eyes classification
  - How to use webcam in open cv
  - Building image data set
  - Capturing video
  - Face classification in video
- **Clustering**

- K-means Clustering

- **Projects**
  - **Spam Filter**
  - **Review Analysis**
- **Introduction To Artificial Neural Network**
  - What is Artificial Neural Network (ANN)?
  - How Neural Network Works?
  - Perceptron
  - Multilayer Perceptron
  - Feed Forward
  - Back propagation
- **Introduction To Deep Learning**
  - What is Deep Learning?
  - Deep Learning Packages
  - Deep Learning Applications
  - Building Deep Learning Environment
    - Installing Tensor Flow Locally
    - Understanding Google Colab
- **Tensor Flow Basics**
  - What is Tensorflow?
  - Tensorflow 1.x V/S Tensorflow 2.x
  - Variables, Constants
  - Scalar, Vector, Matrix
  - Operations using tensorflow
  - Difference between tensorflow and numpy operations
- **Optimizers**
  - What does optimizers do?
  - Gradient Descent (full batch and min batch)
  - Stochastic Gradient Descent
  - Adam, momentum
  - Learning rate , epoch
- **Activation Functions**
  - What does Activation Functions do?
  - Sigmoid Function,
  - Hyperbolic Tangent Function (tanh)

- ReLU –Rectified Linear Unit
- Softmax Function

Building Artificial Neural Network

- Using Tensorflow
- Understanding MNIST Dataset
- Initializing weights and biases
- Gradient Tape
- Defining loss/cost Function
- Train the Neural Network
- Minimizing the loss by adjusting weights and biases

Building Deep Neural Network Using Keras

- What is Keras?
- Keras Fundamental For Deep Learning
- Keras Sequential Model and Functional API
- Solve a Linear Regression and Classification Problem with Example
- Saving and Loading a Keras Model

Convolutional Neural Networks (CNNs)

- Introduction to CNN
- CNN Architecture
- Convolutional Operations
- Pooling , Stride and Padding Operations
- Data Augmentation
- Building ,Training and Evaluating First CNN Model
- Model Performance Optimization
- Auto encoders for CNN
- Transfer Learning and Object Detection Using Pre-trained CNN Models
    - VGG16,19
    - ResNet50
    - Inception(GooGleNet)
    - Yolo algorithm

Speech Recognition APIs

- Text To Speech
- Speech To Text
- Automate task using voice
- Voice Search on Web

Projects

- Attendance System Using Face Recognition
- Hand Written Digits & Letters Prediction
- Number Plate Recognition
- Gender Classification
- My Assistant for Desktop
- Cat v/s Dog Image Classification

Partners : ORACLE WORKFORCE DEVELOPMENT PROGRAM | redhat. CERTIFIED TRAINING PARTNER | UBI | edexcel | Java

DUCAT®
development | consultancy | training

E-mail: info@ducatindia.com
Visit us: www.ducatindia.com
www.facebook.com/ducateducation

NOIDA
A-43 & A-52, Sector-16,
Noida - 201301, (U.P.) INDIA
Ph. : 0120-4646464
Mb. : 09871055180

GREATER NOIDA
F 205 Neelkanth Plaza Alpha 1
commercial Belt Opposite to Alpha
Metro Station Greater Noida
Ph. : 0120-4345190-91-92 to 97
Mb. :09899909738, 09899913475

GHAZIABAD
1, Anand Industrial Estate,
Near ITS College, Mohan Nagar,
Ghaziabad (U.P.)
Ph.: 0120-4835400...98-99
Mb. : 09810831363 / 9818106660
: 08802288258 - 59-60

FARIDABAD
SCO-32, 1st Floor, Sec.-16,
Faridabad (HARYANA)
Ph. : 0129-4150605-09
Mb. : 09811612707

GURGAON
1808/2, 2nd floor old DLF,
Near Honda Showroom,
Sec.-14, Gurgaon (Haryana)
Ph. : 0124-4219095-96-97-98
Mb. : 09873477222-333