

Live Online Instructor-led Training
on
APPLIED DEEP LEARNING FOR MEDICAL DATA ANALYSIS
[MRI, CTSCAN, XRAY]

Total Duration: 30 Hours (10-days)
3-Hours / Per day

Training Highlights:



5+ Hands-on AI Projects
covered during the training.



Total 30+ Hours live online Instructor-led
Training.



Training includes:
Projects, Training PPT's & Recording.



Training **certificate of completion** will be
provided to each participant.

Projects included in Training

- **Project1:** Health Care Cost Regression & EDA
- **Project2:** Detecting COVID-19 in X-ray images with Deep Learning – Classifying NORMAL, PNEUMONIC Human Xray Data
- **Project3:** Human Brain MRI for Brain Tumour Detection using Deep Learning
- **Project4:** ECG Heart Beat Analysis, Visualization & Classification
- **Project5:** Classifying & Predicting Person with Brain Tumour or No-Tumour MRI Analysis
- **Project6:** DICOM / CT Scan Medical Image Visualization & Analysis

APPLIED DEEP LEARNING FOR MEDICAL DATA ANALYSIS

Course Content [30 Hours]

Note: Python will be Pre-Requisite for this course

DAY 1:

Module 1: Introduction to AI & Deep Learning

Introduction to Artificial Intelligence
Introduction to Machine Learning
Artificial Intelligence vs Machine Learning
Benefits of Machine Learning w.r.t. traditional methodologies
Deep Learning - Introduction
How DL is different from all other Machine Learning methods
Supervised and unsupervised learning
Reinforcement Learning
AI Training & testing flow
Classification and Regression in Supervised Learning
Clustering and Association in Unsupervised Learning
Algorithms that are used in these categories

DATA PREPARATION

Module 2: Data Manipulation – Cleansing – Munging using Python Modules

Cleansing Data with Pandas
Data Manipulation steps (Sorting, filtering, duplicates, merging, appending, subsetting, derived variables, sampling, Data type conversions, renaming, formatting etc)
Stripping out extraneous information
Scaling and Normalizing data
Pre-processing and Formatting data
Feature selection – RFE, Correlation etc

DAY 2:

Module 3: Data Analysis – Visualization Using Python

Introduction exploratory data analysis
Descriptive statistics, Frequency Tables and summarization
Univariate Analysis (Distribution of data & Graphical Analysis)
Bivariate Analysis (Cross Tabs, Distributions & Relationships, Graphical Analysis)
Creating Graphs- Bar/pie/line chart/histogram/ boxplot/ scatter/ density etc)

DAY 3:

Module 4: Statistics & Data Preparation / Feature Selection

Basic Statistics - Measures of Central Tendencies and Variance
Building blocks - Probability Distributions - Normal distribution
Central Tendency
Re-visiting vector and matrix algebra
Feature engineering & dimension reduction
Concept of Cross validation (Bootstrapping, K-Fold validation etc)

DAY 4

NEURAL NETWORKS

Module 5: Artificial Neural Networks

Perceptron
Logic gates
ANN & Working
Single Layer Perceptron Model
Multilayer Neural Network
Feed Forward Neural Network
Cost Function Formation
Activation Function
Cost Function Optimization
Applying Gradient Descent Algorithm
Stochastic Gradient Descent
Backpropagation Algorithm & Mathematical Modelling
Programming Flow for backpropagation algorithm
Use Cases of ANN
Programming Single Layer Neural Networks using Python
Programming MLNN using Python
XOR Logic using MLNN & Backpropagation
Score Predictor

DAY 5:**TENSORFLOW & KERAS****Module 6: TensorFlow**

TensorFlow library for AI
Keras – High Level TensorFlow API
Getting started with TensorFlow
Installation & Setting up TensorFlow
TensorFlow Data Structures
Tensor board – Visualization

DAY 6:**Module 7: Single Layered Perceptron**

Perceptron
Various activation functions in neural networks – Unit Step, Sigmoid, ReLu, Softmax, and hyperbolic functions
Single Layer Perceptron

Module 8: MLP - Regression & Classification concepts

Introduction to Multilayer Neural Network
Concept of Deep neural networks
Multi-layer perceptron
Neural network hyperparameters
Backpropagation, Forward propagation, overfitting, hyperparameters.
Training of neural networks
The various techniques used in training of artificial neural networks
Gradient descent rule
Perceptron learning rule
Tuning learning rate
Stochastic process
Optimization techniques

DAY 7:**DEEP LEARNING****Module 9: Linear Regression with ANN**

Learning Algorithm

Linear Regression – Theory
Feature selection - Correlation
Input Matrix & Output Labels
Activation Function
Training A single perceptron
Model Optimizers - Parameters and Hyperparameters
Multiple Linear Regression

Module 10: Logistic Regression with ANN

Logistic Regression – Theory
Classification Problems
Training the model
Hypothesis, Parameters & Hyperparameters, Cost Function, Model Optimization – Optimizers
Activation Function

DAY 8

IMAGE PROCESSING: OPENCV

Module 11: Introduction to OpenCV

Introduction to OpenCV
Image Processing
Working & implementation with Image
Edge Detection & smoothing of image
Working with resolution
Colour filtering on Image
Image Contour
Feature Extraction

DAY 9 & 10:

CNN

Module 12: CNNs (Convolutional Neural Networks)

Convolutional Neural Network
Understanding the architecture and use-cases of CNN
Pooling Layer
How to visualize using CNN
How to fine-tune a convolutional neural network
What is transfer learning
Kernel filter, Feature maps, and pooling
Deploying convolutional neural networks in TensorFlow

PROJECT - CONSOLIDATE LEARNINGS

- Health Care Cost Regression & EDA
- Detecting COVID-19 in X-ray images with Deep Learning – Classifying NORMAL, PNEUMONIC Human Xray Data
- Human Brain MRI for Brain Tumour Detection using Deep Learning
- ECG Heart Beat Analysis, Visualization & Classification
- Classifying & Predicting Person with Brain Tumour or No-Tumour MRI Analysis
- DICOM / CT Scan Medical Image Visualization & Analysis

Who can attend?

- **Basic Python programming language Knowledge must to attend this training.**
- Training is best suitable for Engineering college faculty, Research scholar, Student & Working IT Professional.

EduxLabs Teams

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