

Deep Learning with TensorFlow



At a Glance

Majority of data in the world are unlabelled and unstructured data, for instance images, sound, and text data. Shallow neural networks cannot easily capture relevant structure in these kind of data, but deep networks are capable of discovering hidden structures within these data. In this course, you will use TensorFlow library to apply deep learning **on different data types to solve real world problems.**



About This Course

Traditional neural networks rely on shallow nets, composed of one input, one hidden layer and one output layer. Deep-learning networks are distinguished from these ordinary neural networks having more hidden layers, or so-called more depth. These kind of nets are capable of discovering hidden structures within unlabeled and unstructured data (i.e. images, sound, and text), which constitutes the vast majority of data in the world.

In this TensorFlow course, you will be able to learn the basic concepts of TensorFlow, the main functions, operations and the execution pipeline. Starting with a simple “Hello Word” example, throughout the course you will be able to see how TensorFlow can be used in curve-fitting, regression, classification and minimization of error functions. This concept is then explored in the Deep Learning world. You will learn how to apply TensorFlow for backpropagation to tune the weights and biases while the Neural Networks are being trained. Finally, the course covers different types of Deep Architectures, such as Convolutional Networks, Recurrent Networks and Autoencoders.



Course Syllabus

Module 1- Induction class(Optional)

Module 2- Introduction Of AI

- Background, Need & importance
- Introduction & installation
- writing first program
- i/o python

Module 3- Programming Elements

- Keywords & variables
- Data types- Numbers & strings
- Operation in python
- Hands-on implementation

Module 4- Conditions & Loops

- indentation & scopes
- if, else & elif blocks
- introduction to loops
- For & while loops
- break & continue statements

Module 5- Data Structures

- Lists, tuples, sets dictionaries
- CRUD operations on data structures
- Building rock paper scissor with console

Module 6- Functions & Exception Handling

- Introduction to functions
- Positional & Keyword arguments
- Return statements
- Try, catch & finally block

Module 7- Add-on topics

- File handling- i/o
- Numpy arrays
- Case studies

Module 8- Basics of AI

- What us AI vs ML vs DL?
- AI applications

Module 9- Neural Network Basics

- Artificial Neuron
- Weights, Bias and Activation
- Function
- Forward Propagation

Module 10- Backward Propogation

- Optimizer- Gradient Desent and adam
- Tensorflow and keras Basics
- What are Tensors?

Module 11- Loss Function & Error

- Regression loss vs Probabilistic loss
- MSE- mean square error
- Simple neural network

Module 12- Artificial Neural network

- Binary cross entropy
- Artificial neural netwok
- Sigmoid vs softmax activation
- Derivative of relu & sigmoid

Module 13- Importance of data normalization

- What is Vanishing gradient?
- Classification in deep learning
- Image basics- Pixels

Module 14- Classification Metrics confusion matrix

- What is overfitting?
- Regularization techniques
- Adding dropout layers & custom callbacks

Module 15- Opencv Basics

- What are filters & Kernals
- Convolution operation
- Blurring, Embossing, Sharpening

Module 16- How to save deep learning mode

- Minor project on digit recognizer
- Streamlit Canvas
- Brush strokes & pixel for canvas

Module 17- Introduction to TensorFlow

- HelloWorld with TensorFlow
- Linear Regression
- Nonlinear Regression
- Logistic Regression
- Activation Functions

Module 18– Convolutional Neural Networks (CNN)

- CNN History
- Understanding CNNs
- CNN Application

Module 19– Recurrent Neural Networks (RNN)

- Intro to RNN Model
- Long Short – Term memory (LSTM)
- Recursive Neural Tensor Network Theory
- Recurrent Neural Network Model

Module 20– Unsupervised Learning

- Applications of Unsupervised Learning
- Restricted Boltzmann Machine
- Collaborative Filtering with RBM

Module 21– Autoencoders

- Introduction to Autoencoders and Applications
- Autoencoders
- Deep Belief Network

Module 22- Transfer learning

- Imagenet Competition
- VGG16 vs Mobilenet

Module 23 – Final Projects & doubt clearing session

- Image data augmentation
- Final project

Module 24 – Web App Development

- Platforms as a service
- Profile and setup file
- Deployment on heroku
- platform

Module 25- Image to text

- Tesseract software
- Optical character recognition
- Web app for OCR

Module 26 - Cascade Classifier

- Shapes in opencv
- Face Detection using haar cascade
- Detect multiscale function

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