SCHOOL OF CONTINUING AND DISTANCE EDUCATION

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

CERTIFICATE COURSE – ARTI FICIAL INTELLIGENCE AND MACHINE LEARING

Sub-3: Artificial Intelligence – Deep Neural Networks, ConvolutionalNeural Networks

Artificial Neural Networks: Introduction

Deep Neural Networks: Introduction to Neural Networks, Linear Regression Gradient Descent(Batch, Stochastic and Mini-Batch), Logistic/Sigmoid neuron, Forward propagation, Backpropagation, Neural Network Architecture, Layers of a Deep Neural Network, Back propagation,Activation Functions (Sigmoid, Tanh, ReLU, Leaky ReLU), Softmax regression classifier,Softmax Regression Classification

Tensor Flow: Introduction to TensorFlow 2.x, Construction Phase, Execution PhaseUse Case: Build handwritten digit recognition model with TensorFlow

Gradient Descent: Exponentially weighted moving average,Gradient Descent with Momentum,Gradient Descent with RMSProp (Root Mean Squared Propagation), Gradient Descent withADAM (Adaptive Momentum Estimation), Batch Normalization

Regularizing Deep Neural Networks, l1, l2 regularization, Dropout regularization, Vanishing& Exploding Gradients, Weight initializations (He/Xavier initialization), Algorithm Optimizers,Momentum - Exponentially weighted moving average

Convolutional Neural Networks: Introduction to CNN (Convolutional Neural Networks),Computer Vision, Convolution and Edge detection, Padding, Striding Convolutions, ConvolutionNeural Network.Edge Detection, Padding, Stride, Pooling, ResNets (CNN build with ResidualBlock), Inception Network (filter size, pooling, stride all combined layer), Data Augmentation,Transfer LearningUse Case: Cat vs Dog classification (Image Classification using 2d Convolutions).

Artificial Intelligence – Natural Language Processing with DeepLearning

Introduction to Semantic Natural Language Representation: Word embeddings/vectorrepresentation, Word2Vec model, Introduction to Transformer Networks and word embeddings.**Sentiment Analysis:** Build sentiment analysis model Using Gensim word2vec representation(DNN, 1d convolution for dimensionality reduction)

Artificial Intelligence – Time Series (RNN), Computer Vision andModel Deployment

Recurrent Neural Networks & Attention Based Networks: Recurrent Neural Networks,Bidirectional Recurrent Neural Networks, Gated Recurrent Units (GRU), Long short-termmemory (LSTM), Auto encoders.

Time series (Stock price prediction), Introduction to Transformer Networks, Seq2Seq Model:Text Summarization - Language Generation (Sequence to Sequence model)Use Case: Stock Market Prediction (Time Series problem)

Computer Vision: Object Localization, Intersection over Union, Anchor Boxes, Non MaxSuppression (NMS), YOLO Algorithm, Object Detection, Face Detection

Project:

Data Labelling/Annotation, Object Detection, Face Detection, OCR, etc

Deep Learning Model Deployment: Setup AWS EC2 server with necessary software, Deploy Deep Learning Modle (TensorFlow or PyTorch), Expose deep learning model as anRESTFul Web Service.

TEXT BOOKS:

1. Eric Matthews, 'Python Crash Course'

3. AurelienGeron, Hands On Machine Learning with Scikit-Learn and Tensor Flow Concepts, Tools and Techniques to Build Intelligent Systems

REFERENCE BOOKS:

1. Mark Lutz, Learning Python, 5th Edition

2. Paul Barry, Head-First Python

3. Adnan Aziz, Elements of Programming Interviews in Python: The Insiders'

4. AndriyBurkov, The Hundred-Page Machine Learning Book

5. Drew Conway and John Myles White, Machine Learning for Hackers: Case Studies and Algorithms to Get you Started

6. Nishant Shukla, Machine Learning with TensorFlow