

# **DLCV with NLP**

## **Instructors:**

## **Curriculum:**

### **Introduction**

#### **Advance NLP with deep-learning overview**

- Computational Linguistic
- History of NLP
- Why NLP
- Use of NLP

### **TensorFlow Installation**

- Tensorflow Installation 2.0
- Tensorflow Installation 1.6 with virtual environment
- TensorFlow 2.0 function
- Tensorflow 2.0 neural network creation
- Tensorflow 1.6 functions
- Tensorflow 1.6 neural network and its functions
- Keras Introduction
- Keras in-depth with neural network creation
- Mini project in Tensorflow

## **Pytorch**

- Pytorch installation
- Pyrotorch functional overview
- Pytorch neural network creation

## **Neural Network**

- A Simple Perception
- Neural Network overview and its use case
- Various Neural Network architect overview
- Use case of Neural Network in NLP and computer vision
- Multilayer Network
- Loss Functions
- The Learning Mechanism
- Optimizers
- Forward and Backward Propagation
- Gradient Descent

## **CNN overview**

- CNN definition and various CNN based architecture
- End to End CNN network training
- Deployment in Azure
- Cloud performance tuning of CNN network

## **Advance computer vision – part 1**

- GAN

- Generative Model Using GAN
- BERT
- Semi-Supervised learning using GAN
- Restricted Boltzmann Machine (RBM) and Autocoders
- CNN Architectures
- LeNet-5
- AlexNet
- GoogleNet
- VGGNet
- ResNet
- SSD
- SSD lite
- Faster R CNN

### **Advance computer Vision – Part 2.**

- SCNN
- Masked R-CNN
- Xception
- SEnet
- Facenet
- Implementing a ResNet – 34 CNN using Keras
- Pretrained Models from Keras
- Pretrained Models for Transfer Learning

### **ChatBot**

- Intents and Entities
- Fulfillment and integration
- Chatbot using Microsoft bot builder and LUIS, development to Telegram, Skype
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- Chatbot using Amazon Lex, deployment to Telegram, Skype
- Chatbot using RASA NLU, deployment to Telegram , Skype
- Semantic Segmentation
- Classification and Localisation
- TensorFlow Object Detection
- You Only Look Once (YOLO)

## **Text processing**

- Importing Text
- Web Scrapping
- Text Processing
- Understanding Regex
- Text Normalisation
- Word Count
- Frequency Distribution
- Text Annotation
- Use of Anotator
- String Tokenization
- Annonator Creation
- Sentence processing
- Lemmatization in text processing

- POS
- Named Entity Recognition
- Dependency Parsing in text
- Sentimental Analysis

## **Spacy**

- Spacy Overview
- Spacy function
- Spacy function implementation in text processing
- POS tagging, challenges and accuracy
- Entities and named entity Recognition, interpolation, Language models

## **NLP Terminology**

- Morphology and Diversity
- Ambiguity and Paradigms
- Structures and meanings
- Lexical Knowledge, Network Metaphors and co-references
- Lexical Ambiguity
- Polysemy and homonymy
- Coreference Resolution
- Anaphora and cataphora resolution
- Multi-sentential resolution
- Humans and Ambiguity
- Machines and ambiguity
- Co-occurrence and distributional similarity

- Similarity and relatedness
- Knowledge graphs and repositories
- Computational Linguistics
- Word embeddings and co-occurrence vectors
- Word Sim353 Dataset examples
- Word2vec
- Part of speech tagging

## **RNN**

- Recurrent Neural Networks
- Long Short Term Memory (LSTM)
- Bi LSTM
- GRU implementation
- Building a Story writer using character level RNN

## **Attention Based model**

- Seq 2 Seq
- Encoders and Decoders
- Attention Mechanism
- Attention Neural Networks
- Self Attention

## **Hardware Setup – GPU**

- GPU Introduction
- Various type of GPU configuration

- GPU provider and its pricing
- Paperspace GPU setup
- Running model in GPU

### **Transfer Learning in NLP**

- Introduction to transformers
- BERT Model
- ELMo Model
- GPT1 Model.
- GPT2 Model
- ALBERT Model
- DistilBERT Model

### **NLP project end to end with deployment in various cloud and UI integration**

- Topic Modeling
- Word sense disambiguation
- Text to speech
- Keyword Spotting
- Document Ranking
- Text Search (with Synonyms)
- Language Modeling
- Spam Detector
- Image Captioning

### **Mini NLP project**

- Machine Translation
- Abstractive text summarization
- Keyword spotting
- Language modelling
- Document summarization

### **Deployment of Model and Performance tuning**

- Deep learning model deployment strategies
- Deep learning project architecture
- Deep learning model deployment phase
- Deep learning model retraining phase
- Deep learning model deployment in aws
- Deep learning model deployment in azure
- Deep learning model deployment in gcloud

### **NLP transfer learning Project**

- Deployment and integration with ui machine translation
- Question answering (like chat – bot)
- Sentiment analysis imdb
- Text search (with synonyms)
- Text classifications
- Spelling corrector
- Entity (person, place or brand) recognition
- Text summarization
- Text similarity (paraphrase)



- Topic detection
- Language identification
- Document ranking
- Fake news detection
- Plagiarism checker
- Text summarization extractive
- Text summarization abstractive

### **NLP end to end project with architecture and deployment**

- Movie review using bert
- Ner using bert
- Pos bert
- Text generation gpt 2
- Text summarization xlnet
- Abstract bert
- Machine Translation
- Nlp text summarization custom
- Keras/tensorflow
- Language identification
- Text classification using fast bert
- Neuralcore
- Detecting fake text using gltr with bert and gpt2
- Fake news detector using gpt2
- Python plagiarism checker type a message
- Question answering

