

DEEP LEARNING MODULE



Course Introduction

Introduction



AI and Deep learning introduction

- What is AI and Deep Learning
- Brief History of AI
- Recap: SL, UL and RL
- Deep Learning: Successes Last Decade
 - Demo and Discussion: Self-Driving Car Object Detection
- Applications of Deep Learning
Challenges of Deep Learning
 - Demo and Discussion: Sentiment Analysis Using LSTM Full Cycle of a Deep Learning

Artificial Neural Network

- Biological Neuron Vs Perceptron Shallow Neural Network Training a Perceptron
 - Demo Code #1: Perceptron (Linear Classification)
- Backpropagation Role of Activation Functions and Backpropagation
 - Demo Code #2: Activation Function
 - Demo Code #3: Backprop Illustration
- Optimization
 - Regularization
 - Dropout layer
 - Demo Code #4: Dropout Illustration,

Deep Neural Network & Tools Deep Neural Network

- Why and Applications Designing a Deep Neural Network
- How to Choose Your Loss Function?
- Tools for Deep Learning Models Keras and its Elements
 - Demo Code #5:
- Build a Deep Learning Model Using Keras Tensorflow and Its Ecosystem
 - Demo Code #6: Build a Deep Learning Model Using Tensorflow TFlearn Pytorch
 - Demo Code #7: Build a Deep Learning Model Using Pytorch

Deep Neural Net optimization, tuning, interpretability

- Optimization Algorithms SGD, Momentum, NAG, Adagrad, Adadelata , RMSprop, Adam
 - Demo code #8: MNIST Dataset Batch Normalization
 - Demo Code #9 Exploding and Vanishing Gradients Hyperparameter Tuning
 - Demo Code #10 Interpretability
 - Demo Code#11: MNIST– Interpretability Lessons Width vs Depth

Convolutional Neural Net Success and History

- CNN Network Design and Architecture
 - Demo Code #12: Keras
 - Demo Code #13: Two Image Type Classification (Kaggle), Using Keras DCN Models