Artificial Intelligence with Computer Vision

Objective: To design the real world application using artificial intelligence with computer vision.

Pre-requisites: Digital Image Processing, Deep Learning and Digital Signal Processing

Session 1 (Image Processing)

- Image Representation and Classification
- Convolutional Filters and Edge Detection
- Types of Features
- Image Segmentation and Feature Vectors

Session 2 (2-D Projective Geometry)

- Projective Transform
- Projective Geometry
- Homography

Session 3 (Deep Neural Architecture and Applications)

- ANN (Artificial Neural Network)
- RNN (Recurrent Neural Network)
- CNN (Convolutional Neural Network)
- BPTT (Backpropagation Through Time)
- LSTM (Long Short Term Memory Networks)

Session 4 (Image Representation and Classification, Convolutional Filters and Edge Detection)

- Learn about advances in CNN architectures and see how region-based CNN's
- Like Faster R-CNN, have allowed for fast
- Localized Object Recognition in Images

Session 5 (Advanced CNN Architectures AND YOLO)

- Learn about the YOLO
- Multi-Object Detection Model and Work with a YOLO implementation

Session 6 (Recurrent Neural Networks)

- Explore how memory can be incorporated into a deep learning model using recurrent neural networks (RNNs)

➤ Learn how RNNs can learn from the generated ordered sequence of data

Session 7 (LSTM)

➤ Luis explains Long Short Term Memory Networks (LSTM)
➤ Similar Architectures which have the benefits of preserving long term memory

Session 8 (Hyper Parameters)

➤ Learn about a number of different hyper parameters that are used in defining and training deep learning models
➤ We'll discuss starting values and intuitions for tuning each hyper parameter

Session 9 (Attention)

➤ Attention is one of the most important recent innovations in deep learning
➤ Learn how attention models work and go over a basic code implementation

Session 10 (Image Captioning)

➤ Learn how to combine CNNs and RNNs to build a complex model
➤ Automatic Image Captioning Model

Session 11 (Implement an effective RNN decoder for a CNN encoder)

➤ Train a CNN-RNN model to predict captions for a given image
➤ Task will be to implement an effective RNN decoder for a CNN encoder

Session 12 (Project Work)