

Workshop on Advanced Deep Learning

Day 1: Deep Learning Revision	
8.00-9.00	Registration
Session 1 9.00-11.00	Revision: Neural Network Neural Networks, Gradient Descent, Backpropagation, Activation Functions, Regularization, Optimizers, and Hyper parameter Tuning
TEA BREAK	
Session 2 11.15-13.00	Deep Learning Lab 1: Hands on with Neural Networks Image classification Fashion MNIST, CIFAR10
LUNCH BREAK	
Session 3 14.00-16.00	Revision: CNN and RNN Convolution, Striding, Padding, Pooling, AlexNet, Transfer Learning, Object Detection, Face Recognition, Sequential Processing, Word Embedding, LSTM, GRU, Text Generation, Translation, Attention Modeling, Speech Recognition
TEA BREAK	
Session 4 16.15-17.30	Deep Learning Lab 2: Hands on with CNN and RNN Image classification CIFAR100 with CNN Transfer Learning with famous pretrained models Reuters newswire topics classification with RNN
Day 2: Advanced Deep Learning Part 1	
Session 1 9.00-11.00	Unsupervised Deep Learning Sparse Coding, Restricted Boltzman Machine, Deep Belief Networks
TEA BREAK	
Session 2 11.15-13.00	Advanced Deep Learning Tools 1 Hands on with Tensorflow 2.0
LUNCH BREAK	
Session 3 14.00-16.00	Deep Generative Models Autoencoders, Variational Autoencoders, Generative Adversarial Networks
TEA BREAK	
Session 4 16.15-17.30	Deep Learning Lab 3: RBM for Recommender Systems Autoencoders for image encoding

	Deconvolutional Generative Neural Networks for digit generation
Day 3: Advanced Deep Learning Part 2	
Session 1 9.00-11.00	Advanced Deep Learning Topics in CNN CNN Visualization, New-age Convolutions, Advanced Object Detection: YOLO v3, Image Segmentation: FCN, SegNet, UNet, Style Transfer
TEA BREAK	
Session 2 11.15-13.00	Advanced Deep Learning Tools 2 Hands on with PyTorch
LUNCH BREAK	
Session 3 14.00-16.00	Advanced Deep Learning Topics in RNN Bidirectional RNN, Attention Models, Memory Networks, Advanced Word Embeddings: BERT, ElMo, MUSE, Augmentation for NLP
TEA BREAK	
Session 4 16.15-17.30	Deep Learning Lab 4: YOLO-v3 Object Detection UNet for Segmentation Style Transfer for image painting Chatbot using Seq2Seq LSTM models
Day 4: Advanced Deep Learning Part 3	
Session 1 9.00-11.00	Deep Learning Model Optimization Part 1 Compact Architectures, Pruning, Low-rank Factorization, Quantization, Encoding
TEA BREAK	
Session 2 11.15-13.00	Deep Learning Model Optimization Part 2 Student Teacher Networks, Neural Architecture Search (NAS), AutoML, Auto Keras, Multi-objective Approaches Deep Learning Lab 5: Pruning for Networks, Low-rank decomposition using SVD, Autokeras for NAS, Knowledge Distillation
LUNCH BREAK	
Session 3 14.00-16.00	Deep Reinforcement Learning Part 1 Introduction To RL, Markov Decision Processes, Dynamic Programming Policies, value functions, Bellman equations, Monte Carlo Methods, Greedy and epsilon-greedy policies, Exploration-Exploitation Dilemma
TEA BREAK	

Session 4 16.15-17.30	Deep Reinforcement Learning Part 2 Temporal-Difference Methods, Deep Q-Learning: Bellman Equations, DQN Variants, Policy-Based Methods and Improvement, Actor-Critic Methods Deep Learning Lab 6: Deep Q Networks for Atari Games
Day 5: Project Day	
Session 1 9.00-11.00	Deep Learning Project 1: Satellite Image Segmentation Data collection, Preprocessing, Augmentation
TEA BREAK	
Session 2 11.15-13.00	Model Development CNN Model Development, Training, Testing and Improvement
LUNCH BREAK	
Session 3 14.00-16.00	Deep Learning Project 2: Wakeup word Detection Data collection, Preprocessing, Feature Extraction
TEA BREAK	
Session 4 16.15-17.30	Model Development RNN Model Development, Training, Testing and Improvement