

Course: Deep Learning and Computer Vision

| Time duration | Theory Topics | Hands on |
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| Week 1 | <ol style="list-style-type: none"> 1. Basics required for Machine Learning (ML), Deep Learning (DL). 2. Introduction to ML, DL, Image Processing (IP), Computer Vision (CV). 3. Types of Learning 4. ML Vs DL | <ol style="list-style-type: none"> 1. Introduction to python. 2. Python for image processing 3. Introduction to TensorFlow, GoogleColab, Keras and Pytorch 4. Important libraries |
| Week 2 | <ol style="list-style-type: none"> 1. Popular traditional ML algorithms. 2. Components of ML/DL Algorithms 3. Introduction to deep neural network 4. Neural network working and applications | <ol style="list-style-type: none"> 1. Implementation of ANN for classification, prediction, and regression using python |
| Week 3 | <ol style="list-style-type: none"> 1. Introduction to auto-encoder and its applications. 2. Introduction of CNN and variants (SoTA models). 3. Solving problems using CNN 4. Transfer Learning | <ol style="list-style-type: none"> 1. Implementing CNN for classification, regression, prediction. 2. SoTA Models 3. Implementation of auto-encoder for dimension reduction and denoising. 4. Use of transfer learning. |
| Week 4 | <ol style="list-style-type: none"> 1. Introduction to generative models (Variational Auto-encoder, Generative Adversarial Networks, and their variants). 2. Applications of generative models (Image synthesis, Data Augmentation, Anomaly Detection) | <ol style="list-style-type: none"> 1. Implementations of generative models for Image synthesis, Data Augmentation, Anomaly Detection. |
| Week 5 | <ol style="list-style-type: none"> 1. Introduction to RNN, LSTM and Transformers. 2. Future trends in AI, ML and DL (Quantum Computing, Explainable AI, Edge AI etc.) 3. Case study of an AI application. | <ol style="list-style-type: none"> 1. Implementation of RNNs, LSTM and transformers. 2. Solving real life problem examples using DL |
| Week 6 | Mini Project | |