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| 1. | Title of the course | Machine Learning for Image Processing |
| 2. | Course number | EE508L |
| 3. | Structure of credits | 3-0-0-3 |
| 4. | Offered to | PG |
| 5. | New course/modification to | Modification To EE5024/4 |
| 6. | To be offered by | Department of Electrical Engineering |
| 7. | To take effect from | July 2022 |
| 8. | Prerequisite | CoT |
| 9. | Course Objective(s): Student will understand the concepts, theory and computational algorithms needed for several real world recognition or classification from Image data, leading to automated scene understanding or summarization and decision making. Provides necessary skills for understanding of similar tasks on text, speech, video and other forms of data. Can developing several exciting learning tasks, in several domains ranging from medical, engineering to state of the art industrial and societal needs | |
| 10. | Course Content: Introduction to Image and Video data, Representation, Classification or Recognition from data, Machine Learning; Feature extraction: From Images (SIFT, Wavelet, HoG) and Videos (BoVW); Machine Learning: Linear Perceptron, Support vector Machines and Neural Networks (NNs). Self Organizing Maps; Deep learning methods: Training in Deep Feed forward NNs; Convolutional NNs, Training CNNs. Standard architectures; Features of Deep Networks: Transfer learning, Multi-task learning, Transformation invariant learning etc.; Applications of Deep Nets: Image segmentation, Object recognition, Transformation invariant recognition. Visual Tracking with Deep trained nets; Introduction to other Deep learning Methods: GANs (Generative adversarial networks). Bayesian Belief Networks for Semi-supervised learning. Recurrent NN. | |
| 11. | Textbook(s): 1. Goodfellow I and BengioY, <i>Deep Learning</i> , MIT Press (2016). 2. Duda R O and Hart P E, <i>Pattern Classification</i> , WILEY (2001). | |
| 12. | Reference(s): 1. Gonzalez R C and Woods R E, <i>Digital Image Processing</i> , Pearson Education (2001). | |