Department of Electronics and Communication Engineering

Pattern Recognition and Computational Intelligence Laboratory

National Institute of Technology Tiruchirappalli

ONLINE Workshop on Machine Learning, Deep learning and Computational intelligence for wireless communication (with Illustrations using MATLAB) (MDCWC 2022)

Patron: Dr. Mrs. G. Ahila, Director

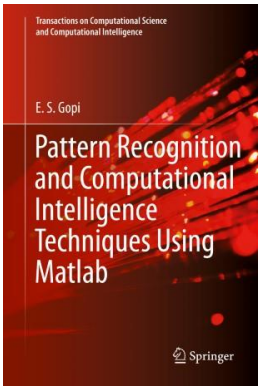
Co-patron: Dr.S.Muthukumuran, Dean (Research and Consultancy)

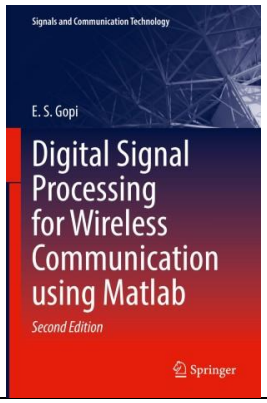
Co-Patron: Dr. P. Muthuchidambaranathan, Head of the ECE Department

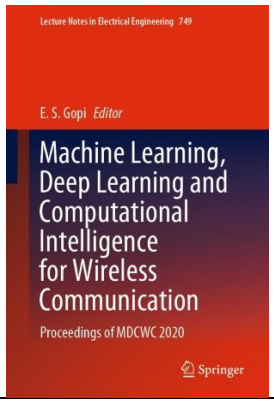
Co-ordinator: Dr. E.S. Gopi, Associate professor, Department of ECE

Duration	**30th May to 24th June 2022** **[Evening classes from 6.00 P.M. to 9.00 P.M.] (Excluding Saturday and Sunday)**			
About the course	**The course aims on strengthening the mathematical foundations involved in wireless communication, machine learning, deep learning and computational intelligence using illustrations using Matlab. Evening classes are offered to facilitate working professionals. Participants will also get the chance to get the paper published in the Machine Learning for wireless Communication with Simulation Illustrations, Signals and Communication Technology series, springer publications, Co-Edited by the event Co-ordinator Link(Papers will be subjected to regular Review process). Guest sessions on the state-to-the-art techniques will also be handled by Foreign and Indian experts on the related topics.**			
Total number of hours: 50		**Module 1**	**Module 2**	
	Theory	**15 hours**	**15 hours**	
	Illustrations	**10 hours**	**10 hours**	
Target Audience:	**UG, PG, Scholars, Faculty from Engineering colleges and universities and participants from Industry. Participants are strongly encouraged to have Matlab software installed in their system to execute the code described during the illustration session.**			
Maximum of participants:	**30 for each module (Based on First Come First Served Basis) Hurry!**			
Registration fee	**Category**	**Module 1 (Including GST)**	**Module 2 (Including GST)**	**Both Modules (Including GST)**
	UG,PG, Research scholars and Faculty	**6000**	**6000**	**10000**
	Industry participants	**8000**	**8000**	**14000**
Online portal	**Webex (Link will be shared for the registered participants)**			
Registration	**Registration fee needs to be paid through SBI portal: Click here for further details**			
	Once registration is done, Google form needs to be filled for the completion of registration.			

Course contents will be based on the book authored/edited by the co-ordinator







Topics covered

Module 1

Parametric approach to Linear regression (Maximum Likelihood Estimation, Least square estimation) Regularization technique, Bayes technique, Kernel smoothing and Gaussian process technique, Dimensionality reduction techniques: Principal Component Analysis, Linear Discriminant Analysis, Kernel Linear Discriminant Analysis and Independent Component Analysis, Probabilistic discriminative model: Perceptron, Multiple class Logistic regression, Support Vector Machine Probabilistic generative model: Gaussian Mixture Model (Combinational model), Generative Model: Hidden Markov Model, Artificial Neural Network Introduction to Deep learning techniques: Convolution Neural Network, Auto-encoder, Generative Adversarial Network, Graph Neural Network, Long Short Term Memory, Recurrent Neural Network, Particle Swarm Optimization, Ant colony Optimization

Module 2

Mathematical model of Time varying wireless channel model: Coherence time, Doppler spread, Coherence frequency and Delay spread Rayleigh, Rician, kappa-mu, eta-mu model, Detection theory: Bayes, Mini-Max and Neyman-pearson technique Estimation theory: MMSE, MMAE and MAP technique, Mathematical model of base band transmission and its Spectral density computation. Relationship between Base and Band pass transmission. Computation of spectral density PSK,QPSK,FSK,MSK, Power Spectral estimation using periodogram, Barlett, Welch and the Blackman-Tuckey method, Multiple Input Multiple Output channel model and Massive MIMO, mmWave channel model Ray tracing model, Beam forming, NOMA, Spatial Modulation, OFDM, Water fill algorithm, Case studies on Machine learning algorithm in Wireless communication.

Organized by
Pattern recognition and Computational Intelligence Laboratory
Department of ECE

Contact for further details:
Dr. E.S.Gopi<esgopi@nitt.edu>
rajasekharreddy poreddy <sekharpraja@gmail.com> ,
vinodha k <vinodhakamaraj@gmail.com>