Pattern Recognition - Web course

COURSE OUTLINE

This course gives the importance and usefulness of pattern recognition in modern world. Images can be classified based on their patterns. Clustering which helps in differentiating groups of data is included in this course. Decision functions will be dealt in with. Pattern recognition with the help of the membership of incoming functions will be taught.

The extractable measure of an image called features which help us distinguish one image from the other will be studied. Feature extraction and feature selection will also form a part of this course. As application of pattern recognition, Pattern recognition using Fuzzy logic and neural network will be used.

COURSE DETAIL

Module	Course content	Hours
I	**INTRODUCTION TO PATTERN RECOGNITION** Basic concepts- Structure of a typical pattern recognition system.	4
II	**DECISION FUNCTIONS** Role of decision functions in pattern recognition- Linear and generalized decision functions - Concept of pattern space and weight space - Geometric properties - Implementation of decision functions.	5
III	**FEATURES** Feature vectors - Feature spaces - Problem of feature identification Feature selection and feature extraction.	4
IV	**CLUSTERING** Distance measures - Clustering transformation and feature ordering - Clustering in feature selection - Feature selection through entropy minimization.	5
V	**PATTERN CLASSIFICATION BY DISTANCE FUNCTIONS** Pattern classification by distance functions - Minimum distance classification - Cluster and cluster seeking algorithms - Pattern classification by likelihood functions.	4
VI	**PATTERN CLASSIFICATION BY STATISTICAL FUNCTIONS** Pattern classification using Statistical classifiers - Bayes'	5

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Electronics & Communication Engineering

Pre-requisites:

Basic knowledge of

- Image Processing
- Calculus
- Linear algebra
- Probability

Additional Reading:

1. P.K. Devijver and J.Kittler - "Pattern Recognition - A Statistical approach" - Prentice Hall, 1982.
2. Julius T. Tou and R.C. Gonzalez - "Pattern Recognition Principles" - Addison Wiley - 1981.
3. R. Scalkoff - "Pattern Recognition - Statistical, Structural and Neural Approaches" - John Wiley 1992.

Coordinators:

Dr. K.Vijayarekha
Electrical & Electronics EngineeringSASTRA University

	classifier - Classification performance measures - Risk and error probabilities.	
VII	**PATTERN RECOGNITION USING FUZZY CLASSIFIERS** Fuzzy and crisp classification - Fuzzy clustering - Fuzzy pattern recognition - Syntactic pattern recognition- Selection of primitives - Syntax analysis for pattern recognition.	5
VIII	**PATTERN RECOGNITION USING NEURAL CLASSIFIERS** Introduction - Neural network structures for PR, Neural network based pattern associators - Feed forward networks trained by back propagation - ART networks.	5
IX	**APPLICATION OF PATTERN RECOGNITION** Application of pattern recognition problem applied for classification of leather images - Application of pattern recognition problem for classification of citrus fruit images.	3
	Total	40

References:

- Manahem Friedman and Abraham Kandel - "Introduction to Pattern Recognition - Statistical, Structural, Neural and Fuzzy logic approaches" ISBN 9810233124 - 1999.