

CU5096 PATTERN RECOGNITION AND MACHINE LEARNING

DETAILED SYLLABUS

OBJECTIVES:

Study the fundamental of pattern classifier.

- To know about various clustering concepts.
- To originate the various structural pattern recognition and feature extraction.
- To understand the basic of concept learning and decision trees
- To explore recent advances in pattern recognition.

UNIT I PATTERN CLASSIFIER

Overview of Pattern recognition – Discriminant functions – Supervised learning – Parametric estimation – Maximum Likelihood Estimation – Bayesian parameter Estimation – Problems with Bayes approach – Pattern classification by distance functions – Minimum distance pattern classifier.

UNIT II CLUSTERING

Clustering for unsupervised learning and classification -Clustering concept – C-means algorithm – Hierarchical clustering procedures -Graph theoretic approach to pattern clustering -Validity of clusters.

UNIT III FEATURE EXTRACTION AND STRUCTURAL PATTERN RECOGNITION

KL Transforms – Feature selection through functional approximation – Binary selection - Elements of formal grammars - Syntactic description - Stochastic grammars – Structural representation.

UNIT IV INTRODUCTION, CONCEPT LEARNING AND DECISION TREES

Learning Problems – Designing Learning systems, Perspectives and Issues – Concept Learning – Version Spaces and Candidate Elimination Algorithm – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search

UNIT V RECENT ADVANCES

Neural network structures for pattern recognition -Neural network-based pattern associators – Unsupervised learning in neural pattern recognition -Self organizing networks -Fuzzy logic - Fuzzy pattern classifiers -Pattern classification using Genetic Algorithms.

REFERENCES:

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2. Morton Nadier and Eric Smith P., Pattern Recognition Engineering, John Wiley & Sons, New York, 1993.
3. Narasimha Murty M and Susheela Devi V, “Pattern Recognition – An Algorithmic Approach”, Springer, Universities Press, 2011

4. Robert J.Schalkoff, Pattern Recognition : Statistical, Structural and Neural Approaches, John Wiley & Sons Inc., New York, 2007.
5. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (Indian Edition), 2013.
6. Tou and Gonzalez, Pattern Recognition Principles, Wesley Publication Company, London, 1974.