EID356 : DATA MINING AND DATA WAREHOUSING

Module I **8 hours**

Introduction: What motivated data mining? why is it important? What is data mining? data mining-on what kind of data? data mining functionalities, what kinds of patterns can be mined? are all of the patterns interesting? classification of data mining systems, data mining task primitives, integration of a data mining system with a database or data warehouse system.

Module II **12 hours**

Data preprocessing: Types of data sets and attribute values, basic statistical descriptions of data, data visualization, measuring data similarity, data quality, major tasks in data preprocessing, data reduction, data transformation and data , discretization, data cleaning and data integration

Data Warehousing and On-Line Analytical Processing: Data Warehouse- Basic concepts, data warehouse modeling: Data cube and OLAP, data generalization by attribute-oriented induction.

Module III **10 hours**

Mining frequent patterns, associations and correlations: Basic concepts, applications of frequent pattern and associations, frequent pattern and association mining: A road map, mining various kinds of association rules, apriori algorithm, FP growth algorithm, Pattern evaluation methods.

Module IV **10 hours**

Classification Analysis: Classification: Basic concepts, decision tree induction, Bayes classification methods, rule-based classification, classification by neural networks, model evaluation and selection, techniques to improve classification accuracy: Ensemble methods.

Module V **10 hours**

Cluster Analysis: Basic concepts and methods, clustering structures, major clustering approaches, partitioning methods, hierarchical methods, density based methods, grid based methods, Evaluation of clustering.

Text Book(s)

1. Jiawei Han, MichelineKamber, Jian Pei , Data Mining: Concepts and Techniques, 3/e, Morgan Kaufmann publishers, 2011.

References

1. Michael Steinbach, Vipin Kumar, Pang-Ning Tan, Introduction to Data Mining, 1/e, Addison-Wesley, 2006
2. Margaret H. Dunham, Data Mining: Introductory and Advanced Topics, 1/e, Pearson publishers, 2006

ECS302: ARTIFICIAL INTELLIGENCE

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Module I **8 hours**

Introduction to AI and Intelligent Agents: Introduction: What is AI? The foundations of artificial intelligence; **Intelligent Agents:** Agents and environments. Good Behaviour: The concept of rationality, The nature of environments, The structure of agents.

Module II **12 hours**

Problem Solving by Search and Exploration:Solving Problems by Searching: Problem solving agents, Example problems, Searchingfor solutions, Uninformed search strategies, Avoiding repeated states, Searching with partial information; **Informed Search and Exploration:** Informed (heuristic) search strategies—Greedy best-first search, A* search: Minimizing the total estimated solution cost, Memory-bounded heuristic search;Heuristic functions: The effect of heuristic accuracy on performance, Inventing admissible heuristic functions;Local search algorithms and optimization problems.

Module III **12 hours**

Knowledge Representation:Logical Agents: Knowledge based agents, The wumpus world, Logic. Propositional Logic: A very simple logic, Reasoning patterns in propositionallogic;**First-Order Logic:** Representation revisited, Syntax and semantics of first order logic, Using first order logic.

Module IV **11 hours**

Knowledge and Reasoning: Inference in First-Order Logic: Propositional vs first order inference, Unification and lifting, Forward chaining, Backward chaining: A backward chaining algorithm, Resolution: Conjunctive normal form for first-order logic, The resolution inference rule, Example proofs; **Planning: Planning:** The planning problem, Planning with state space search, Partial order planning: A partial-order planning example.

Module V **10 hours**

Uncertain Knowledge: Uncertainty: Acting under uncertainty, Basic probability notation, the axioms of Probability, Inference using full joint distributions, Independence, Bayes' rule and its use, thewumpus world revisited. **Learning:Learning from Observations:** Forms of learning, Inductive learning, Learning decision trees: Decision trees as performance elements, Expressiveness of decision trees, Inducing decision trees from examples, Choosing attribute tests, Assessing the performance of the learning algorithm;Ensemble learning.

Text Book(s):

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2/e, Pearson Education, 2010.

References:

1. Elaine Rich, Kevin Knight and Shivashankar B. Nair, Artificial Intelligence, 3/e, McGraw Hill Education, 2008.
2. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Learning, 2012.