ML R-22

Unit 01

Short Questions

- Define machine learning?
- What is Well-posed learning problem?
- What are the types of machine learning? Compare supervised and unsupervised learning.
- List out any 5 application of machine learning.
- Define concept learning.
- What do you mean by hypothesis space, instance space, version space?
- List the Perspectives and issues in machine learning.
- Write remarks on version spaces and candidate elimination.
- Define perceptron.
- Define perceptron training rule
- What is linear separability.
- What is linear regression and its types.
- State Hebb's rule.

Long Questions

- Describe steps in designing a learning system?
- What do you understand about a concept learning task? Explain with an example?
- With an example explain find-S: finding a maximally specific hypothesis algorithm?
- Describe Candidate Elimination Learning algorithm in detail with an illustrative example.

Unit 02

Short Questions

- What is a multi layer perceptron
- What is a feed forward network. How do you represent it?
- Define curse of dimensionality
- Define interpolation.
- State XOR problem.
- Give the formulas for various activation functions
- Give the advantages of radial basis network

Long Questions

- Explain multilayer perceptron algorithm with a simple example
- Explain Back Propagation algorithm.
- Explain radial basis function algorithm
- With a neat diagram explain support vector machine

Unit 03

Short Questions

- Define bagging and boosting? Give examples
- Define entropy and information gain
- Define pruning
- Define ensemble learning
- Define stacking
- Define overfitting and underfitting
- Define bias and variance
- Define GINI index. Give the formula for it.

Long Questions

- Explain the concept of Decision Tree Learning? Construct a Decision Tree using ID3 by considering the following Training Examples:

Day	*Outlook*	*Temperature*	*Humidity*	*Wind*	*PlayTennis*
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

TABLE 3.2
Training examples for the target concept *PlayTennis*.

- Explain the concept of Decision Tree Learning? Construct a Decision Tree using ID3 by considering the following Training Examples:

3.2. Consider the following set of training examples:

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	−	T	F
4	+	F	F
5	−	F	T
6	−	F	T

- Explain K-nearest neighbor learning algorithm?
- Explain K-Means algorithm with an example
- Explain naïve bayes algorithm with an example
- Explain the steps in ADA boost algorithm
- Explain random forest algorithm

Unit 04

Short Questions

- Give the applications of genetic algorithm.
- Explain terms related to Genetic Algorithm? (Population, chromosomes, Gene, Fitness)
- What is difference between mutation and cross-over?
- Compare Single-Point and Two-Point cross over?
- What are stopping condition in Genetic Algorithm?
- What is dimensionality reduction.
- Define manifold learning.

Long Questions

- Create or generate new offspring from the given population for genetic algorithm? Illustrate.
- Describe the steps in genetic Algorithm?
- Explain PCA, LDA, ISOMAP

Unit 05

Short Questions

- Define reinforcement learning. Give applications
- List the components of reinforcement learning.
- What is a Markov chain
- Define joint probability and conditional probability
- Give applications of a Bayesian network
- Compare Kalman filter and particle filter
- Define Q learning with a simple example
- Give bellman equation
- Define Markov decision process.

Long Questions

- Explain the algorithms in Markov chain monte carlo
- Explain Bayesian network with an example
- Explain hidden Markov model