

X MACHINE LEARNING TECHNIQUES X

X AKTU X

X 2025 X

X Important questions X

X 100% [M.I] X

unit-1

- ① Explain the "concept Learning" Task giving an example.
- ② Compare supervised and unsupervised learning techniques with examples. → 100% [M.I]
- ③ Compare regression, classification and clustering in machine learning along with suitable real life applications. → 100% [M.I]

- ④ Illustrate the various areas in which you can apply machine learning. → 100%

- ⑤ Explain the confusing matrix with respect to machine learning algorithms. → 90%

- ⑥ [2 marks] → (i) Discuss the important objectives of machine learning.

(ii) Discuss overfitting and underfitting situation in decision tree learning.

(iii) Discuss support vector in SVM.

(iv) Discuss reinforcement learning.

(v) Discuss model representation of artificial neuron.

(vi) Explain the concept of machine learning.

(vii) Difference [machine learning Vs deep learning]

(viii) Difference [Data science Vs Machine learning]

- 7) Find the maximally general hypothesis and maximally specific hypothesis for the training examples given in the candidate elimination algorithm.  
Given Training Example is  $\rightarrow$  80%

Sky	Temp	Humidity	wind	water	Forecast	Sport
Sunny	warm	Normal	strong	warm	Same	yes
Sunny	warm	High	strong	warm	Same	yes
Rainy	Cold	High	strong	warm	Change	No
Sunny	warm	High	strong	cool	Change	Yes

unit - 2

$\rightarrow$  100% [M.I]

- 1) Discuss the role of Bayes theorem in machine learning.  
How naive Bayes algorithm is different from Bayes theorem?
- 2) Differentiate between Naive Bayes classifier and Bayesian belief network. Give an application of Bayesian belief networks.  $\rightarrow$  100% [M.I]
- 3) How is Bayes theorem used in machine learning? How naive Bayes algorithm is different from Bayes theorem?
- 4) Explain hyperplane (decision boundary) in SVM. Categorize various popular kernels associated in SVM.  $\rightarrow$  100% [M.I]
- 5) Discuss linear regression and logistic regression in detail.
- 6) Explain Maximum Likelihood and Least Squared Error Hypothesis with example.  $\rightarrow$  100%.
- 7) Why SVM an example of a large margin classifier?  
Discuss the different ~~types~~ kernels functions used in SVM. Discuss the applications, properties, issues, and advantages of SVM.  $\rightarrow$  100%.

(8) comment on algorithm convergence & generalization property of ANN. J-80%

(9) Discuss the following issues in Decision Tree learning:  
(i) overfitting and data

(ii) Guarding against bad attribute choices.

(iii) Handling continuous valued attributes.

(iv) Handling missing attribute values.

(v) Handling attributes with different costs.

(10) [2 marks] J-

(i) what is gradient descent data rule.

(ii) Explain case-based learning. J-100%

(iii) compare ANN & Bayesian Network.

(iv) How is Naive Bayesian classifier different from Bayesian classifier. J-) (2 marks)

(v) what is role of Inductive Bias in ANN?

(vi) Define one learning classifiers.

### unit - 3

(1) compare and construct information gain, gain Ratio, and Gini Index in detail. J-) 100% [M.I]

(2) Discuss Decision Tree and explain its working in detail. J-) 100% [M.I]

(3) Demonstrate k-nearest neighbors algorithm for classification with the help of an example. J-) 100% [NT]

(4) Explain Instance based learning. compare locally weighted regression and radial basis function networks. J-) 100% [M.I]

(5) Describe one following concept in decision tree in detail.

(i) Avoiding overfitting in decision tree (ii) Incorporating continuous valued attributes. J

- ⑥ Explain the relevance of CBR. How CADET tool employs CBR? [8%]
- ⑦ [2 marks] →
- ⑧ Highlight the importance of Case Based Learning.
- ⑨ Explain one rule of central limit theorem Approach for deriving confidence Interval. [8%]
- ⑩ [2 marks]-
- (i) For which problem decision tree is best suitable
- (ii) Illustrate one advantages of instance based learning techniques over other machine learning techniques.
- (iii) Differentiate between gradient Descent and stochastic gradient Descent.
- unit - 4
- ① Explain one different layers used in convolutional neural network with suitable example.
- ② Illustrate back propagation algorithm by assuming the training rules for output unit weights and Hidden unit weights. [10%] [M.I]
- ③ write short notes on Probabilistic Approximately correct (PAC) a learning model. [10%]
- ④ Explain various types of activation function with examples. [10%]
- ⑤ Discuss various mistake Bound model for learning.
- ⑥ Describe BPN algorithm in ANN along with a suitable example. [9%]

7. Describe the Kohonen self-organizing maps and its algorithm. [10%]
8. what problem does one EM algorithm solve? [10%]
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1. Explain Q-learning with its key terms, key features and elements. Discuss its applications used in real life. [10%] [M.I] → 100% [M.I]
2. Define one term Genetic algorithm. Discuss the working of genetic algorithm with the help of flow chart. [10%] [M.I]
3. Discuss one application of reinforcement learning. In which problems reinforcement learning is used.
4. Explain various types of reinforcement learning techniques with suitable examples. [10%] [M.I]
5. How to identify the reproduction cycle of genetic algorithm? Explain with suitable example. [10%] [M.T]
6. Illustrate the process of Q-learning and discuss the following terms: [10%] [M.I]
- i) Q-values or action values (in reward and episode)
  - ii) Temporal difference or TD update. → 100% [M.I]
7. markov decision process in reinforcement learning
8. Explain one various learning models for reinforcement learning [10%] [M.I]
9. write short notes on Learning first order Rules. What is the significance of learn-one Rule algorithm?
10. [2 marks] [8%]
  - i) Define one term CNN, and ANN

- i) Differentiate between Lazy and Eager learning.
- ii) Comparison of Purely analytical and Purely inductive learning.
- iii) Define one term offspring, chromosome and genes are used in GA.
- iv) What is one problem of crowding in GA
- v) Comparison of purely analytical and purely inductive learning.
- vi) What is the difference between Q learning and deep Q learning.