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REVA UNIVERSITY
Bengaluru, India

Seventh Semester B.Tech-CSE Semester End Examination - December 2017
Course (Subject): Machine Learning and Applications
Course Code: BTCS15F7100

Time: 3 Hours **Max. Marks: 100**

Note: *Answer ONE FULL question from each unit.*

UNIT –I

1. a) Machine learning has become the most talked about term in all the fields. Define machine learning according to Tom Michelle and explain with suitable terms and examples 5
   b) With the help of a neat diagram, describe the final design of a learning system. 8
   c) For a developer to develop a machine learning system, illustrate the basic design issues and approaches. 12

OR

2. a) Machine learning techniques are used in almost all the fields. List out the fields in which machine learning has been applied. 5
   b) Many Online marketing companies make use of association learning or market basket analysis. Illustrate the usage of market basket analysis and solve the given problem using market basket analysis 8

Customer	Items
1	Orange Juice, Soda
2	Milk, Orange Juice, window Cleaner
3	Orange Juice, Detergent
4	Orange Juice, Detergent, Soda
5	Window Cleaner, Soda

   c) Learning is important in order to solve a future problem. Explain the different types of learning with examples. 5
   d) Machine learning involves learning from specific examples and generalize them. FIND-S algorithm is one such algorithm used. Explain the FIND-S algorithm and for the given example, generalize Enjoy Sport. 7

Sky	Air Temp	Humidity	wind	Water	Forecast	EnjoySport
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 – II

3. a) The data collected by a bank from a client who has applied for a personal loan has a lot of attributes, and all of these are not necessary as some data will be redundant. Also, the attributes are not necessary as it becomes computationally expensive. Hence the number of attributes are to be reduced. What is the technique of attribute reduction called and what are the different approaches? 5

b) When there is a lot a variance between the collected data, then the technique for reduction is Principal Component Analysis (PCA). Apply PCA for the given dataset and find the axis having maximum variance. 12

x	Y
1	-1
0	1
-1	0

c) When there is labeled data, reducing the number of feature can be done using Linear Discriminate Analysis. Explain LDA with a neat diagram. Also differentiate between LDA and PCA. 8

OR

4. a) A technique of dimensionality reduction works by maximizing interclass variance and minimizing intraclass variance(less scatter in a class). What is this technique called? Describe the technique (Hint: The technique is supervised) 8

b) There are unsupervised techniques for dimensionality reduction. Explain with a neat diagram, any one technique with appropriate steps 9

c) Data collected from a shopping mall from all the visitors for some product analysis might contain redundant data like date of birth, age, etc. The redundant data needs to be eliminated. What is this technique in machine learning called? What are the different approaches of this technique? Explain 8

UNIT – III

5. a) Classification has multiple applications and has been used for medical data analysis, by banks and credit card companies to detect future list of defaulters. One of the technique for classification is decision tree. Explain decision trees and ID3 algorithm and use them to solve the given problem. 12

Outlook	Temperature	Wind	Plays
Sunny	High	Strong	no
Sunny	normal	weak	yes
Sunny	High	Weak	yes
rainy	High	strong	no
rainy	normal	weak	no

b) The concept of entropy and information gain are generally used in ID3 Algorithm to select the best attribute for deciding the internal node of the decision tree. Explain these terms. 7

c) A very popular clustering technique uses bottom up procedure for clustering. Explain this clustering technique. 6

OR

6. a) Unsupervised learning involves clustering of data. Define clustering and list its applications 8

b) List out the other clustering algorithms and give a brief introduction on them. Also explain K-means which is one of the popular clustering algorithm — 10

c) The other popular clustering algorithm used is hierarchical clustering. What are different methods in hierarchical clustering. Explain — 7

UNIT – IV

7. a) Neural networks are inspired by the working of neurons. In artificial neural network, instead of neurons perceptrons are used. Implement the working of basic AND gate using perceptrons. — 9

b) Activation functions are used for bringing in the linearity which is present in the real world data. List and explain the various activation functions used in neural network. — 8

c) If a learning involves reward and punishment, the learner might learn better. What is this kind of learning known as? Explain it and list out its applications — 8

OR

8. a) Nand and Nor are the two universal gates using which any digital circuit can be realized. Implement the working of Nand gate using neural networks. — 9

b) Learning can be categorized into supervised, unsupervised and reinforced learning. Explain reinforced learning and relate it any real world scenario of learning — 8

c) Write short notes on i) WEKA tool ii) Categorical data iii) Numerical data iv)Python — 8

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