HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR
B.Tech(CS/IT)
End Semester Examination
Even Semester (I), 2022-23
ECS-482: MACHINE LEARNING

Time: 2:30 Hours   Max. Marks: 50

Note: 1. *Attempt all questions. All questions carry marks as shown against them.*
Course Outcomes (CO):
1. Understand Machine learning and Machine Learning Models. (Understand)
2. Apply various classification and regression techniques and assess their performance. (Apply)
3. Apply various clustering algorithms for the problems to be solved with machine learning. (Apply)
4. Assessment of various machine learning models. (Analyze)
5. Understand probabilistic learning models and trends in machine learning. (Understand)

		Related CO	Marks

1 *Answer all parts:*

a. Distinguish between Supervised learning and Reinforcement learning. Give appropriate examples of each. — CO1 (5)

b. What are Geometric models? Explain in detail and discuss any two examples of Geometric models. — CO1 (5)

2 *Answer all parts:*

a. Distinguish between Overfitting and Underfitting. Give diagrams to explain both. How can it affect model generalization? — CO2 (5)

b. Identify the first splitting attribute for decision tree by using ID3 algorithm with the following dataset. 'Hired?' Column is the dependent variable and others are independent. — CO2 (5)

Major	Experience	Tie	Hired?
CS	programming	Pretty	NO
CS	programming	Pretty	NO
CS	management	Pretty	YES
CS	management	Ugly	YES
MBA	programming	Pretty	YES
MBA	programming	Ugly	YES
MBA	management	Pretty	NO
MBA	management	Pretty	NO

3. a. What is Unsupervised Learning? Give two instances where this learning is useful. — CO3 (5)

b. Cluster the following eight points (with (x, y) representing locations) into three clusters: (5)
A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9) using *Manhattan distance measure*

4 *Answer all parts:*

a. Suppose 10000 patients get tested for flu; out of them, 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For the healthy people, the same test was positive for 180 and negative for 8820. Construct a confusion matrix for the data and compute the precision and recall for the data. CO4 (5)

b. For the below posterior probability, plot the ROC. CO4 (5)

Instance	P (+|A)	True Class
1	0.95	+
2	0.93	+
3	0.87	-
4	0.85	-
5	0.85	-
6	0.85	+
7	0.76	-
8	0.53	+
9	0.43	-
10	0.25	+

5. *Answer all parts:* CO5 (5)

a. What is Naïve Baye's Rule? How is it used for classification?

b. The table below shows whether a person has flu or not based on the attributed listed. CO5 (5)

chills	runny nose	headache	fever	flu?
Y	N	Mild	Y	N
Y	Y	No	N	Y
Y	N	Strong	Y	Y
N	Y	Mild	Y	Y
N	N	No	N	N
N	Y	Strong	Y	Y
N	Y	Strong	N	N
Y	Y	Mild	Y	Y

Based on Naïve Baye's classification, predict the outcome of 'flu?' based on the value of attributes as specified below:

chills	runny nose	headache	fever	flu?
Y	N	Mild	N	?

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR
B.Tech (FCSE/FIT)
END SEMESTER EXAMINATION
EVEN SEMESTER (VIII), 2022-23
ELECTIVE III
ECS 466: DISTRIBUTED SYSTEM

Time: 2:30 Hours   Max. Marks: 50

Note: *Attempt all questions. All questions carry marks, as shown against them.*
Please mention all the Course Outcomes (CO) in statement form

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1. Understand the concepts of distributed systems in solving real world problems. (Understand)
2. Understand and apply various concepts of synchronization and agreement protocols. (Understand, Apply)
3. Understand and develop various distributed applications using remote procedure calls and remote method invocation for real time problems. (Understand, Apply)
4. Configure, deploy and access network file system. (Understand, Apply)
5. Develop distributed algorithms for MAC, routing and transport layer protocols. (Apply)

		Related CO	Marks
Q. No. 1:	Attempt all parts		
(a)	What is a Lamport logical clock? Discuss the limitations of Lamport logical clocks.	01	05
(b)	How distributed mutual exclusion can be classified? What are the requirements of mutual exclusion theorem?	01	05
Q. No.2:	Attempt all parts		
(a)	What is atomic commit in distributed database system? Explain the two-phase commit protocol used for atomicity in distributed system.	02	05
(b)	Describe Byzantine agreement problem and its solution. Show that Byzantine agreement cannot always be reached among four processors if two processors are faulty.	02	05
	OR		
	What do you mean by deadlock avoidance? Discuss the edge chasing algorithm for deadlock detection.	02	05
Q. No. 3:	Attempt all parts		
(a)	What is Digital Signature? Explain the different methods for generating and verifying the signature.	03	05
(b)	How does a server know that one of his remote objects provided by him is no longer used by clients and can be collected? How does Java RMI handle this problem?	03	05
Q. No. 4:	Attempt all parts		
(a)	Compare and contrast between different concurrency control techniques with suitable example.	04	05
(b)	Write short notes of the following: (i) Transaction recovery. (ii) Timestamp ordering.	04	05

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OR

Explain the distributed transactions. Discuss the functionality of Flat and Nested distributed transactions.　04　05

Q. No. 5:　Attempt all parts

(a) What is balanced sliding window protocol? How is it important for distributed system?　05　05

(b) Describe routing algorithm with example. What are the limitations of routing algorithm?　05　05

HARCOURT BUTLER TECHNICAL UNIVERSITY, KANPUR
END SEMESTER EXAMINATION
EVEN SEMESTER (VII), 2022-23

Technology of Pigments and Extenders

Time: 2 hours 30 Min.

Maximum Marks: 50

NOTES: 1. Attempt ALL questions.
2. All questions carry marks as shown against them.

			Related CO (Course Outcome)	Marks
Q.1	(a)	What is Pigment? What do you understand by additive colour mixing and substractive colour mixing? Also discuss different illuminant sources for shade matching.	1	[5]
	(b)	What is the importance of surface area of pigments? Which technique is used to check surface area of pigment? Discuss The techniques in detail.	1	[5]
Q.2	(a)	What are differences between organic and organic pigments? Provide short notes on general methods of manufacturing of natural and synthetic pigments.	2	[5]
	(b)	Name different white pigments with their chemical composition. Discuss manufacturing, properties and application of white pigments containing Zinc. OR Explain preparation method, properties and uses of talc and bentonite.	2	[5]
Q.3	(a)	Discuss preparation, properties and uses of Iron Blue/Prussian blue.	3	[5]
	(b)	Explain precipitation process for preparation of Iron oxide pigments.	3	[5]
Q.4	(a)	Explain the manufacturing of Azo Pigments with a suitable example.	4	[5]
	(b)	Discuss sources and steps involved for preparation of organic pigments.	4	[5]
Q.5	(a)	Discuss the manufacturing process and properties of aluminium pigments. How does tone of gold pigments vary?	5	[5]
	(b)	Define phosphorescence. How do phosphorescent pigments emit light? OR What are IR reflective pigments? Discuss its mechanism, factors affecting IR reflectivity and advantages over general pigments.	5	[5]

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