SRI KRISHNA INSTITUTE OF TECHNOLOGY

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Department of Artificial Intelligence and Machine Learning

Subject Name: Machine Learning **Subject Code: BAI602**
SEM: 6 **DIV: A**
Faculty: Prof. Nanda M B

Module-4 Question Bank

SL#	Question	CO	Level	Marks
1.	What is meant by Bayesian learning?	CO4	L2	4
2.	What is the difference between prior and posterior and likelihood probabilities?	CO4	L2	4
3.	State Bayes theorem.	CO4	L2	4
4.	Consider a boy who has a volleyball tournament on the next day, but today he feels sick. It is unusual that there is only a 40% chance he would fall sick since he is a healthy boy. Now, Find the probability of the boy participating in the tournament. The boy is very much interested in volley ball, so there is a 90% probability that he would participate in tournaments and 20% that he will fall sick given that he participates in the tournament.	CO4	L2	4
5.	Explain Naïve Bayes algorithm.	CO4	L2	6
6.	Assess a student's performance using Naïve Bayes algorithm with the dataset provided in Table. Given the test data = (CGPA ⩾9, Interactiveness = Yes, Practical knowledge = Average, Communication Skills = Good), apply the Bayes theorem to classify whether the given student gets a Job offer or not.	CO4	L2	10
7.	Given the hypothesis space with 4 hypothesis h1, h2, h3 and h4. Determine if the patient is diagnosed as COVID positive or COVID negative using Bayes Optimal classifier	CO4	L3	4

S.No.	CGPA	Interactiveness	Practical Knowledge	Communication Skills	Job Offer
1.	≥9	Yes	Very good	Good	Yes
2.	≥8	No	Good	Moderate	Yes
3.	≥9	No	Average	Poor	No
4.	<8	No	Average	Good	No
5.	≥8	Yes	Good	Moderate	Yes
6.	≥9	Yes	Good	Moderate	Yes
7.	<8	Yes	Good	Poor	No
8.	≥9	No	Very good	Good	Yes
9.	≥8	Yes	Good	Good	Yes
10.	≥8	Yes	Average	Good	Yes

$P(h_i \mid T)$	P(COVID Positive $\mid h_i$)	P(COVID Negative $\mid h_i$)
0.3	0	1
0.1	1	0
0.2	1	0
0.1	1	0

<table>
<tr><td>8.</td><td>Assess a student's performance using Naïve Bayes algorithm for the Continuous Attribute. Predict whether a student gets a job offer or not in his final year of the course Consider the test data to be (CGPA = 8.5, Interactiveness = Yes).
<table>
<tr><th>S.No.</th><th>CGPA</th><th>Interactiveness</th><th>Job Offer</th></tr>
<tr><td>1.</td><td>9.5</td><td>Yes</td><td>Yes</td></tr>
<tr><td>2.</td><td>8.2</td><td>No</td><td>Yes</td></tr>
<tr><td>3.</td><td>9.3</td><td>No</td><td>No</td></tr>
<tr><td>4.</td><td>7.6</td><td>No</td><td>No</td></tr>
<tr><td>5.</td><td>8.4</td><td>Yes</td><td>Yes</td></tr>
<tr><td>6.</td><td>9.1</td><td>Yes</td><td>Yes</td></tr>
<tr><td>7.</td><td>7.5</td><td>Yes</td><td>No</td></tr>
<tr><td>8.</td><td>9.6</td><td>No</td><td>Yes</td></tr>
<tr><td>9.</td><td>8.6</td><td>Yes</td><td>Yes</td></tr>
<tr><td>10.</td><td>8.3</td><td>Yes</td><td>Yes</td></tr>
</table></td><td>CO4</td><td>L3</td><td>10</td></tr>
<tr><td>9.</td><td>Explain General Algorithm for Decision Tree.</td><td>CO4</td><td>L3</td><td>06</td></tr>
<tr><td>10.</td><td>Describe the Decision Tree Induction Algorithm-ID3</td><td>CO4</td><td>L3</td><td>06</td></tr>
<tr><td>11.</td><td>Example 6.3: Assess a student's performance during his course of study and predict whether a student will get a job offer or not in his final year of the course. The training dataset T consists of 10 data instances with attributes such as 'CGPA', 'Interactiveness', 'Practical Knowledge' and 'Communication Skills' as shown in Table 6.3. The target class attribute is the 'Job Offer'.
<table>
<tr><th>S.No.</th><th>CGPA</th><th>Interactiveness</th><th>Practical Knowledge</th><th>Communication Skills</th><th>Job Offer</th></tr>
<tr><td>1.</td><td>≥9</td><td>Yes</td><td>Very good</td><td>Good</td><td>Yes</td></tr>
<tr><td>2.</td><td>≥8</td><td>No</td><td>Good</td><td>Moderate</td><td>Yes</td></tr>
<tr><td>3.</td><td>≥9</td><td>No</td><td>Average</td><td>Poor</td><td>No</td></tr>
<tr><td>4.</td><td><8</td><td>No</td><td>Average</td><td>Good</td><td>No</td></tr>
<tr><td>5.</td><td>≥8</td><td>Yes</td><td>Good</td><td>Moderate</td><td>Yes</td></tr>
<tr><td>6.</td><td>≥9</td><td>Yes</td><td>Good</td><td>Moderate</td><td>Yes</td></tr>
<tr><td>7.</td><td><8</td><td>Yes</td><td>Good</td><td>Poor</td><td>No</td></tr>
<tr><td>8.</td><td>≥9</td><td>No</td><td>Very good</td><td>Good</td><td>Yes</td></tr>
<tr><td>9.</td><td>≥8</td><td>Yes</td><td>Good</td><td>Good</td><td>Yes</td></tr>
<tr><td>10.</td><td>≥8</td><td>Yes</td><td>Average</td><td>Good</td><td>Yes</td></tr>
</table>
Construct Decision Tree using Induction Algorithms-CART.</td><td>CO4</td><td>L3</td><td>10</td></tr>
<tr><td>12.</td><td>Write the Algorithm for Constructing Regression Trees.</td><td>CO4</td><td>L3</td><td>08</td></tr>
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