SRI KRISHNA INSTITUTE OF TECHNOLOGY

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#57, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Department of Artificial Intelligence and Machine Learning

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

Module-3 Question Bank

<table>
<tr><th>Q.No.</th><th>Questions</th><th>COs</th><th>CL</th><th>Marks</th></tr>
<tr><td>1</td><td>Compare and contrast the differences between instance based learning and model based learning.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>2</td><td>Explain nearest neighbour learning along with the algorithm.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>3</td><td>Consider the student performance training dataset of 8 data instances which describes the performance of individual students in a course and their CGPA, Assessment and project. The target variable is Result which is a discrete valued variable that takes two values Pass or Fail. Based on the performance of a student, classify whether a student will pass or fail in that course using k-NN. Given a test instance (6.1,40,5).Assign k=3
<table>
<tr><th>S.NO</th><th>CGPA</th><th>Assessment</th><th>Project submitted</th><th>Result</th></tr>
<tr><td>1</td><td>9.2</td><td>85</td><td>8</td><td>Pass</td></tr>
<tr><td>2</td><td>8</td><td>80</td><td>7</td><td>Pass</td></tr>
<tr><td>3</td><td>8.5</td><td>81</td><td>8</td><td>Pass</td></tr>
<tr><td>4</td><td>6</td><td>45</td><td>5</td><td>Fail</td></tr>
<tr><td>5</td><td>6.5</td><td>50</td><td>4</td><td>Fail</td></tr>
<tr><td>6</td><td>8.2</td><td>72</td><td>7</td><td>Pass</td></tr>
<tr><td>7</td><td>5.8</td><td>38</td><td>5</td><td>Fail</td></tr>
<tr><td>8</td><td>8.9</td><td>91</td><td>9</td><td>Pass</td></tr>
</table></td><td>CO3</td><td>L3</td><td>8M</td></tr>
<tr><td>4</td><td>Explain Weighted K-nearest neighbour along with the algorithm.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>5</td><td>Use weighted k-NN and determine the class. Given a test instance (7.6,60,8)).Assign k=3
<table>
<tr><th>S.NO</th><th>CGPA</th><th>Assessment</th><th>Project submitted</th><th>Result</th></tr>
<tr><td>1</td><td>9.2</td><td>85</td><td>8</td><td>Pass</td></tr>
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</table></td><td>CO3</td><td>L3</td><td>8M</td></tr>
<tr><td>6</td><td>Explain Nearest centroid classifier using algorithm.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
</table>

<table>
<tr><td>7</td><td>Consider the sample data with two features x and y .The target classes are A or B. Predict the class using Nearest centroid classifier. Given a test instance (6, 5) predict the class.
<table>
<tr><th>X</th><th>Y</th><th>Class</th></tr>
<tr><td>3</td><td>1</td><td>A</td></tr>
<tr><td>5</td><td>2</td><td>A</td></tr>
<tr><td>4</td><td>3</td><td>A</td></tr>
<tr><td>7</td><td>6</td><td>B</td></tr>
<tr><td>6</td><td>7</td><td>B</td></tr>
<tr><td>8</td><td>5</td><td>B</td></tr>
</table></td><td>CO3</td><td>L3</td><td>8M</td></tr>
<tr><td>8</td><td>Write a note on Locally Weighted Regression (LWR).</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>9</td><td>Consider a simple example with four instances shown and apply locally weighted regression.
<table>
<tr><th>S.NO</th><th>Salary(In Lakhs)</th><th>Expenditure(in thousands)</th></tr>
<tr><td>1</td><td>5</td><td>25</td></tr>
<tr><td>2</td><td>1</td><td>5</td></tr>
<tr><td>3</td><td>2</td><td>7</td></tr>
<tr><td>4</td><td>1</td><td>8</td></tr>
</table></td><td>CO3</td><td>L3</td><td>8M</td></tr>
<tr><td>10</td><td>Consider the following training dataset of 10 data instances shown which describes the award performance of individual students based on CGPA and No. of projects done. The target variable is AWARD which is a discrete valued variable that takes 2 values YES or NO.
<table>
<tr><th>S.NO</th><th>GPA</th><th>No. of projects done</th><th>Award</th></tr>
<tr><td>1</td><td>9.5</td><td>5</td><td>Yes</td></tr>
<tr><td>2</td><td>8.0</td><td>4</td><td>Yes</td></tr>
<tr><td>3</td><td>7.2</td><td>1</td><td>No</td></tr>
<tr><td>4</td><td>6.5</td><td>5</td><td>Yes</td></tr>
<tr><td>5</td><td>9.5</td><td>4</td><td>Yes</td></tr>
<tr><td>6</td><td>3.2</td><td>1</td><td>No</td></tr>
<tr><td>7</td><td>6.6</td><td>1</td><td>No</td></tr>
<tr><td>8</td><td>5.4</td><td>1</td><td>No</td></tr>
<tr><td>9</td><td>8.9</td><td>3</td><td>Yes</td></tr>
<tr><td>10</td><td>7.2</td><td>4</td><td>Yes</td></tr>
</table>
Given a test instance (GPA-7.8,No of projects done-4),use the training set to classify the test instance.Choose k=3.
1)k-Nearest Neighbour classifier
2)Weighted k-Nearest Neighbour classifier
3)Nearest Centroid classifier</td><td>CO3</td><td>L3</td><td>15M</td></tr>
<tr><td>11</td><td>What is the role of regression model in data analysis?</td><td>CO3</td><td>L1</td><td>5M</td></tr>
<tr><td>12</td><td>Explain the terms Regression, Correlation and Causation.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>13</td><td>What are linearity and Non –linearity Relationships?</td><td>CO3</td><td>L1</td><td>6M</td></tr>
<tr><td>14</td><td>Explain the types of regression methods.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
</table>

<table>
<tr><td>15</td><td>What are the limitations of Regression method?</td><td>CO3</td><td>L1</td><td>4M</td></tr>
<tr><td>16</td><td>Write a note a linear regression</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>17</td><td><table><tr><th>Xi(week)</th><th>Yi(sales in thousands)</th></tr><tr><td>1</td><td>1.2</td></tr><tr><td>2</td><td>1.8</td></tr><tr><td>3</td><td>2.6</td></tr><tr><td>4</td><td>3.2</td></tr><tr><td>5</td><td>3.8</td></tr></table>Let us consider an example where the five weeks sales data is given. Apply linear regression technique to predict the 7th and 9th week sales.</td><td>CO3</td><td>L3</td><td>6M</td></tr>
<tr><td>18</td><td>Find linear regression of the data of week and product sales given. Use linear regression matrix form.<table><tr><th>Xi(week)</th><th>Yi(sales in thousands)</th></tr><tr><td>1</td><td>1</td></tr><tr><td>2</td><td>3</td></tr><tr><td>3</td><td>4</td></tr><tr><td>4</td><td>8</td></tr></table></td><td>CO3</td><td>L3</td><td>6M</td></tr>
<tr><td>19</td><td>Apply multiple regressions for the values given where weekly sales along with sales for products X1 and X2 are provided. Use matrix approach for finding multiple regressions.<table><tr><th>X1(Product one sales)</th><th>X2(Product two sales)</th><th>Y(sales in thousands)</th></tr><tr><td>1</td><td>4</td><td>1</td></tr><tr><td>2</td><td>5</td><td>6</td></tr><tr><td>3</td><td>8</td><td>8</td></tr><tr><td>4</td><td>2</td><td>12</td></tr></table></td><td>CO3</td><td>L3</td><td>6M</td></tr>
<tr><td>20</td><td>Explain Polynomial regression.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
<tr><td>21</td><td>Consider the data provided and fit it using the second-order polynomial.<table><tr><th>X</th><th>Y</th></tr><tr><td>1</td><td>1</td></tr><tr><td>2</td><td>4</td></tr><tr><td>3</td><td>9</td></tr><tr><td>4</td><td>15</td></tr></table></td><td>CO3</td><td>L3</td><td>6M</td></tr>
<tr><td>22</td><td>Write a note on logistic regression.</td><td>CO3</td><td>L2</td><td>6M</td></tr>
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Faculty Signature