Assignment – 1

Subject Name	Subject Code	Issue Date	Due Date
Machine Learning	**01CE0617**	**12 Feb 2025**	**08 March 2025**

Que. No.	Question	CO	Blooms Level
1	Define Machine Learning. Write any 20 applications of Machine Learning.	CO1	Remember
2	Explain types of Machine Learning with proper diagram.	CO1	Understand
3	Compare Supervised ML, Unsupervised ML and Reinforcement ML.	CO1	Remember
4	What is Data Visualization? Explain types of data for Visualization and types of Data Visualization approaches in details.	CO1	Understand
5	Explain Reinforcement Learning with suitable diagram.	CO1	Understand
6	Define the following terms: a) Confusion Matrix b) True Positive c) True Negative d) False Positive e) False Negative f) Accuracy g) Precision h) Recall/TPR/Sensitivity i) F1_Score j) Threshold k) False Positive Rate l) AUC-ROC	CO2	Remember
7	Calculate accuracy, precision, recall and F1-score for given confusion matrix. Also identify TP, TN, FP and FN. N=165 | Predicted No | Predicted Yes Actual No | 50 | 10 Actual Yes | 5 | 100	CO2	Apply
8	I had taken random samples of 500 female, male customers, out of these 50 are actually female, our model predicted 100 total females. 45 of which are actually females. (a) Identify TP, TN, FP, FN and construct Confusion matrix. (b) Calculate Accuracy, Precision, Recall and F1-Score.	CO2	Apply

<table>
<tr><td>9</td><td>Apply Naïve Bayes classifier to classify whether a fruit is “Apple” or “Orange”, if the new fruit is “Red” Color.

<table><tr><td>Fruit ID</td><td>Color</td><td>Class</td></tr><tr><td>1</td><td>Red</td><td>Apple</td></tr><tr><td>2</td><td>Red</td><td>Apple</td></tr><tr><td>3</td><td>Green</td><td>Apple</td></tr><tr><td>4</td><td>Orange</td><td>Orange</td></tr><tr><td>5</td><td>Orange</td><td>Orange</td></tr><tr><td>6</td><td>Green</td><td>Apple</td></tr></table></td><td>CO2</td><td>Apply</td></tr>
<tr><td>10</td><td>Explain Support Vector Machine with diagram and also discuss different types of kernel functions used in SVM.</td><td>CO2</td><td>Understand</td></tr>
<tr><td>11</td><td>Write down the steps used in KNN classification process. How we select the value of K?</td><td>CO2</td><td>Understand</td></tr>
<tr><td>12</td><td>Suppose to calculate the MAE, MSE and RMSE for given dataset.<table><tr><td>X</td><td>y</td><td>Pred_y</td></tr><tr><td>10</td><td>150</td><td>150</td></tr><tr><td>20</td><td>250</td><td>290</td></tr><tr><td>30</td><td>350</td><td>340</td></tr><tr><td>40</td><td>450</td><td>490</td></tr></table></td><td>CO3</td><td>Apply</td></tr>
<tr><td>13</td><td>What is Regression? Write any 10 applications of Regression. Explain types of regression models with equation for each in detail.</td><td>CO3</td><td>Understand</td></tr>
<tr><td>14</td><td>Apply the Simple Linear Regression & find the mean absolute error, mean squared error, root mean squared error for given dataset. (Apply mean, variance and Covariance method i.e. method1). Also Calculate the value of y for X=125.<table><tr><td>X</td><td>Y</td><td>ŷ</td></tr><tr><td>2</td><td>3</td><td>3.4</td></tr><tr><td>4</td><td>7</td><td>5.3</td></tr><tr><td>6</td><td>5</td><td>7.2</td></tr><tr><td>8</td><td>10</td><td>9.1</td></tr></table></td><td>CO3</td><td>Apply</td></tr>
<tr><td>15</td><td>Apply the Simple Linear Regression & find the MAE, MSE, RMSE for given dataset. (Apply Tabular method i.e. method2). Also Calculate the value of temperature of wood pulp for hours of mixing = 17.25<table><tr><td>Hours of Mixing X</td><td>Temp of wood Pulp Y</td></tr><tr><td>2</td><td>21</td></tr><tr><td>4</td><td>27</td></tr></table></td><td>CO3</td><td>Appy</td></tr>
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	6 | 29 8 | 64 10 | 86 12 | 92			
16	Explain Gradient Descent with Linear Regression.		CO3	Understand
17	Explain Overfitting and Underfitting & Bias and Variance.		CO3	Understand
18	Explain Regularization & Hyper-parameter Tuning.		CO3	Understand

Note:
1. All the students will have to submit the task before the given deadline.

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