**Week-3 Assignment**

**1)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Confusion matrix** | | |  |
|  | **Prediction Positive** | **Prediction Negative** | **Measures** |
| **Actual POSITIVE** | **TP – True Positive (Hit)** | FN – False Negative (type II error) |  |
| **Actual NEGATIVE** | FP – False Positive (type I error) | **TN – True Negative (Correct Rejection)** |  |

The below table shows the format of confusion matrix.

In this question, We have 3 cutoffs 0.25, 0.5, 0.75 , Here we have to develop confusion matrix for each cutoff.

**For cutoff (0.25):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Confusion matrix** | | |  |
|  | **Prediction Positive** | **Prediction Negative** | **Measures** |
| **Actual POSITIVE** | **3** | 0 |  |
| **Actual NEGATIVE** | 8 | **9** |  |

Error Rate = = = 0.4

Accuracy = = = 12/20 =0.6

= = 1

= = 0.53

**For Cutoff (0.5):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Confusion matrix** | | |  |
|  | **Prediction Positive** | **Prediction Negative** | **Measures** |
| **Actual POSITIVE** | **3** | 0 |  |
| **Actual NEGATIVE** | 2 | **15** |  |

Error Rate = = = 0.1

Accuracy = = = 18/20 =0.9

= = 1

= =15/17= 0.88

**For Cutoff (0.75):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Confusion matrix** | | |  |
|  | **Prediction Positive** | **Prediction Negative** | **Measures** |
| **Actual POSITIVE** | **2** | 1 |  |
| **Actual NEGATIVE** | 0 | **17** |  |

Error Rate = = = 0.05

Accuracy = = = 19/20 =0.95

= = 0.66

= = 1

**2)**

**a)** From the given information, We are applying the classification model for the

Sample(n) = 800, Here we have 2 categories a)Frauds and b) non-Frauds

Number of correctly classified Frauds =310

Number of correctly classified non-Frauds = 270

Number of missed frauds = 90 (means model predicted actual frauds as non- frauds)

Number of incorrectly classified as frauds = 130 (model predicted non-frauds as frauds)

|  |  |  |  |
| --- | --- | --- | --- |
| **Confusion matrix** | | |  |
|  | **Prediction Frauds** | **Prediction Non-frauds** | **Measures** |
| **Actual Frauds** | **310** | 90 |  |
| **Actual Non-Frauds** | 130 | **270** |  |

**b) Adjusted Misclassification Rate:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Prediction Frauds** | **Prediction Non-frauds** |  |
| **Actual Frauds** | **310** | 90(FN) | 400 |
| **Actual Non-Frauds** | 130(FP) | **270** | **400** |
|  | 440 | **360** | **800** |

**Misclassification rate: = FP + FN / Total**

**= 90+130 / 800**

**= 0.275**