COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF SOFTWARE ENGINEERING

MACHINE LEARNING COURSE

Group Assignment

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Example confusion matrix for a ternary classifier, it shows the predicted and actual temperature for 345 days. For 110 days the temperature is predicted correct, and for 235 it is predicted incorrectly.

N = 345	Predicted High	Predicted Medium	Predicted Low
Actual High	TP_H = 50	FP_H = 20	FN_H = 10
Actual Medium	FP_M = 30	TP_M = 25	FN_M = 40
Actual Low	FP_L = 60	FP_L = 75	TP_L = 35

Where:

- **TP** = True Positive
- **FP** = False Positive
- **FN** = False Negative

Metrics Calculation

1. **Accuracy**:

   Acuuracy = (TP_H + TP_M + TP_L) / total samples

   = (50 + 25 + 35) / 345 = 110 / 345 = 0.32

2. **Precision** for each class:

   Precision_High = TP_H / (TP_H + FP_H) = 50 / (50 + 20) = 0.714

   Precision_Medium = TP_M / (TP_M + FP_M) = 25 / (25 + 30) = 0.455

   Precision_Low   = TP_L / (TP_L + FP_L) = 35 / (35 + 60 + 75) = 35 / 170 = 0.21

3. **Recall** for each class:

   Recall_High = TP_H / (TP_H + FN_H) = 50 / 50 + 10 = 0.83

   Recall_Medium   = TP_M / (TP_M + FN_M) = 25 / 25 + 40 = 0.385

   Recall_Low = TP_L / (TP_L + FN_L) = 35 / 35 + 10 + 40 = 35 / 85 = 0.412

4. **Specificity** for each class (True Negative Rate):

Specificity_High = TN_H / (TN_H + FP_H) = (25 + 35) / (25 + 35 + 20) = 60 / 80 = 0.75

Specificity_Medium = TN_M / (TN_M + FP_M) = (50 + 35) / (50 + 35 + 30) = 85 / 115 =

0.74

Specificity_Low = TN_L / (TN_L + FP_L) = (50 + 25) / (50 + 25 + 60 + 75) = 75 / 210 =

0.36

5. Error Rate:
   Error Rate = (FP_H + FP_M + FP_L + FN_H + FN_M + FN_L)/ total samples
   = 1 - Accuracy = 1 - 0.32 = 0.68