

Name : Salman AlMaskati

I- Consider the following table with actual and predicted House Price Index or HPI. Calculate MAE, MSE, RMSE.

HPI Actual	HPI Predicted
175	135
216	256
288	231
298	267
193	139
159	150
183	127
278	216
189	139
223	250
297	264

MAE: $(\text{abs}(135-175) + \text{abs}(256-216) + \text{abs}(231-288) + \text{abs}(267-298) + \text{abs}(139-193) + \text{abs}(150-159) + \text{abs}(127-183) + \text{abs}(216-278) + \text{abs}(139-189) + \text{abs}(250-223) + \text{abs}(264-297)) / 11 = \mathbf{41.73}$

MSE: $((135-175)^2 + (256-216)^2 + (231-288)^2 + (267-298)^2 + (139-193)^2 + (150-159)^2 + (127-183)^2 + (216-278)^2 + (139-189)^2 + (250-223)^2 + (264-297)^2) / 11 = \mathbf{1973.18}$

RMSE: $\sqrt{((135-175)^2 + (256-216)^2 + (231-288)^2 + (267-298)^2 + (139-193)^2 + (150-159)^2 + (127-183)^2 + (216-278)^2 + (139-189)^2 + (250-223)^2 + (264-297)^2) / 11} = \mathbf{44.42}$

II- Calculate TP, FP, TN, FN, Accuracy, Precision, Recall, Classification Accuracy, Classification Error, Sensitivity, Specificity and False Positive Rate.

Actual	Predicted
M	W
M	M
W	W
M	M
W	M
W	W
W	W
M	M
M	W
W	W

M= POSTIVE, W=NEGATIVE

TP: MM FP:WM TN:WW FN:MW

TP: 3 FP:2 TN:4. FN:2

Accuracy: $(3+4) / (3+2+2+4) = 0.64$

Precession: $3 / (3+2) = 0.6$

Recall: $3 / (3+2) = 0.6$

Classification accuracy: $(3+4) / (3+2+2+4) = 0.64$

Classification error: $(2+2) / (3+2+4+2) = 0.36$

Specificity: $4 / (2+4) = 0.66$

Sensitivity: $3 / (3+2) = 0.6$

False positive rate: $2 / (4+2) = 0.33$

III- Consider the following predicted disease with a default threshold. Decrease the threshold for predicting the disease in order to increase the sensitivity of the classifier. Write down new predicted responses. (You can select a threshold of your choice)

Probabilities = [0.45896027, 0.17065156, 0.49889026, 0.51341541, 0.39678612, 0.67189438]

Predicted_Response = [0, 0, 0, 1, 0, 1]

Threshold= 0.3

Predicted Response = [1, 0, 1, 1, 1, 1]