

# Confusion Matrix Notes

An AI model made the following sales prediction for a new mobile phone which they have recently launched:

Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	50	40
	No	12	10

(i) Identify the total number of wrong predictions made by the model.

(ii) Calculate precision, recall and F1 Score.

Ans: (i) the total number of wrong predictions made by the model is the sum of false positive and false negative.  $FP+FN=40+12= 52$

**(ii) Precision=TP/(TP+FP)**

$$=50/(50+40)$$

$$=50/90$$

$$=0.55$$

**Recall=TP/(TP+FN)**

$$=50/(50+12)$$

$$=50/62$$

$$=.81$$

**F1 Score =**

$$2*Precision*Recall/(Precision+Recall)$$

$$=2*0.55*.81/ (.55+.81)$$

$$=.891/1.36$$

$$=0.65$$

**Precision:** How many of the items the model predicted p as positive were actually positive.

**Focus:** Minimizes false positives, meaning it reduces incorrect positive predictions.

**Example:** If a model identifies 10 emails as spam, and 8 of them are actually spam, the precision is 80%.

**Recall:**How many of the actual positive items were successfully found by the model.

**Focus:**Minimizes false negatives, meaning it reduces the number of relevant items missed.

**Example:**There are 10 actual spam emails, and the model correctly identifies 8 of them, the recall is 80%.

(1 marks for part (i) and ½ mark for each formula and ½ mark each for substitution of values in part(ii))

Please note: the mathematical calculations can be ignored