Random Forest - Confusion Matrix

Test Data Count 134	**Predicted-Purchased**	**Predicted-Not Purchased**
Actual-Purchased	43 True-Purchased	6 False-Not Purchased
Actual-Not Purchased	7 False-Purchased	78 True-Not Purchased

Accuracy: What is the correct Classification of this model ?

$$= \frac{True(Purchased)+True(Not\ Purchased)}{True(Purchased)+True(Not\ Purchased)+False(Purchased)+False(Not\ purchased)}$$

$$= \frac{78+43}{78+43+7+6}$$

Accuracy = 0.90

Recall for Purchased: Out of all actual purchases, how many did we correctly identify ?

$$= \frac{True(Purchased)}{True(Purchased)+False(Not\ Purchased)}$$

$$= \frac{43}{43+6}$$

= 0.87

Recall for Not Purchased:

$$= \frac{True(Not\ Purchased)}{True(Not\ Purchased)+False(Purchased)}$$

$$= \frac{78}{78+7}$$

= 0.92

Precision for Purchased:

Out of all predicted purchases, how many did we correctly identify ?

$$= \frac{True(Purchased)}{True(Purchased)+False(Purchased)}$$

$$= \frac{43}{43+7}$$

= 0.86

Precision for Not Purchased:

$$= \frac{True(Not\ Purchased)}{True(Not\ Purchased)+False(Not\ Purchased)}$$

$$= \frac{78}{78+6}$$

= 0.92

F1 score: Overall performance of Purchased

$$= 2 * \frac{Recall*Precission}{Recall+Precision}$$

$$= 2 * \frac{87*86}{87+86} = 2* \frac{7482}{173} = 2 * 43.24$$

F1 score for purchased = 86.49

F1 score: Overall performance of Not Purchased

$$= 2 * \frac{Recall*Precission}{Recall+Precision}$$

$$= 2 * \frac{92*92}{92+92} = 2* \frac{8464}{184} = 2 * 46$$

F1 score for Not purchased = 92

Macro Average: Average performance of Precision

$$\text{Macro Average} = \frac{Precision(Purchased)+Precision(Not\ Purchased)}{2}$$

$$= \frac{0.86+0.92}{2}$$

$$= \frac{1.78}{2}$$

$$= 0.89$$

Macro Average: Average performance of Recall

$$\text{Macro Average} = \frac{Recall(Purchased)+Recall(Not\ Purchased)}{2}$$

$$= \frac{0.87+0.92}{2}$$

$$= \frac{1.79}{2}$$

$$= 0.895$$

Macro Average: Average performance of F1-Score

$$\text{Macro Average} = \frac{F1(Purchased)+F1(Not\ Purchased)}{2}$$

$$= \frac{86.49+92}{2}$$

$$= \frac{178.49}{2}$$

$$= 89.24$$

Weighted Average: Precision

$$= \text{Precision Purchased} * \frac{49}{134} + \text{Precision Not Purchased} * \frac{85}{134}$$

$$= 0.86 * \frac{49}{134} + 0.92 * \frac{85}{134}$$

$$= 0.89$$

Weighted Average: Recall

= Recall Purchased * $\frac{49}{134}$ + recall Not Purchased * $\frac{85}{134}$

= 0.87 * $\frac{49}{134}$ + 0.92 * $\frac{85}{134}$

= 0.90

Weighted Average: F1 measure

= F1 score for Purchased * $\frac{49}{134}$ + F1 score for Not Purchased * $\frac{85}{134}$

= 86.49 * $\frac{49}{134}$ + 92 * $\frac{85}{134}$

=89.98