Machine Learning – Classification(RF)

Confusion Matrix:

```
[[72  7]
 [ 3 38]]
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	precision	recall	f1-score	support
0	0.96	0.91	0.94	79
1	0.84	0.93	0.88	41
accuracy			0.92	120
macro avg	0.90	0.92	0.91	120
weighted avg	0.92	0.92	0.92	120

Accuracy: Overall performance of model

Purchased = 0, Not-Purchased =1

Tp = Total of purchased(72) Fp= Total of False purchased(7) Total = 120

Tnp= Total of not-purchased (38) Fnp= Total of False non-purchased(3)

Formula=Tp+Tnp/(Tp+Tnp+ Fp+Fnp)

=72+38/(72+38+7+3) = 110/120=91.667== 92%

Recall: Percentage of correct classification of purchased or not purchased

Formula(purchased)=Tp/Tp+Fp

=72/72+7 =72/79=0.91==91%

Formula(not-purchased)=Tnp/Tnp+Fnp =38/38+3 =38/41=0.926==93%

Precision: Percentage of correct and wrong classification of purchased or not purchased

Formula(purchased)= Tp/Tp+Fp

=72/72+3 =72/75=0.96==96%

Formula(not-purchased)=Tnp/Tnp+Fp

=38/38+7 =38/45=0.84==84%

F1 Measure: Overall performance of purchased or not purchased

Formula(purchased)= 2*(Recall*Precision)/ (Recall+Precision)

=2*(0.91*0.96)/(0.91+0.96)

=1.74/1.87 = 0.935 = 0.94%

Formula(not-purchased)= 2*(Recall*Precision)/ (Recall+Precision)

=2*(0.93*0.84)/(0.93+0.84)

= 1.56/1.77 = 88%

Macro Average: Average performance of Recall, Precision, F1 Measure

Formula(**Precision**)=Tp(precision) +Tnp(precision)/2 = 0.96+0.84/2 = 90

Formula(**Recall**)=Tp(**Recall**)+Tnp(**Recall**)/2 = 0.91+0.93/2 = 92

Formula(**F1 Measure**)=Tp(**F1 Measure**)+Tnp(**F1 Measure**)/2 = 0.94+0.88/2 = 91

Weighted Average: Sum of product rate of proportion of class of Recall, Precision, F1 Measure

Formula(**Precision**)=Tp(precision)(Tp/Total)+ Tnp(precision)(Tnp/Total)

=0.96(72/120)+ 0.84(38/120) = 0.92

Formula(**Recall**)= Tp(**Recall**)(Tp/Total)+ Tnp(**Recall**)(Tnp/Total)

= 0.91(72/120)+ 0.93(38/120) =0.92

Formula(**F1 Measure**)= Tp(**F1 Measure**)(Tp/Total)+ Tnp(**F1 Measure**)(Tnp/Total)

= 0.94(72/120)+ 0.88(38/120) = 0.92