

# Machine Learning – Classification(RF)

	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

Tp = Total of purchased    Fp= Total of False purchased    Total = 120

Tnp= Total of not-purchased    Fnp= Total of False non-purchased

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) =  $T_p / (T_p + F_p)$

$$= 72 / (72 + 3) = 72 / 75 = 0.96 = 96\%$$

Formula(not-purchased) =  $T_{np} / (T_{np} + F_p)$

$$= 38 / (38 + 7) = 38 / 45 = 0.84 = 84\%$$

## F1 Measure: Overall performance of purchased or not purchased

Formula(purchased) =  $2 * (\text{Recall} * \text{Precision}) / (\text{Recall} + \text{Precision})$

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

$$= 1.74 / 1.87 = 0.935 = 93.5\%$$

Formula(not-purchased) =  $2 * (\text{Recall} * \text{Precision}) / (\text{Recall} + \text{Precision})$

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

$$= 1.56 / 1.77 = 88\%$$

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

Formula(Precision) =  $(T_p(\text{precision}) + T_{np}(\text{precision})) / 2 = (0.96 + 0.84) / 2 = 90$

Formula(Recall) =  $(T_p(\text{Recall}) + T_{np}(\text{Recall})) / 2 = (0.91 + 0.93) / 2 = 92$

Formula(F1 Measure) =  $(T_p(\text{F1 Measure}) + T_{np}(\text{F1 Measure})) / 2 = (0.94 + 0.88) / 2 = 91$

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

Formula(Precision )= $Tp(\text{precision})(Tp/\text{Total}) + Tnp(\text{precision})(Tnp/\text{Total})$

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

Formula(Recall )=  $Tp(\text{Recall})(Tp/\text{Total}) + Tnp(\text{Recall})(Tnp/\text{Total})$

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

Formula(F1 Measure )=  $Tp(\text{F1 Measure})(Tp/\text{Total}) + Tnp(\text{F1 Measure})(Tnp/\text{Total})$

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