# HOPE ARTIFICIAL INTELLIGENCE

***CONFUSION MATRIX & CLASSIFICATION REPORT MANUAL CALCULATION (EVALUATION MATRIX )***

***FOR DIFFERENT ALGORITHMS***

1. Random Forest Classification (Best Result) Handson

CM

```
print (cm)
```

```
[[72  7]
 [ 4 37]]
```

CLF REPORT

```
print (clf_report)
```

| | precision | recall | f1-score | support |
|---|---|---|---|---|
| 0 | 0.95 | 0.91 | 0.93 | 79 |
| 1 | 0.84 | 0.90 | 0.87 | 41 |
| accuracy | | | 0.91 | 120 |
| macro avg | 0.89 | 0.91 | 0.90 | 120 |
| weighted avg | 0.91 | 0.91 | 0.91 | 120 |

**Manual Calculation:**

**Given Dataset Details:**

**Total count in the test set = 120**
**Total count of Purchased=79**
**Total count of Not Purchased=41**
**True Purchased =72**
**False Purchased = 7**
**False Not purchased=4**
**True Not Purchased=37**

1. **Accuracy =** $\frac{\text{T (Purchased) + T (Not Purchased)}}{\text{T (Purchased) + T (Not Purchased)+F(Purchased)+F(Not Purchased)}}$

$= \frac{72 + 37}{72+7+4+37}$

$= \frac{109}{120}$

Accuracy = **90.8**

2. Recall = T (Purchased)

Total input(Purchased) in the test set

= 72

79

Purchased Recall = 91.13

= T (Not Purchased)

Total input(Not Purchased) in the test set

= 37

41

Not Purchased Recall = 90.2

3. Precision = T (Purchased)

T (Purchased) + F (Not Purchased)

= 72

76

Purchased Precision = 94.7

= T (Not Purchased)

T (Not Purchased) + F (Purchaed)

= 37

44

Not Purchased Precision = 84.09

4. F1 Measure = 2 * Recall * Precision

Recall + Precision

= 2 * 0.91 * 0.94

0.91 + 0.94

Purchased F1 Measure = 93

= 2 * Recall * Precision

Recall + Precision

= 2 * 0.91 * 0.94

0.91 + 0.94

Not Purchased F1 Measure= 87

5. Macro Average Precision = Precision(Purchased) + Precision (Not Purchased)

$$= \frac{94.7 + 84.09}{2}$$

**Macro Average Precision = 89.39**

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

$$= \frac{91.13 + 90.2}{2}$$

**Macro Average Recall = 90.66**

**Macro Average F1 Measure= $\frac{\text{F1(Purchased) + F2(Not Purchased)}}{2}$**

$$= \frac{93+87}{2}$$

**Macro Average F1 Measure = 90.66**

6.Weighted Average Precision = Precision(Purchased)*(72/120)+Precision(Not Purchased)*(37/120)

Weighted Average Precision = **90.8**

Weighted Average Precision = Recall(Purchased)*(72/120)+Recall(Not Purchased)*(37/120)

Weighted Average Recall = **90.8**

Weighted Average F1 Measure = F1(Purchased)*(72/120)+F2(Not Purchased)*(37/120)

Weighted Average Recall = **90.8**