**Model Performance Metrics**

1. **Random Forest:**

**Confusion Matrix**

[74, 5]

[ 5, 36]

**Accuracy** = T(P) + T(NP) / T(P) + T(NP) + F(P) + F(NP)

= 74+36 / 74 + 36 + 5 +5 = 110 / 120

= 0.92

**Recall for Purchased** = T(P)/T(P) + F(P)

= 36/36+5 = 36/41 = 0.88

**Recall for Not Purchased** = T(NP)/T(NP) + F(NP)

= 74/74+5 = 74/79 = 0.94

**Precision for Purchased** = T(P)/T(P) + F(NP)

= 36 / 36+5 = 36/41 = 0.88

**Precision for Not Purchased** = T(NP)/T(NP) + F(P)

= 74 / 74 + 5 = 74/79 = 0.94

**F1-measure for Purchased** = 2 \* Recall(P) \* Precision(P) / Recall(P) + Precision(P)

= 2 \* 0.88 \* 0.88 / 0.88 + 0.88

= 2\*0.77 / 1.76 = 1.54/1.76 = 0.88

**F1-measure for Not Purchased** = 2 \* Recall(NP) \* Precision(NP) / Recall(NP) + Precision(NP)

= 2\* 0.94 \* 0.94 / 0.94 + 0.94

= 2\* 0.88 / 1.88 = 1.76/1.88 = 0.94

**Macro average for Recall** = Recall(P) + Recall(NP) / 2

= 0.88 + 0.94 / 2 = 1.82/2 = 0.91

**Macro average for Precision** = Precision (P) + Precision (NP) / 2

=0.88+0.94/2 = 1.82/2 = 0.91

**Macro average for f1-measure** = f1-measure (P) + f1-measure (NP) / 2

= 0.88 + 0.94 / 2 = 1.82/2 =0.91

**Weighted Average for Recall** = Recall(P) \* (sum(P)/sum(p)+sum(NP)) + Recall(NP)\*(sum(NP)/sum(P)+sum(NP))

= 0.88 \* (41/120) + 0.94\*(79/120)

= 0.88\* 0.34 + 0.94 \* 0.66

= 0.30 + 0.62 =0.92

**Weighted Average for Precision** = 0.88 \* (41/120) + 0.94\*(79/120)

= 0.88\* 0.34 + 0.94 \* 0.66

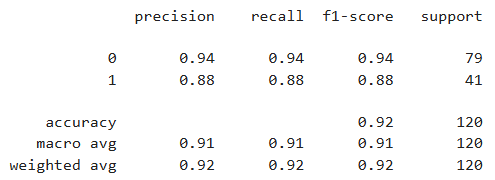
= 0.30 + 0.62 =0.92

**Weighted Average for f1-measure** = 0.88 \* (41/120) + 0.94\*(79/120)

= 0.88\* 0.34 + 0.94 \* 0.66

= 0.30 + 0.62 =0.92

1. What is the percentage of correct classification of both / overall performance (Accuracy): 0.92
2. What is the correct classification (sum of purchased) percentage of purchased (Recall 1): 0.88
3. What is the correct classification (sum of not purchased) percentage of not purchased (Recall 0): 0.94
4. What is the total (sum of correct & wrong purchased) percentage of purchased (Precision 1): 0.88
5. What is the total (sum of correct & wrong not purchased) percentage of not purchased (Precision 0): 0.94
6. Overall Performance of Purchased (f1-measure 1): 0.88
7. Overall Performance of not Purchased (f1-measure 0): 0.94
8. Average performance of Recall (Macro Average): 0.91
9. Average performance of Precision (Macro Average): 0.91
10. Average performance of f1-Measure (Macro Average): 0.91
11. Sum of the product of proportion rate (Weight) of each class (Recall): 0.92
12. Sum of the product of proportion rate (Weight) of each class (Precision): 0.92
13. Sum of the product of proportion rate (Weight) of each class (f1-measure):0.92
14. Count of Purchased (Support 1): 41
15. Count of not purchased (Support 0): 79



**2. Decision Tree:**

**Confusion Matrix**

[71, 8]

[ 6, 35]

**Accuracy** = T(P) + T(NP) / T(P) + T(NP) + F(P) + F(NP)

= 71+35 / 71 + 35 + 8 +6 = 106 / 120

= 0.88

**Recall for Purchased** = T(P)/T(P) + F(P)

= 35/35+6 = 35/41 = 0.85

**Recall for Not Purchased** = T(NP)/T(NP) + F(NP)

= 71/71+8 = 71/79 = 0.90

**Precision for Purchased** = T(P)/T(P) + F(NP)

= 35 / 35+8 = 35/43 = 0.81

**Precision for Not Purchased** = T(NP)/T(NP) + F(P)

= 71 / 71 + 6 = 71/77 = 0.92

**F1-measure for Purchased** = 2 \* Recall(P) \* Precision(P) / Recall(P) + Precision(P)

= 2 \* 0.85 \* 0.81 / 0.85 + 0.81

= 2\*0.69 / 1.66 = 1.38/1.66 = 0.83

**F1-measure for Not Purchased** = 2 \* Recall(NP) \* Precision(NP) / Recall(NP) + Precision(NP)

= 2\* 0.90 \* 0.92 / 0.90 + 0.92

= 2\* 0.83 / 1.82 = 1.66/1.82 = 0.91

**Macro average for Recall** = Recall(P) + Recall(NP) / 2

= 0.85 + 0.90 / 2 = 1.75/2 = 0.88

**Macro average for Precision** = Precision (P) + Precision (NP) / 2

=0.81+0.92/2 = 1.73/2 = 0.87

**Macro average for f1-measure** = f1-measure (P) + f1-measure (NP) / 2

= 0.83 + 0.91 / 2 = 1.74/2 =0.87

**Weighted Average for Recall** = Recall(P) \* (sum(P)/sum(p)+sum(NP)) + Recall(NP)\*(sum(NP)/sum(P)+sum(NP))

= 0.85 \* (41/120) + 0.90\*(79/120)

= 0.85\* 0.34 + 0.90 \* 0.66

= 0.29 + 0.59 =0.88

**Weighted Average for Precision** = 0.81 \* (41/120) + 0.92\*(79/120)

= 0.81\* 0.34 + 0.92 \* 0.66

= 0.28 + 0.61 =0.89

**Weighted Average for f1-measure** = 0.83 \* (41/120) + 0.91\*(79/120)

= 0.83\* 0.34 + 0.91 \* 0.66

= 0.28 + 0.60 =0.88

1. What is the percentage of correct classification of both / overall performance (Accuracy): 0.88
2. What is the correct classification (sum of purchased) percentage of purchased (Recall 1): 0.85
3. What is the correct classification (sum of not purchased) percentage of not purchased (Recall 0): 0.90
4. What is the total (sum of correct & wrong purchased) percentage of purchased (Precision 1): 0.81
5. What is the total (sum of correct & wrong not purchased) percentage of not purchased (Precision 0): 0.92
6. Overall Performance of Purchased (f1-measure 1): 0.83
7. Overall Performance of not Purchased (f1-measure 0): 0.91
8. Average performance of Recall (Macro Average): 0.88
9. Average performance of Precision (Macro Average): 0.87
10. Average performance of f1-Measure (Macro Average): 0.87
11. Sum of the product of proportion rate (Weight) of each class (Recall): 0.88
12. Sum of the product of proportion rate (Weight) of each class (Precision): 0.89
13. Sum of the product of proportion rate (Weight) of each class (f1-measure):0.88
14. Count of Purchased (Support 1): 41
15. Count of not purchased (Support 0): 79

