Confusion matrix:- Decision Tree

2*2 matrix classification

Accuracy:

This calculates the total number of true correct predictions out of total number in the dataset.

What is the **overall performance** of the model?

76	9
8	41

The overall performance of the model is

Accuracy = 76+43/76+43+8+9

= 0.87

Recall:

It calculates the total number of actual positives that was identified correctly.

What is the percentage of **correct classification** of purchased and non-purchased to the total input of the model?

76	9
8	41

The correct classification of the model is

Recall of non-purchased = 76/(76+9) = 0.89

Recall of purchased = 41/(41+8) = 0.84

Precision:

Precision refers to number true positives divided by total number of positives (number of true positives and false positives).

What is the percentage of **correct and wrongly classified** data of purchased and non-purchased of the model?

76	9
8	41

The correct and wrong classification of the model is

Precision of non-purchased = 76/(76+8) = 0.90

Precision of purchased = 41/(41+9) = 0.82

F1 measure:

F1 score is a weighted average of precision and recall. As we know in precision and in recall there is false positive and false negative so it also considers both of them. F1 score is usually more useful than accuracy, especially if you have an uneven class distribution.

What if the recall value is high and the precision value is low or vice versa?

Go for F1 measure

76	9
8	41

2* Recall*Precision/(Recall + Precision)

F1 score of non-purchased = 2*0.89*0.90/(0.89+0.90) = 0.90

F1 score of purchased = 2*0.84*0.82/(0.84+0.82) = 0.83

Macro average:

The **average performance** of precision, recall and F1 measure is called macro average.

Average of recall = (0.89+0.84)/2 = 0.87

Average of precision = (0.90+0.82)/2 = 0.86

Average of F1 score = (0.90+0.83)/2 = 0.87

Weighted average:

It is the **proposition** of purchased and non-purchased value

76	9
8	41

Weighted average = Precision(non-purchased)*(85/134) + Precision(purchased)*(49/134) = 0.57+0.30 = 0.87

Weighted average = Recall(non-purchased)*(85/134) + Recall(purchased)*(49/134) = 0.56+0.31 = 0.87

Weighted average = F1score(non-purchased)*(85/134) + F1score(purchased)*(49/134) = 0.57+0.30 = 0.87

Confusion matrix:- Random Forest

2*2 matrix classification

Accuracy:

This calculates the total number of true correct predictions out of total number in the dataset.

What is the **overall performance** of the model?

78	7
6	43

The overall performance of the model is

Accuracy = 78+43/78+43+7+6

= 0.90

Recall:

It calculates the total number of actual positives that was identified correctly.

What is the percentage of **correct classification** of purchased and non-purchased to the total input of the model?

78	7
6	43

The correct classification of the model is

Recall of non-purchased = 78/(78+7) = 0.92

Recall of purchased = 43/(43+6) = 0.88

Precision:

Precision refers to number true positives divided by total number of positives (number of true positives and false positives).

What is the percentage of **correct and wrongly classified** data of purchased and non-purchased of the model?

78	7
6	43

The correct and wrong classification of the model is

Precision of non-purchased = 78/(78+6) = 0.92

Precision of purchased = 43/(43+7) = 0.86

F1 measure:

F1 score is a weighted average of precision and recall. As we know in precision and in recall there is false positive and false negative so it also considers both of them. F1 score is usually more useful than accuracy, especially if you have an uneven class distribution.

What if the recall value is high and the precision value is low or vice versa?

Go for F1 measure

78	7
6	43

2* Recall*Precision/(Recall + Precision)

F1 score of non-purchased = 2*0.92*0.92/(0.92+0.92) = 0.92

F1 score of purchased = 2*0.88*0.86/(0.88+0.86) = 0.87

Macro average:

The **average performance** of precision, recall and F1 measure is called macro average.

Average of recall = (0.92+0.88)/2 = 0.90

Average of precision = (0.92+0.86)/2 = 0.89

Average of F1 score = (0.92+0.87)/2 = 0.90

Weighted average:

It is the **proposition** of purchased and non-purchased value

78	7
6	43

Weighted average = Precision(non-purchased)*(85/134) + Precision(purchased)*(49/134) = 0.58+0.31 = 0.89

Weighted average = Recall(non-purchased)*(85/134) + Recall(purchased)*(49/134) = 0.58+0.32 = 0.90

Weighted average = F1score(non-purchased)*(85/134) + F1score(purchased)*(49/134) = 0.58+0.32 = 0.90

Confusion matrix:- SVM

2*2 matrix classification

Accuracy:

This calculates the total number of true correct predictions out of total number in the dataset.

What is the **overall performance** of the model?

82	3
26	23

The overall performance of the model is

Accuracy = 82+23/82+23+3+26

= 0.78

Recall:

It calculates the total number of actual positives that was identified correctly.

What is the percentage of **correct classification** of purchased and non-purchased to the total input of the model?

82	3
26	23

The correct classification of the model is

Recall of non-purchased = 82/(82+3) = 0.96

Recall of purchased = 23/(23+26) = 0.47

Precision:

Precision refers to number true positives divided by total number of positives (number of true positives and false positives).

What is the percentage of **correct and wrongly classified** data of purchased and non-purchased of the model?

82	3
26	23

The correct and wrong classification of the model is

Precision of non-purchased = 82/(82+26) = 0.75

Precision of purchased = 23/(23+3) = 0.88

F1 measure:

F1 score is a weighted average of precision and recall. As we know in precision and in recall there is false positive and false negative so it also considers both of them. F1 score is usually more useful than accuracy, especially if you have an uneven class distribution.

What if the recall value is high and the precision value is low or vice versa?

Go for F1 measure

82	3
26	23

2* Recall*Precision/(Recall + Precision)

F1 score of non-purchased = 2*0.96*0.75/(0.96+0.75) = 0.84

F1 score of purchased = 2*0.88*0.47/(0.88+0.47) = 0.61

Macro average:

The **average performance** of precision, recall and F1 measure is called macro average.

Average of recall = (0.96+0.47)/2 = 0.72

Average of precision = (0.75+0.88)/2 = 0.82

Average of F1 score = (0.84+0.61)/2 = 0.73

Weighted average:

It is the **proposition** of purchased and non-purchased value

82	3
26	23

Weighted average = Precision(non-purchased)*(85/134) + Precision(purchased)*(49/134) = 0.48+0.32 = 0.80

Weighted average = Recall(non-purchased)*(85/134) + Recall(purchased)*(49/134) = 0.61+0.17 = 0.78

Weighted average = F1score(non-purchased)*(85/134) + F1score(purchased)*(49/134) = 0.53+0.22 = 0.75