

# Assignment 1 - ML-Classification-Decision Tree

Not Purchased	Purchased
0	257
1	143

Actual Class			
Predicted Class		True (Not Purchased)	Purchased
	True (Not Purchased)	71	8
	Purchased	3	38

## Evaluation Metrics - Accuracy

### Accuracy for Purchased and Not Purchased Data set:

What is the percentage of correct classification of both ("Not Purchased" and "Purchased") to the total input in the test set?

$$\frac{\text{True (Not Purchased)} + \text{True (Purchased)}}{\text{True (Not Purchased)} + \text{True (Purchased)} + \text{False (Not Purchased)} + \text{False (Purchased)}}$$

Result: 0.91

## Evaluation Metrics - Recall

### Recall for Not Purchased:

What is the percentage of correct classification of "Not Purchased" to the total input of (Not Purchased) in the test set?

$$\frac{\text{True (Not Purchased)}}{\text{True (Not Purchased)} + \text{False (Not Purchased)}}$$

Result: 0.90

### Recall for Purchased:

What is the percentage correct classification of "Purchased" to the total input of (Purchased) in the test set?

$$\frac{\text{True (Purchased)}}{\text{True (Purchased) + False (Purchased)}}$$

Result: 0.93

## Evaluation Metrics - Precision

### Precision for Not Purchased:

What is the percentage of correct classification of "Not Purchased" to the Sum of correctly classified as "Not Purchased" and wrongly classified as "Not Purchased in the test set?

$$\frac{\text{True (Not Purchased)}}{\text{True (Not Purchased) + False (Purchased)}}$$

Result: 0.96

### Precision for Purchased:

What is the percentage of correct classification of "Purchased" to the Sum of correctly classified as "Not Purchased" and wrongly classified as "Purchased in the test set?

$$\frac{\text{True (Purchased)}}{\text{True (Purchased) + False (Not Purchased)}}$$

Result: 0.83

## Evaluation Metrics - F1-Measure

### F1-Measure for Not Purchased:

What is the overall performance of "Not Purchased"?

$$2 * \frac{\text{Recall (Not Purchased)} * \text{Precision (Not Purchased)}}{\text{Recall (Not Purchased) + Precision (Not Purchased)}}$$

Result: 0.93

### **F1-Measure for Purchased:**

What is the overall performance of “Not Purchased”?

$$2 * \frac{\text{Recall (Purchased)} * \text{Precision (Purchased)}}{\text{Recall (Purchased)} + \text{Precision (Purchased)}}$$

Result: 0.87

## **Macro Average:**

### **Precision:**

What is the average performance of Precision (Correctly and wrongly classified)?

$$\frac{\text{Precision of “Not Purchased”} + \text{Precision of “Purchased”}}{2}$$

Result: 0.89

### **Recall:**

What is the average performance of Recall (Correctly and wrongly classified)?

$$\frac{\text{Recall of “Not Purchased”} + \text{Recall of “Purchased”}}{2}$$

Result: 0.91

### **F1-Measure:**

What is the average performance of F1-Measure (Correctly and wrongly classified)?

$$\frac{\text{F1(Not Purchased)} + \text{F1(Purchased)}}{2}$$

Result: 0.90

## **Weighted Average**

### **Precision:**

What is the sum of product of proportion rate (Weight) of each class

$$\text{Precision ("Not Purchased")} * 79/120 + \text{Precision ("Purchased")} * 41/120$$

Result: 0.91

### **Recall**

What is the sum of product of proportion rate (Weight) of each class

$$\text{Recall ("Not Purchased")} * 79/120 + \text{Recall ("Purchased")} * 41/120$$

Result: 0.91

### **F1-Measure**

What is the sum of product of proportion rate (Weight) of each class

$$F1 ("Not Purchased") * 79/120 + f2 ("Purchased") * 41/120$$

Result: 0.91