

## 5 ניסויים – Decision Tree :

### 1. ניסוי 1 : max\_depth = 10 , min\_samples\_split = 20

```
Training Accuracy: 0.9758241758241758
Testing Accuracy: 0.9385964912280702

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.93       0.91       0.92         43
     1           0.94       0.96       0.95         71

   accuracy          0.94
  macro avg          0.94       0.93       0.93         114
weighted avg          0.94       0.94       0.94         114

Confusion Matrix (Test Set):
[[39  4]
 [ 3 68]]
```

### 2. ניסוי 2 : min\_samples\_leaf=5 , max\_features="sqrt"

```
Training Accuracy: 0.978021978021978
Testing Accuracy: 0.9385964912280702

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.93       0.91       0.92         43
     1           0.94       0.96       0.95         71

   accuracy          0.94
  macro avg          0.94       0.93       0.93         114
weighted avg          0.94       0.94       0.94         114

Confusion Matrix (Test Set):
[[39  4]
 [ 3 68]]
```

### 3. ניסוי 3 : criterion='entropy' , min\_impurity\_decrease=0.01

```
Training Accuracy: 0.9934065934065934
Testing Accuracy: 0.956140350877193

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.97       0.91       0.94         43
     1           0.95       0.99       0.97         71

   accuracy          0.96
  macro avg          0.96       0.95       0.95         114
weighted avg          0.96       0.96       0.96         114

Confusion Matrix (Test Set):
[[39  4]
 [ 1 70]]
```

#### 4. ניסוי 4: `class_weight='balanced'`, `max_leaf_nodes=10`

```
Training Accuracy: 0.9868131868131869
Testing Accuracy: 0.9736842105263158

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.98         0.95         0.96         43
     1           0.97         0.99         0.98         71

   accuracy              0.97              114
  macro avg           0.97         0.97         0.97         114
 weighted avg           0.97         0.97         0.97         114

Confusion Matrix (Test Set):
[[41  2]
 [ 1 70]]
```

#### 5. ניסוי 5: `min_samples_split=10`, `max_depth=15`, `ccp_alpha=0.05`, `min_samples_leaf=5`

```
Training Accuracy: 0.9208791208791208
Testing Accuracy: 0.8947368421052632

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.83         0.91         0.87         43
     1           0.94         0.89         0.91         71

   accuracy              0.89              114
  macro avg           0.89         0.90         0.89         114
 weighted avg           0.90         0.89         0.90         114

Confusion Matrix (Test Set):
[[39  4]
 [ 8 63]]
```

### 5 ניסויים – Random Forest :

#### 1. ניסוי 1: `max_depth=10`, `n_estimators=50`

```
Training Accuracy: 1.0
Testing Accuracy: 0.9649122807017544

Classification Report (Test Set):
              precision    recall  f1-score   support

     0           0.98         0.93         0.95         43
     1           0.96         0.99         0.97         71

   accuracy              0.96              114
  macro avg           0.97         0.96         0.96         114
 weighted avg           0.97         0.96         0.96         114

Confusion Matrix (Test Set):
[[40  3]
 [ 1 70]]
```

#### 2. ניסוי 2: `min_samples_leaf=5`, `min_samples_split=10`

```

Training Accuracy: 0.9824175824175824
Testing Accuracy: 0.9649122807017544

Classification Report (Test Set):
              precision    recall  f1-score   support

     0       0.98        0.93        0.95         43
     1       0.96        0.99        0.97         71

   accuracy          0.96          114
  macro avg       0.97        0.96        0.96          114
 weighted avg     0.97        0.96        0.96          114

Confusion Matrix (Test Set):
[[40  3]
 [ 1 70]]

```

### 3. ניסוי 3: `bootstrap=True`, `max_features="log2"`

```

Training Accuracy: 1.0
Testing Accuracy: 0.9649122807017544

Classification Report (Test Set):
              precision    recall  f1-score   support

     0       0.98        0.93        0.95         43
     1       0.96        0.99        0.97         71

   accuracy          0.96          114
  macro avg       0.97        0.96        0.96          114
 weighted avg     0.97        0.96        0.96          114

Confusion Matrix (Test Set):
[[40  3]
 [ 1 70]]

```

### 4. ניסוי 4: `oob_score=True`, `max_leaf_nodes=20`

```

Training Accuracy: 1.0
Testing Accuracy: 0.9649122807017544

Classification Report (Test Set):
              precision    recall  f1-score   support

     0       0.98        0.93        0.95         43
     1       0.96        0.99        0.97         71

   accuracy          0.96          114
  macro avg       0.97        0.96        0.96          114
 weighted avg     0.97        0.96        0.96          114

Confusion Matrix (Test Set):
[[40  3]
 [ 1 70]]

```

5. ניסוי 5: `max_depth=15 ,n_estimators=200`  
`ccp_alpha=0.05 ,min_samples_leaf=5 ,min_samples_split=10`

```
Training Accuracy: 0.9582417582417583
Testing Accuracy: 0.9649122807017544

Classification Report (Test Set):
              precision    recall  f1-score   support

     0       0.98         0.93         0.95         43
     1       0.96         0.99         0.97         71

   accuracy          0.96         114
  macro avg       0.97         0.96         0.96         114
 weighted avg       0.97         0.96         0.96         114

Confusion Matrix (Test Set):
[[40  3]
 [ 1 70]]
```

## 5 ניסויים – ADABOOST :

1. ניסוי 1: `n_estimators=50`

```
Accuracy: 0.9649122807017544
F1 Score: 0.9722222222222222
Classification Report:
              precision    recall  f1-score   support

     0       0.98         0.93         0.95         43
     1       0.96         0.99         0.97         71

   accuracy          0.96         114
  macro avg       0.97         0.96         0.96         114
 weighted avg       0.97         0.96         0.96         114

Confusion Matrix:
[[40  3]
 [ 1 70]]
```

2. ניסוי 2: `learning_rate=0.5`

```
Accuracy: 0.9649122807017544
F1 Score: 0.9722222222222222
Classification Report:
              precision    recall  f1-score   support

     0       0.98         0.93         0.95         43
     1       0.96         0.99         0.97         71

   accuracy          0.96         114
  macro avg       0.97         0.96         0.96         114
 weighted avg       0.97         0.96         0.96         114

Confusion Matrix:
[[40  3]
 [ 1 70]]
```

### 3. ניסוי 3: algorithm='SAMME.R'

```
Accuracy: 0.9736842105263158
F1 Score: 0.9790209790209791
Classification Report:
              precision    recall  f1-score   support

         0           0.98       0.95       0.96         43
         1           0.97       0.99       0.98         71

    accuracy              0.97         114
   macro avg           0.97       0.97       0.97         114
weighted avg           0.97       0.97       0.97         114

Confusion Matrix:
[[41  2]
 [ 1 70]]
```

### 4. ניסוי 4: learning\_rate=0.5 ,n\_estimators=200

```
Accuracy: 0.9736842105263158
F1 Score: 0.9790209790209791
Classification Report:
              precision    recall  f1-score   support

         0           0.98       0.95       0.96         43
         1           0.97       0.99       0.98         71

    accuracy              0.97         114
   macro avg           0.97       0.97       0.97         114
weighted avg           0.97       0.97       0.97         114

Confusion Matrix:
[[41  2]
 [ 1 70]]
```

### 5. ניסוי 5: learning\_rate=0.2 , n\_estimators=500 ,algorithm='SAMME.R'

```
Accuracy: 0.9736842105263158
F1 Score: 0.9790209790209791
Classification Report:
              precision    recall  f1-score   support

         0           0.98       0.95       0.96         43
         1           0.97       0.99       0.98         71

    accuracy              0.97         114
   macro avg           0.97       0.97       0.97         114
weighted avg           0.97       0.97       0.97         114

Confusion Matrix:
[[41  2]
 [ 1 70]]
```