

# למידת מכונה- מטלה 1

## Decision tree classifier

### ניסוי 1

criterion='entropy', max\_depth= 5, min\_samples\_leaf=3

```
Decision Tree Results:
Accuracy: 0.9473684210526315
Confusion Matrix:
[[39  4]
 [ 2 69]]
Precision: 0.9452054794520548
Recall: 0.971830985915493
F1 Score: 0.9583333333333334
```

### ניסוי 2

min\_samples\_split=4, min\_weight\_fraction\_leaf=0.1, min\_impurity\_decrease=0.01

```
Decision Tree Results:
Accuracy: 0.8947368421052632
Confusion Matrix:
[[39  4]
 [ 8 63]]
Precision: 0.9402985074626866
Recall: 0.8873239436619719
F1 Score: 0.9130434782608695
```

### ניסוי 3

max\_features='log2', max\_leaf\_nodes=10, class\_weight='balanced'

```
Decision Tree Results:
Accuracy: 0.9298245614035088
Confusion Matrix:
[[40  3]
 [ 5 66]]
Precision: 0.9565217391304348
Recall: 0.9295774647887324
F1 Score: 0.9428571428571428
```

### ניסוי 4

criterion='entropy', min\_samples\_split=6, ccp\_alpha=0.01

```
Decision Tree Results:
Accuracy: 0.956140350877193
Confusion Matrix:
[[39  4]
 [ 1 70]]
Precision: 0.9459459459459459
Recall: 0.9859154929577465
F1 Score: 0.9655172413793104
```

### ניסוי 5

max\_depth=8, min\_weight\_fraction\_leaf=0.2, max\_features='sqrt', random\_state=42

```
Decision Tree Results:
Accuracy: 0.9473684210526315
Confusion Matrix:
[[37  6]
 [ 0 71]]
Precision: 0.922077922077922
Recall: 1.0
F1 Score: 0.9594594594594594
```

## Random forest classifier

### ניסוי 1

n\_estimators= 150, max\_depth=15, min\_samples\_leaf=4

```
Random Forest Results:
Accuracy: 0.9649122807017544
Confusion Matrix:
[[40  3]
 [ 1 70]]
Precision: 0.958904109589041
Recall: 0.9859154929577465
F1 Score: 0.9722222222222222
```

### ניסוי 2

criterion='entropy', min\_samples\_split=5, min\_weight\_fraction\_leaf=0.3

```
Random Forest Results:
Accuracy: 0.9649122807017544
Confusion Matrix:
[[39  4]
 [ 0 71]]
Precision: 0.9466666666666667
Recall: 1.0
F1 Score: 0.9726027397260274
```

### ניסוי 3

max\_features=None, min\_impurity\_decrease=1.5, oob\_score=True

```
Random Forest Results:
Accuracy: 0.6228070175438597
Confusion Matrix:
[[ 0 43]
 [ 0 71]]
Precision: 0.6228070175438597
Recall: 1.0
F1 Score: 0.7675675675675676
```

### ניסוי 4

max\_leaf\_nodes=20, bootstrap=False, n\_jobs=3

```
Random Forest Results:
Accuracy: 0.9649122807017544
Confusion Matrix:
[[40  3]
 [ 1 70]]
Precision: 0.958904109589041
Recall: 0.9859154929577465
F1 Score: 0.9722222222222222
```

### ניסוי 5

n\_estimators=50, max\_depth=7, min\_impurity\_decrease=0.01, n\_jobs=-1

```
Random Forest Results:
Accuracy: 0.9649122807017544
Confusion Matrix:
[[40  3]
 [ 1 70]]
Precision: 0.958904109589041
Recall: 0.9859154929577465
F1 Score: 0.9722222222222222
```

## Ada boost classifier

### ניסוי 1

estimator=RandomForestClassifier(), learning\_rate=0.4

```
AdaBoost Results:
Accuracy: 0.9649122807017544
Confusion Matrix:
[[40  3]
 [ 1 70]]
Precision: 0.958904109589041
Recall: 0.9859154929577465
F1 Score: 0.9722222222222222
```

### ניסוי 2

n\_estimators=100, algorithm='SAMME'

```
AdaBoost Results:
Accuracy: 0.9736842105263158
Confusion Matrix:
[[41  2]
 [ 1 70]]
Precision: 0.9722222222222222
Recall: 0.9859154929577465
F1 Score: 0.9790209790209791
```

### ניסוי 3

n\_estimators=20, learning\_rate=5.0

```
AdaBoost Results:
Accuracy: 0.9122807017543859
Confusion Matrix:
[[39  4]
 [ 6 65]]
Precision: 0.9420289855072463
Recall: 0.9154929577464789
F1 Score: 0.9285714285714286
```

### ניסוי 4

n\_estimators=200, learning\_rate=0.01, algorithm='SAMME'

```
AdaBoost Results:
Accuracy: 0.956140350877193
Confusion Matrix:
[[40  3]
 [ 2 69]]
Precision: 0.9583333333333334
Recall: 0.971830985915493
F1 Score: 0.965034965034965
```

### ניסוי 5

n\_estimators=150, learning\_rate=3.0, algorithm='SAMME'

```
AdaBoost Results:
Accuracy: 0.9122807017543859
Confusion Matrix:
[[42  1]
 [ 9 62]]
Precision: 0.9841269841269841
Recall: 0.8732394366197183
F1 Score: 0.9253731343283582
```