Application 1

Supervised Machine Learning

Using Decision Tree

- Below application uses Decision Tree algorithm to classify the type of ball.
- In this application training set contains two types of balls.
- Features of our training set is weight and type of surface of ball.
- We are using two labels as Tennis and Cricket.
- We train our data set using Decision tree algorithm.

Consider below characteristics of Machine Learning Application :

Classifier :	**Decision Tree**
DataSet :	**Balls Dataset**
Features :	**Weight & Surface type**
Labels :	**Tennis and Cricket**
Training Dataset :	**15 Entries**
Testing Dataset :	**1 Entry**

```
from sklearn import tree

def MarvellousML(weight,surface):

    BallIsFeatures = [[35,1],[47,1],[90,0],[48,1],[90,0],[35,1],[92,0],[35,1],[35,1],[35,1],[96,0],[43,1],[110,0],
       [35,1],[95,0]]

    Names = [1,1,2,1,2,1,2,1,1,1,2,1,2,1,2]

    clf = tree.DecisionTreeClassifier()

    clf = clf.fit(BallIsFeatures,Names)

    result = clf.predict([[weight,surface]])

    if result == 1:
        print("Your object looks like Tennis ball")
    elif result == 2:
        print("Your object looks like Cricket ball")

def main():
    print("---- Marvellous Infosystems by Piyush Khairnar-----")

    print("Enter weight of object")
    weight = input()

    print("What is the surface type of your object Rough or Smooth")
    surface = input()
    if surface.lower() == "rough" :
        surface = 1
    elif surface.lower() == "smooth" :
        surface = 0
    else :
        print("Error : Wrong input")
        exit()

    MarvellousML(weight,surface)

if __name__ == "__main__":
    main()
```

Output of above application

```
(base) MacBook-Pro-de-MARVELLOUS:Ball marvellous$ p
ython3 BallClassificationUser.py
---- Marvellous Infosystems by Piyush Khairnar-----
Enter weight of object
50
What is the surface type of your object Rough or Sm
ooth
Rough
Your object looks like Tennis ball
(base) MacBook-Pro-de-MARVELLOUS:Ball marvellous$
```

Training set referred by above application

Marvellous Infosystems Training Data set

Weight	Pattern	Label
35	Rough	Tennis
47	Rough	Tennis
90	Smooth	Cricket
48	Rough	Tennis
90	Smooth	Cricket
35	Rough	Tennis
92	Smooth	Cricket
35	Rough	Tennis
35	Rough	Tennis
35	Rough	Tennis
96	Smooth	Cricket
43	Rough	Tennis
110	Smooth	Cricket
35	Rough	Tennis
95	Smooth	Cricket

Tennis Ball

Cricket Ball

Marvellous Infosystems Training Data set of Balls

Weight	Pattern	Label
35	Rough	Tennis
47	Rough	Tennis
90	Smooth	Cricket
48	Rough	Tennis
90	Smooth	Cricket
35	Rough	Tennis
92	Smooth	Cricket
35	Rough	Tennis
35	Rough	Tennis
35	Rough	Tennis
96	Smooth	Cricket
43	Rough	Tennis
110	Smooth	Cricket
35	Rough	Tennis
95	Smooth	Cricket

Tennis Ball

Cricket Ball