Day 3

Tic tac toe problem

import os

import time

board = [' ',' ',' ',' ',' ',' ',' ',' ',' ',' ']

player = 1

########win Flags##########

Win = 1

Draw = -1

Running = 0

Stop = 1

###########################

Game = Running

Mark = 'X'

#This Function Draws Game Board

def DrawBoard():

print(" %c | %c | %c " % (board[1],board[2],board[3]))

print("\_\_\_|\_\_\_|\_\_\_")

print(" %c | %c | %c " % (board[4],board[5],board[6]))

print("\_\_\_|\_\_\_|\_\_\_")

print(" %c | %c | %c " % (board[7],board[8],board[9]))

print(" | | ")

#This Function Checks position is empty or not

def CheckPosition(x):

if(board[x] == ' '):

return True

else:

return False

#This Function Checks player has won or not

def CheckWin():

global Game

#Horizontal winning condition

if(board[1] == board[2] and board[2] == board[3] and board[1] != ' '):

Game = Win

elif(board[4] == board[5] and board[5] == board[6] and board[4] != ' '):

Game = Win

elif(board[7] == board[8] and board[8] == board[9] and board[7] != ' '):

Game = Win

#Vertical Winning Condition

elif(board[1] == board[4] and board[4] == board[7] and board[1] != ' '):

Game = Win

elif(board[2] == board[5] and board[5] == board[8] and board[2] != ' '):

Game = Win

elif(board[3] == board[6] and board[6] == board[9] and board[3] != ' '):

Game=Win

#Diagonal Winning Condition

elif(board[1] == board[5] and board[5] == board[9] and board[5] != ' '):

Game = Win

elif(board[3] == board[5] and board[5] == board[7] and board[5] != ' '):

Game=Win

#Match Tie or Draw Condition

elif(board[1]!=' ' and board[2]!=' ' and board[3]!=' ' and board[4]!=' ' and board[5]!=' ' and board[6]!=' ' and board[7]!=' ' and board[8]!=' ' and board[9]!=' '):

Game=Draw

else:

Game=Running

print("Tic-Tac-Toe Game Designed By Sourabh Somani")

print("Player 1 [X] --- Player 2 [O]\n")

print()

print()

print("Please Wait...")

time.sleep(3)

while(Game == Running):

os.system('cls')

DrawBoard()

if(player % 2 != 0):

print("Player 1's chance")

Mark = 'X'

else:

print("Player 2's chance")

Mark = 'O'

choice = int(input("Enter the position between [1-9] where you want to mark : "))

if(CheckPosition(choice)):

board[choice] = Mark

player+=1

CheckWin()

os.system('cls')

DrawBoard()

if(Game==Draw):

print("Game Draw")

elif(Game==Win):

player-=1

if(player%2!=0):

print("Player 1 Won")

else:

print("Player 2 Won")

output:



Min max problem

import math

def minimax (curDepth, nodeIndex,

maxTurn, scores,

targetDepth):

if (curDepth == targetDepth):

return scores[nodeIndex]

if (maxTurn):

return max(minimax(curDepth + 1, nodeIndex \* 2,

False, scores, targetDepth),

minimax(curDepth + 1, nodeIndex \* 2 + 1,

False, scores, targetDepth))

else:

return min(minimax(curDepth + 1, nodeIndex \* 2,

True, scores, targetDepth),

minimax(curDepth + 1, nodeIndex \* 2 + 1,

True, scores, targetDepth))

scores = [3, 5, 2, 9, 12, 5, 23, 23]

treeDepth = math.log(len(scores), 2)

print("The optimal value is : ", end = "")

print(minimax(0, 0, True, scores, treeDepth))

output:



Alpha-beta pruning:

MAX, MIN = 1000, -1000

def minimax(depth, nodeIndex, maximizingPlayer,values, alpha, beta):

if depth == 3:

return values[nodeIndex]

if maximizingPlayer:

best = MIN

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex \* 2 + i,False, values, alpha, beta)

best = max(best, val)

alpha = max(alpha, best)

if beta <= alpha:

break

return best

else:

best = MAX

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex \* 2 + i,

True, values, alpha, beta)

best = min(best, val)

beta = min(beta, best)

if beta <= alpha:

break

return best

if \_\_name\_\_ == "\_\_main\_\_":

values = [3, 5, 6, 9, 1, 2, 0, -1]

print("The optimal value is :", minimax(0, 0, True, values, MIN, MAX))

output:



Decision tree

# Run this program on your local python

# interpreter, provided you have installed

# the required libraries.

# Importing the required packages

import numpy as np

import pandas as pd

from sklearn.metrics import confusion\_matrix

from sklearn.model\_selection import train\_test\_split

from sklearn.tree import DecisionTreeClassifier

from sklearn.metrics import accuracy\_score

from sklearn.metrics import classification\_report

# Function importing Dataset

def importdata():

balance\_data = pd.read\_csv(

'https://archive.ics.uci.edu/ml/machine-learning-'+

'databases/balance-scale/balance-scale.data',

sep= ',', header = None)

# Printing the dataswet shape

print ("Dataset Length: ", len(balance\_data))

print ("Dataset Shape: ", balance\_data.shape)

# Printing the dataset obseravtions

print ("Dataset: ",balance\_data.head())

return balance\_data

# Function to split the dataset

def splitdataset(balance\_data):

# Separating the target variable

X = balance\_data.values[:, 1:5]

Y = balance\_data.values[:, 0]

# Splitting the dataset into train and test

X\_train, X\_test, y\_train, y\_test = train\_test\_split(

X, Y, test\_size = 0.3, random\_state = 100)

return X, Y, X\_train, X\_test, y\_train, y\_test

# Function to perform training with giniIndex.

def train\_using\_gini(X\_train, X\_test, y\_train):

# Creating the classifier object

clf\_gini = DecisionTreeClassifier(criterion = "gini",

random\_state = 100,max\_depth=3, min\_samples\_leaf=5)

# Performing training

clf\_gini.fit(X\_train, y\_train)

return clf\_gini

# Function to perform training with entropy.

def tarin\_using\_entropy(X\_train, X\_test, y\_train):

# Decision tree with entropy

clf\_entropy = DecisionTreeClassifier(

criterion = "entropy", random\_state = 100,

max\_depth = 3, min\_samples\_leaf = 5)

# Performing training

clf\_entropy.fit(X\_train, y\_train)

return clf\_entropy

# Function to make predictions

def prediction(X\_test, clf\_object):

# Predicton on test with giniIndex

y\_pred = clf\_object.predict(X\_test)

print("Predicted values:")

print(y\_pred)

return y\_pred

# Function to calculate accuracy

def cal\_accuracy(y\_test, y\_pred):

print("Confusion Matrix: ",

confusion\_matrix(y\_test, y\_pred))

print ("Accuracy : ",

accuracy\_score(y\_test,y\_pred)\*100)

print("Report : ",

classification\_report(y\_test, y\_pred))

# Driver code

def main():

# Building Phase

data = importdata()

X, Y, X\_train, X\_test, y\_train, y\_test = splitdataset(data)

clf\_gini = train\_using\_gini(X\_train, X\_test, y\_train)

clf\_entropy = tarin\_using\_entropy(X\_train, X\_test, y\_train)

# Operational Phase

print("Results Using Gini Index:")

# Prediction using gini

y\_pred\_gini = prediction(X\_test, clf\_gini)

cal\_accuracy(y\_test, y\_pred\_gini)

print("Results Using Entropy:")

# Prediction using entropy

y\_pred\_entropy = prediction(X\_test, clf\_entropy)

cal\_accuracy(y\_test, y\_pred\_entropy)

# Calling main function

if \_\_name\_\_=="\_\_main\_\_":

main()

output:

