Ahsanullah University of Science and Technology

Department of Computer Science & Engineering

Course No.	CSE 4108
Course Name	Artificial Intelligence Lab
Assignment No.	02

Submitted To:

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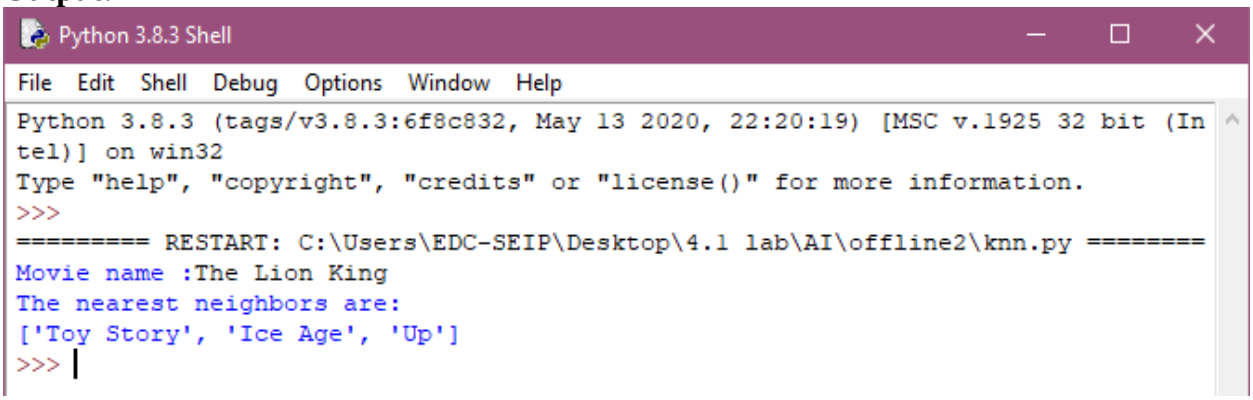
k-Nearest Neighbor Classifier:

Python code:

```
movielist = [
                    ('Up',2009,8.2,96),
                    ('Rio',2011,6.9,96),
                    ('Toy Story',1995,8.3,81),
                    ('The Lion King',1994,8.5,88),
                    ('Ice Age',2002,7.5,81)
                ]

X=str(input("Movie name :"))

i,j=0,0
templ,s=0,0
k=1

distancelist = {}


for i in range(5):
    if(movielist[i][0] == X):
        break

for j in range(5):
    if( j != i ):
        s = 0
        for k in range(4):
           if(k != 0 ):
               s = s + pow((movielist[i][k] - movielist[j][k]),2)
        templ = pow(s,1/2)
        distancelist[movielist[j][0]] = [templ]


templist = sorted(distancelist.items(), key=lambda x:x[1])
sortdict = dict(templist)

print('The nearest neighbors are:')

print(list(sortdict.keys())[:3])
```

Output:



k-Means Clustering:

Python code:

```
pointlist = [('Medicine A',1,1),('Medicine B',2,1),('Medicine C',4,3),('Medicine D',5,4)]

centroid1 = [1,1]
centroid2 = [2,1]
i,j,k,l,m,n=0,0,0,0,0,0
temp1,temp2=0,0
distance2 = []
distance1 = []
cluster = []
tempcluster = []

while(1):

    for i in range(4):
        temp1 = pow( (pow((pointlist[i][1] - centroid1[0]),2) + pow((pointlist[i][2] - centroid1[1]),2)) , 1/2 )
        temp2 = pow( (pow((pointlist[i][1] - centroid2[0]),2) + pow((pointlist[i][2] - centroid2[1]),2)) , 1/2 )
        distance1.append(temp1)
        distance2.append(temp2)

    cluster.clear()
    for j in range(4):
        if(distance1[j]<distance2[j]):
            cluster.append(1)
        if(distance2[j]<distance1[j]):
            cluster.append(2)

    if( tempcluster == cluster ):
        break
```

```
    if( tempcluster != cluster ):
        centroid1.clear()
        centroid2.clear()
        distance1.clear()
        distance2.clear()
        x1,y1,x2,y2 = 0,0,0,0
        cnt1,cnt2 = 0,0

        for k in range(4):
            if ( cluster[k] == 1 ):
                x1 += pointlist[k][1]
                y1 += pointlist[k][2]
                cnt1 = cnt1+1
            if ( cluster[k] == 2 ):
                x2 += pointlist[k][1]
                y2 += pointlist[k][2]
                cnt2 = cnt2 + 1
        centroid1.append(x1/cnt1)
        centroid1.append(y1/cnt1)
        centroid2.append(x2/cnt2)
        centroid2.append(y2/cnt2)
        tempcluster.clear()
        tempcluster = cluster.copy()

print('Group 1:')
for l in range(4):
    if(cluster[l] == 1):
        print(pointlist[l][0])
print('Group 2:')
for l in range(4):
    if(cluster[l] == 2):
        print(pointlist[l][0])
```

Output: