ISM MP, Informatique
Année 2024/2025

Corrigé du TP Informatique 15

Exercice 1

1. On saisit :

```
def majo(L):
    memo={}
    for x in L:
        if x in memo:
            memo[x]+=1
        else:
            memo[x]=1
    M=L[0]
    for x in memo:
        if memo[x]>memo[M]:
            M=x
    return M
```

2. On saisit :

```
def knn(k,X,A):
    res=[]
    C=len(A)
    for c in range(C):
        A_c=A[c]
        for X_i in A_c:
            res.append([c,alg.norm(X-X_i)])
    res=sorted(res,key=lambda u:u[1])
    return majo([x[0] for x in res[:k]])
```

3. On saisit :

```
confusion=[[0]*C for k in range(C)]
for i in range(C):
    for pt in pop_1[i]:
        classe=knn(5,pt,pop_0)
        confusion[i][classe]+=1
```

4. On observe :

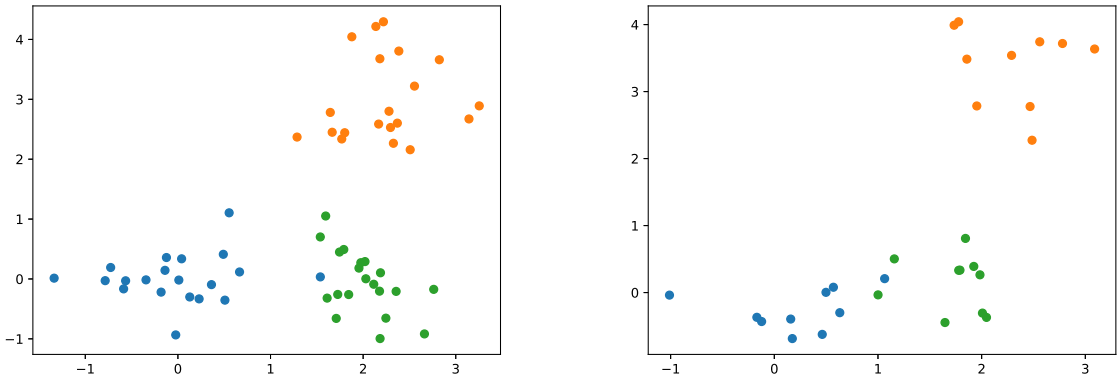

FIGURE 1 – Base d'apprentissage et base de test

On obtient comme matrice de confusion :

```
[[10  0  0]
 [ 0 10  0]
 [ 1  0  9]]
```

Il y a une seule erreur de classification.

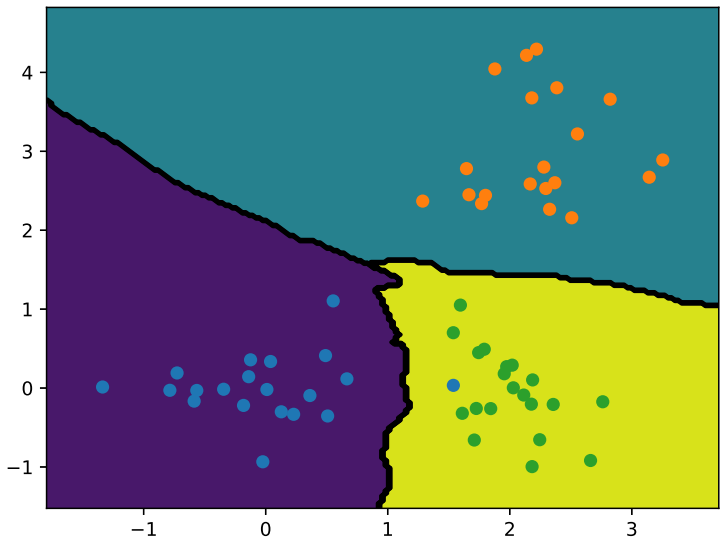

FIGURE 2 – Zones délimitées par les k plus proches voisins

Exercice 2

1. Voir exercice précédent.

2. On saisit :

```
k=11
t_mean_reco=[]
tn=[50,100,200,500,1000,2000,4000,5000]
for n in tn:
    t_knn=[]
    # de la redondance ici!
    A=[[] for i in range(10)]
    for i in range(n):
        A[labelarray[i]].append(imagearray[i])
    for i in range(100):
        X=imagearray[-i]
        aux_knn=knn(k,X,A)
        t_knn.append(aux_knn==labelarray[-i])
    t_mean_reco.append(np.mean(t_knn))

plt.plot(tn,t_mean_reco)
plt.xlabel("Taille de la base d'apprentissage")
plt.ylabel("Taux de reconnaissance")
plt.show()
```

On observe :

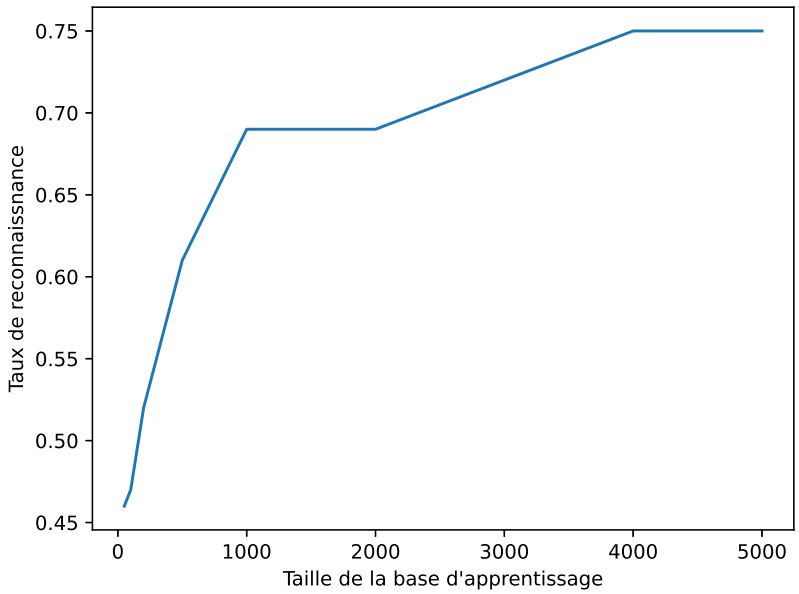

FIGURE 3 – Taux de reconnaissance en fonction de la taille d'apprentissage