Machine Learning I

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Nearest Neighbor

```
import numpy as np
from sklearn import datasets
from sklearn.neighbors import KNeighborsClassifier
iris = datasets.load_iris()
X, Y = iris.data, iris.target
np.random.seed(0)
indices = np.random.permutation(len(X))
X_train, Y_train = X[indices[:-10]], Y[indices[:-10]]
X_test, Y_test = X[indices[-10:]], Y[indices[-10:]]
knn = KNeighborsClassifier()
knn.fit(X_train, Y_train)
result = knn.predict(X_test)
print(result,Y_test)
```

Malédiction de la dimension

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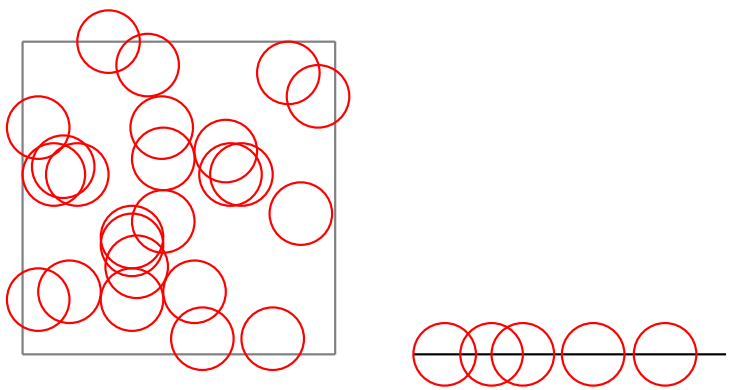
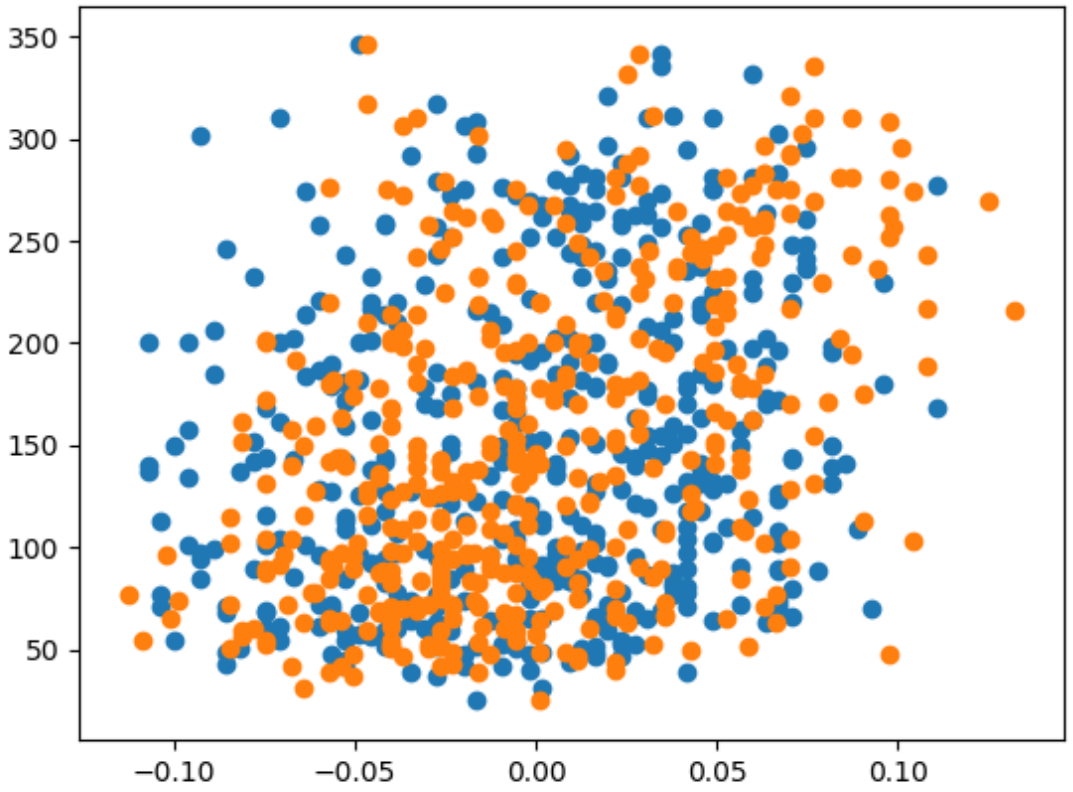
Donc le nombre de boules nécessaires pour couvrir croît exponentiellement avec la dimension (le nombre de variables).



Régression linéaire

```
from sklearn import linear_model, datasets
import matplotlib.pyplot as plt
import numpy as np
dbt = datasets.load_diabetes()
X_train,X_test=dbt.data[:-20],dbt.data[-20:]
Y_train,Y_test=dbt.target[:-20],dbt.target[-20:]
regr = linear_model.LinearRegression()
regr.fit(X_train, Y_train)
print(regr.coef_)
print(np.mean((regr.predict(X_test)-Y_test)**2))
print(regr.score(X_test, Y_test))
plt.scatter(dbt.data[:,0],dbt.target)
plt.scatter(dbt.data[:,3],dbt.target)
plt.show()
```

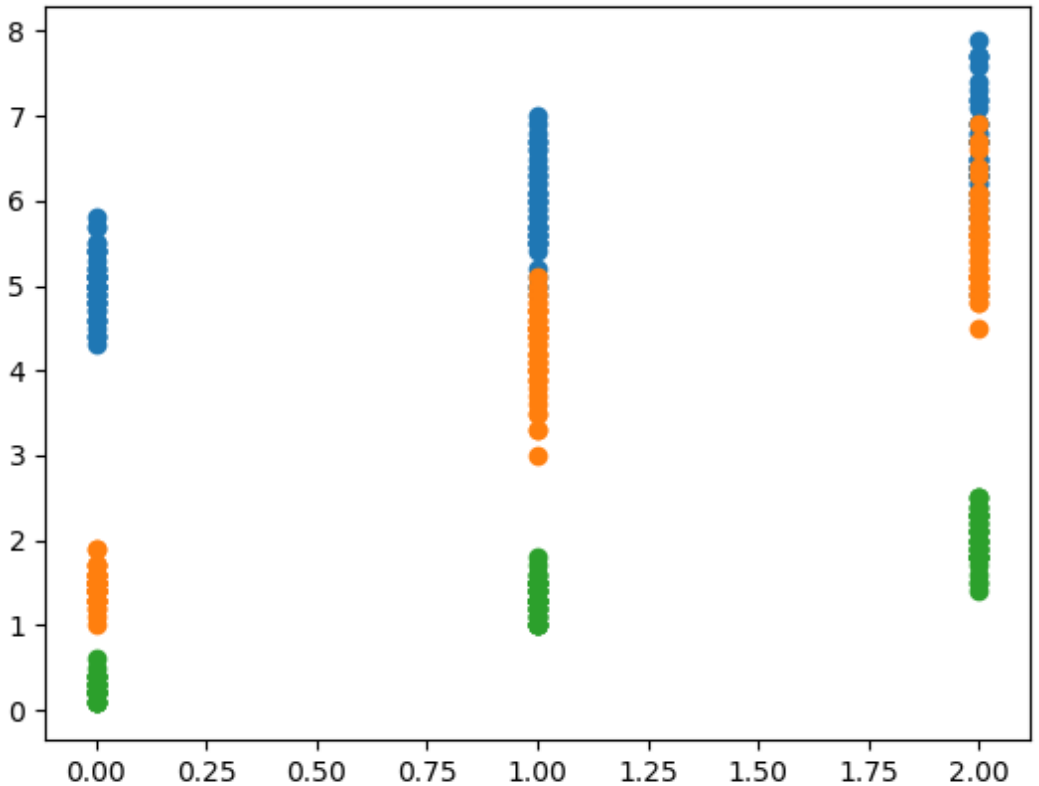
Régression linéaire



Régression logistique

```
from sklearn import linear_model, datasets
import matplotlib.pyplot as plt
import numpy as np
iris = datasets.load_iris()
X, Y = iris.data, iris.target
logistic = linear_model.LogisticRegression(C=1e5)
logistic.fit(X, Y)
print(logistic.coef_)
print(logistic.score(X, Y))
plt.scatter(Y,X[:,0])
plt.scatter(Y,X[:,2])
plt.scatter(Y,X[:,3])
plt.show()
```

Régression logistique



SVM

```
from sklearn import svm, datasets
import numpy as np
iris = datasets.load_iris()
X, Y = iris.data, iris.target
np.random.seed(55)
indices = np.random.permutation(len(X))
X_train, Y_train = X[indices[:-70]], Y[indices[:-70]]
X_test, Y_test = X[indices[-70:]], Y[indices[-70:]]
svc,svc2=svm.SVC(kernel='linear'),svm.SVC(kernel='rbf')
svc.fit(X_train, Y_train)
svc2.fit(X_train, Y_train)
results=(svc.predict(X_test),svc2.predict(X_test))
print(results[0]-Y_test,"\n",results[1]-Y_test)
```

SVM

```
Python 3.6.4 (v3.6.4:d48eceb, Dec 19 2017, 06:54:40) on Windows (64 bits).
This is the Pyzo interpreter with integrated event loop for TK.
Type 'help' for help, type '?' for a list of *magic* commands.

>>> (executing file "sklearn4-svm.py")
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]

>>>
```