Carbon

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2.Clustering

1. Load data

```
#load module data
import data
#create a dataset object and read data from file sample.txt
sample = data.DataSet()
#To read nominal data, you have to add argument ‘nominal’,
default is ‘numeric’
#Read data from ‘sample.txt’
sample.read('sample.txt', 'numeric')
#create train dataset and test dataset using 1:10 hold out
train,test = data.holdOut(sample,0.1)
```

2. kMeans

A kMeans algorithm which also support bi-kMeans.

The algorithm only works for: numerical data

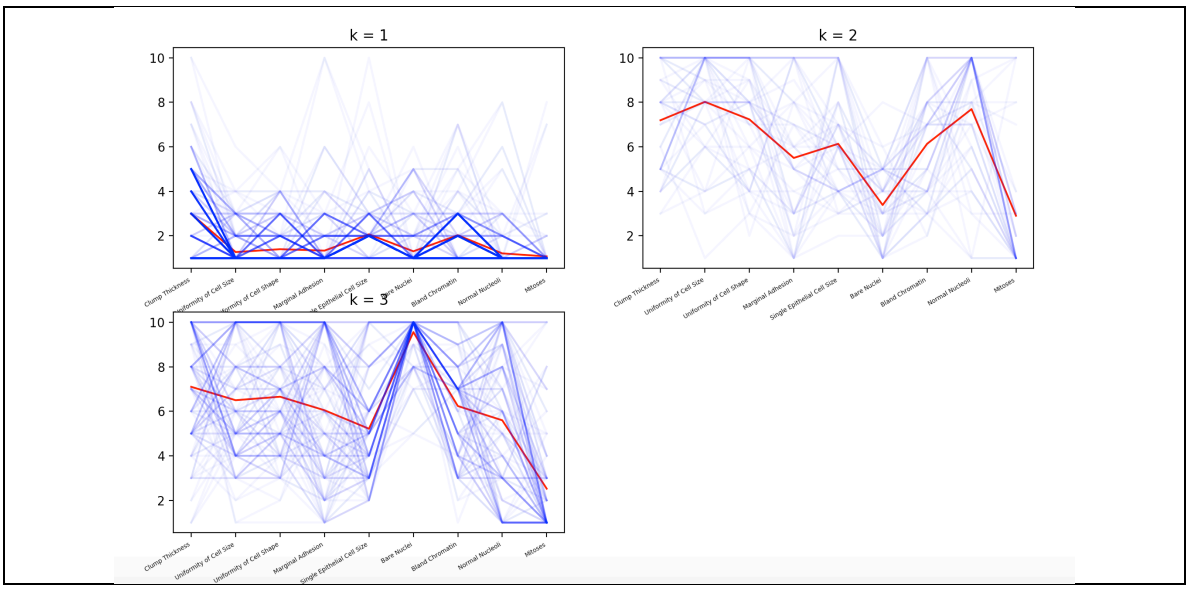
Parameters:

k: int from 1 to inf

dist: ‘euclidean’

method: ‘KMeans’, ‘biKMeans’

```
#load kMeans module
from clustering import kMeans
#create an instance with k=3, euclidean distance, KMeans
instance = kMeans.build(k=3, dist='euclidean', method='KMeans')
#train the classifier with train data and k=4
centroids,clusters = instance.cluster(train.x)
#centroids contains the centers of each cluster
centroids
matrix([[ 7.25555556,  4.87777778,  5.12222222,  4.9       ,
4.02222222, 9.04444444,  5.27777778,  3.75555556,  1.7       ],
        [ 2.96933962,  1.26650943,  1.4009434 ,  1.31603774,
2.0754717 , 1.29009434,  2.02830189,  1.22169811,  1.07075472],
        [ 7.04310345,  8.40517241,  8.05172414,  6.72413793,  6.5
, 7.17241379,  6.89655172,  7.88793103,  3.3362069 ]])
#clusters contains the cluster labels and distances from the
centers
clusters
matrix([[   1.        ,    5.85476927],
        [   1.        ,    6.9962787 ],
        [   2.        ,  125.31599287],
        ...,
        [   2.        ,   49.50564804],
        [   2.        ,   62.02288942],
        [   2.        ,   53.57461356]])
#to view the clusters
kMeans.view(train, centroids, clusters)
```



3. hierarchical

A hierarchical algorithm supports ward method.

The algorithm only works for: numerical data

Parameters:

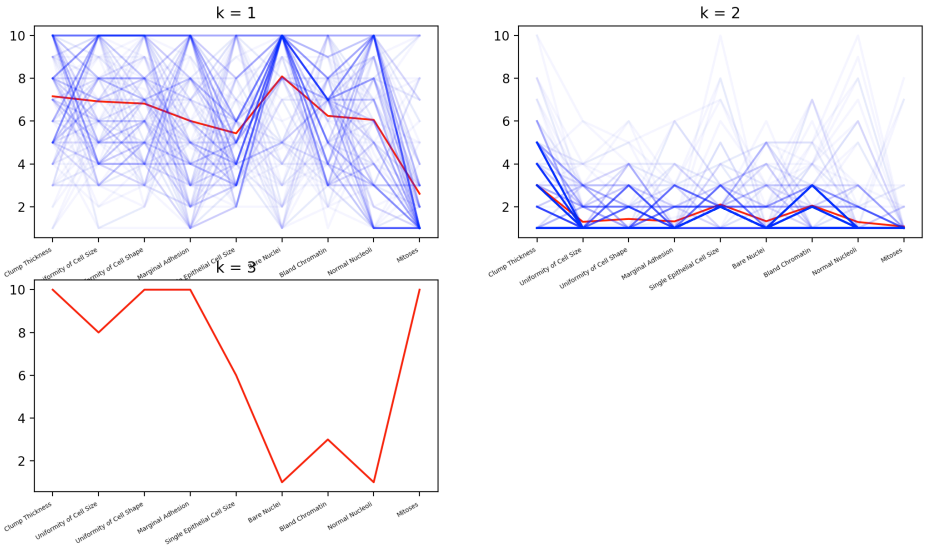
k: +int

dist: ‘euclidean’

method: ‘ward’, ‘clink’

```
#load hierarchical module
from clustering import hierarchical
#create an instance with k=3, euclidean distance, hierarchical
instance = hierarchical.build(k=3, dist='euclidean',
method='ward')
#train the classifier with train data and k=3
centroids,clusters = instance.cluster(train.x)
#centroids contains the centers of each cluster
centroids
matrix([[  7.16      ,   6.92      ,   6.8175    ,   6.00875   ,
           5.42875   ,   8.08875   ,   6.245     ,   6.0575    ,
2.605     ],
        [  3.00225816,   1.29173951,   1.42693765,   1.31155303,
           2.10278263,   1.32000291,   2.05150058,   1.28256119,
           1.07473776],
        [ 10.        ,   8.        ,  10.        ,  10.        ,
           6.        ,   1.        ,   3.        ,   1.        ,
10.        ]])
#clusters contains the cluster labels
clusters
array([ 1.,  1.,  0.,  1.,  0.,  1.,  1.,  1.,  1.,  1.,  1.,
1.,  1.,
...
0.,  0.,  1.,  1.,  1.,  1.,  1.,  1.,  1.,  1.,  1.,  0.,  1.,
1.,  1.,  1.,  0.,  0.,  0.])
```

```
#to view the clusters
hierarchical.view(train, centroids, clusters)
```




```
#fast start
import data
sample = data.DataSet()
sample.read('sample.txt')
train,test = data.holdOut(sample,0.1)
from imp import reload

reload(hierarchical)
instance = hierarchical.build(k=1,dist='euclidean',method='ward')
old,clusters = instance.cluster(train.x)
new = mean(train.x,0)
```