Assignment 3

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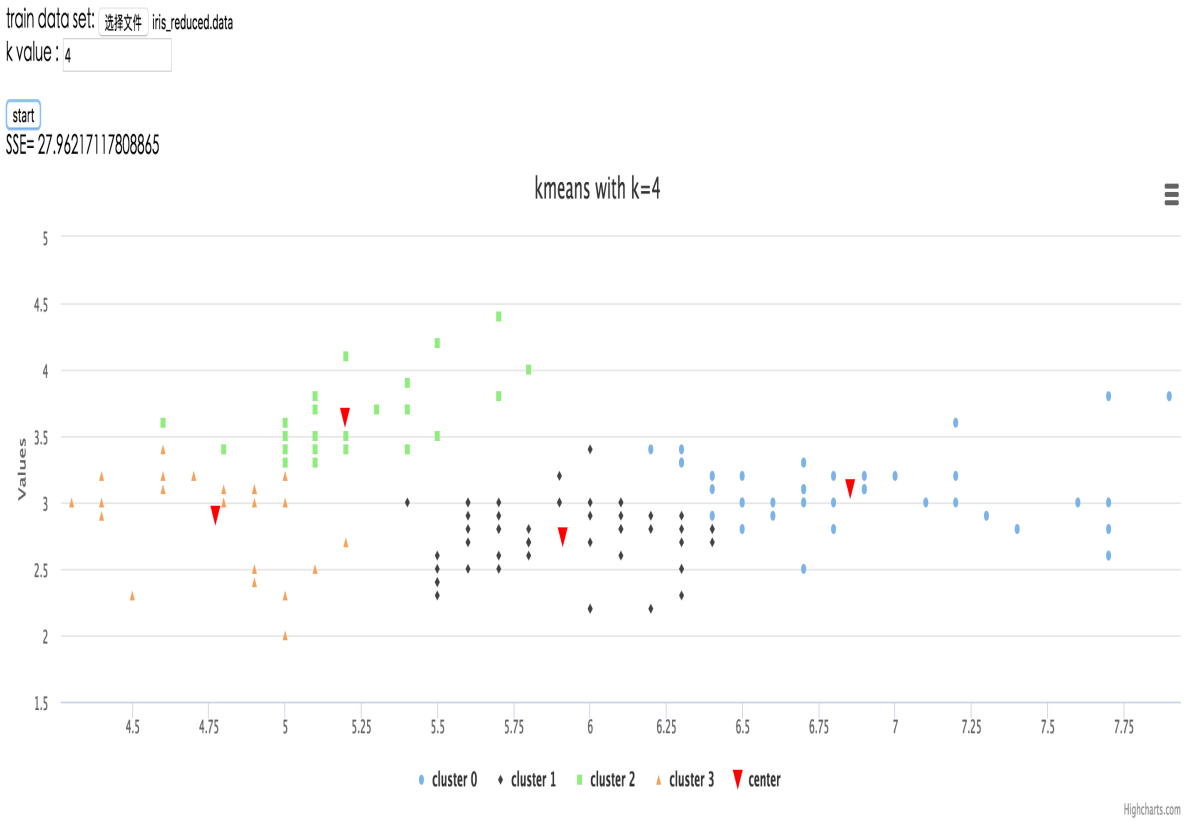
How to Run

1. Open ‘kmeans.html’ with browser
2. Click ‘choose file’ button to choose one of the two datasets (iris_reduced.data and wine_reduced.data)
3. Input the k value (default 4)
4. Click the ‘start’ button
5. The result will show as the following picture.



Data Sets

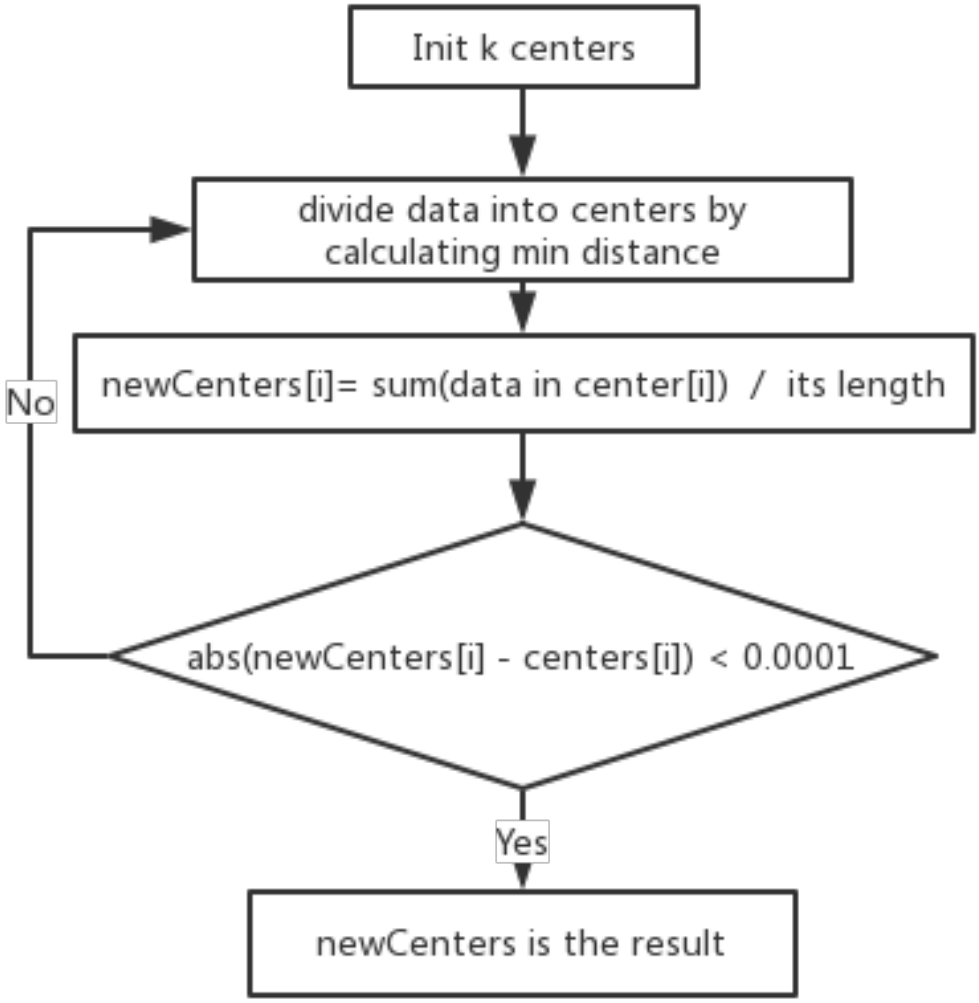
1. Name: Iris Data Set
   Attribute:
   a) sepal length in cm.
   b) sepal width in cm.
   c) petal length in cm.
   d) petal width in cm
   e) class
2. Name: Wine Data Set
   Attribute:
   a) Alcohol
   b) Malic acid
   c) Ash
   d) Alcalinity of ash
   e) Magnesium
   f) Total phenols
   g) Flavanoids
   h) Nonflavanoid phenols
   i) Proanthocyanins
   j) Color intensity
   k) Hue
   l) OD280/OD315 of diluted wines
   m) Proline

Data Preprocessing

To show the results on two dimensions, I choose two of the attributes each data set.

I choose ‘sepal length in cm’ and ‘sepal width in cm’ in Iris Data Set; choose ‘Malic acid’ and ‘Ash’ in Wine Data Set.

Design of the Program



(Picture is drawn on processon and its url: https://www.processon.com/view/link/58538b35e4b097c6e69c1f0a)

1.Choose first k points as the center

2. For data[i], if data[i] is nearest to center[j], then data[i] belongs to center[j]
3. Calculate new center[j] = sum of data in center[j] / its length
4. If change of old and new center is large than 0.0001, repeat step 2 and 3

Result

Result will be shown on the web, when you put your mouse on one point, it will show the coordinate. You can see how well the result is directly.

I also show the SSE of the result, you can change the k value to adjust the SSE.

Limitations and improvements

The first k points are chosen as the initial centers. To improve it, I should use different initial centers and choose the best ones whose SSE of result is minimal.

Files

1. iris_reduced.data: dataset after Data Preprocessing
2. wine_reduced.data: dataset after Data Preprocessing
3. kmeans.html: user interface of the program
4. kmeans.js: kernel of the program
5. origin_data: origin dataset
6. lib: library of high-charts which is used to draw picture

7. reports.pdf: reports