

系统工程导论第七章作业

何舜成

2015 年 5 月 25 日

1 计算结果

选择k=2，最终可得如下分类结果：（五角星为每一类的中心点）

其中计算过程迭代8次，用时1.0486s

选择k=3:

计算过程迭代5次，用时0.7576s

选择k=4:

计算过程迭代12次，用时1.8084s

选择k=5:

计算过程迭代16次，用时2.4336s

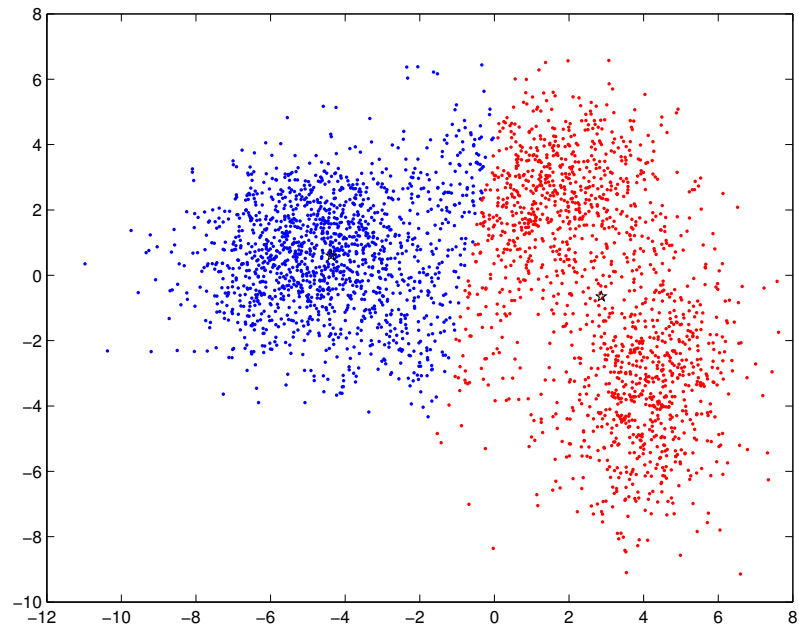
选择k=3:

计算过程迭代65次，用时9.6139s

2 具体实现

Matlab代码（.m文件）如下所示：

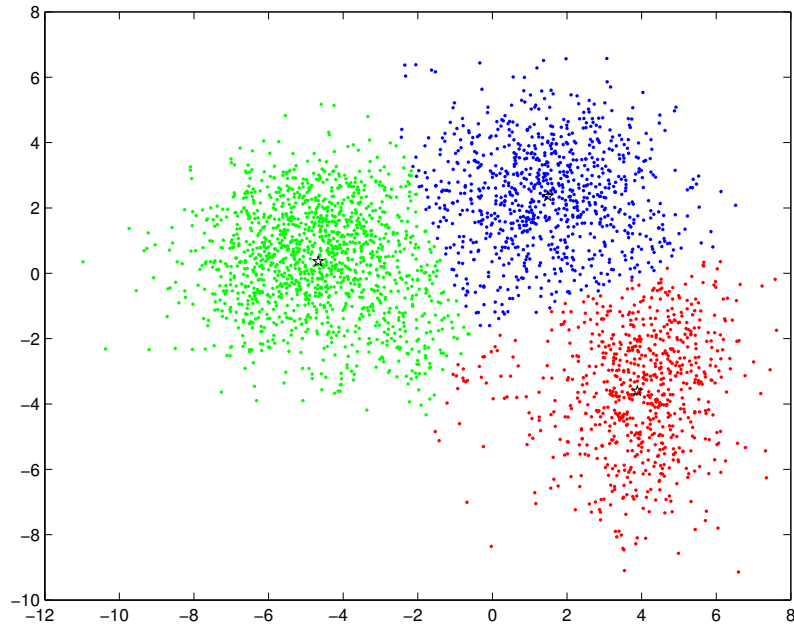
```
1 function label=kmeans_clustering(data,num)
2 k = num;
3 dsize = size(data);
4 N = dsize(1);
5 m = dsize(2);
6 center = data(N-k+1:N,:);
7 rho = inf;
8 label = zeros(N,1);
```



```

9  iter = 0;
10 while(0 < 1)
11     newrho = 0;
12     for p=1:N
13         dist = inf;
14         label(p) = 0;
15         for q=1:k
16             if norm(center(q,:)-data(p,:)) < dist
17                 dist = norm(center(q,:)-data(p,:));
18                 label(p) = q;
19             end
20         end
21         newrho = newrho + dot(data(p,:)-center(label(p)
22                               ),:),data(p,:)-center(label(p),:));
23     end
24     if abs(rho-newrho) < 1e-4

```



```

24         break;
25     end
26     rho = newrho;
27     center = zeros(k,m);
28     total = zeros(k,1);
29     for p=1:N
30         total(label(p)) = total(label(p)) + 1;
31         center(label(p),:) = center(label(p),:) + data
            (p,:);
32     end
33     for q=1:k
34         center(q,:) = center(q,:)/total(q);
35     end
36     iter = iter + 1;
37     fprintf(' iter =%d, rho =%f\n',iter,rho);
38 end

```

