Experiment 7a

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Subject: DWM

Class: TE4

Roll no: 46

Batch: D

Aim: Implementation of Clustering algorithm (K-means/K-medoids) 1 D

1d K-means Clustering

Program:

```java
import java.util.*;

public class D {



  static int count1, count2, count3;

  static int d[];

  static int k[][];

  static int tempk[][];

  static double m[];

  static double diff[];

  static int n, p;

  static int cal_diff (int a)
  {
   for (int i = 0; i < p; ++i)
     {
        if (a > m[i])
          diff[i] = a - m[i];
```

```
            else

                diff[i] = m[i] - a;

       }
     int val = 0;

     double temp = diff[0];

     for (int i = 0; i < p; ++i)

        {

            if (diff[i] < temp)

               {

                  temp = diff[i];

                  val = i;

               }

        }

      return val;

    }

    static void cal_mean ()

    {

      for (int i = 0; i < p; ++i)

         m[i] = 0;

      int cnt = 0;

      for (int i = 0; i < p; ++i)

        {

            cnt = 0;

            for (int j = 0; j < n - 1; ++j)

              {

                 if (k[i][j] != -1)

                    {
```

```java
                m[i] += k[i][j];

                ++cnt;

            }

        }

        m[i] = m[i] / cnt;

    }

}

static int check1 ()

{

  for (int i = 0; i < p; ++i)

    for (int j = 0; j < n; ++j)

      if (tempk[i][j] != k[i][j])

        {

          return 0;

        }

  return 1;

}

public static void main (String args[])

{

  Scanner scr = new Scanner (System.in);

  System.out.print ("\nEnter the number of elements: ");

  n = scr.nextInt ();//Accepting no. of elements

  d = new int[n];//Creation of Object for an integer array

  System.out.println ("Enter " + n + " elements: ");

  for (int i = 0; i < n; ++i)

    d[i] = scr.nextInt ();

  System.out.print ("\nEnter the number of clusters: ");
```

```
p = scr.nextInt ();//Accepting the number of clusters
k = new int[p][n];//Creation of an object for integer matrix
tempk = new int[p][n];//Creation of object for integer matrix
m = new double[p];//Creation of object for double array
diff = new double[p];//Creation of object for double array
for (int i = 0; i < p; ++i)
  m[i] = d[i];
int temp = 0;
int flag = 0;
do
 {
    for (int i = 0; i < p; ++i)
     for (int j = 0; j < n; ++j)
       {
         k[i][j] = -1;
       }
    for (int i = 0; i < n; ++i)
     {
       temp = cal_diff (d[i]);
        if (temp == 0)
         k[temp][count1++] = d[i];
        else if (temp == 1)
         k[temp][count2++] = d[i];
        else if (temp == 2)
         k[temp][count3++] = d[i];
       }
    cal_mean ();//Calling cal_mean ()
```

```java
flag = check1 ();
if (flag != 1)
  for (int i = 0; i < p; ++i)
    for (int j = 0; j < n; ++j)
      tempk[i][j] = k[i][j];
System.out.println ("\n\nAt this step");
System.out.println ("\nValue of clusters");
for (int i = 0; i < p; ++i)
  {
    System.out.print ("K" + (i + 1) + "{ ");
    for (int j = 0; k[i][j] != -1 && j < n - 1; ++j)
      System.out.print (k[i][j] + " ");
    System.out.println ("}");
  }
System.out.println ("\nValue of m ");
for (int i = 0; i < p; ++i)
  System.out.print ("m" + (i + 1) + "=" + m[i] + " ");
count1 = 0;
count2 = 0;
count3 = 0;
}
while (flag == 0);
System.out.println ("\n\n\nThe Final Clusters By Kmeans are as follows: ");
for (int i = 0; i < p; ++i)
  {
    System.out.print ("K" + (i + 1) + "{ ");
    for (int j = 0; k[i][j] != -1 && j < n - 1; ++j)
```

```
        System.out.print (k[i][j] + " ");
      System.out.println ("}");
    }
  }
}
```

Output:

Enter the number of elements: 9

Enter 9 elements:

1

2

6

7

8

10

15

17

20

Enter the number of clusters: 3

At this step

Value of clusters

K1{ 1 }

K2{ 2 }

K3{ 6 7 8 10 15 17 20 }

Value of m
m1=1.0 m2=2.0 m3=11.857142857142858

At this step

Value of clusters
K1{ 1 }
K2{ 2 6 }
K3{ 7 8 10 15 17 20 }

Value of m
m1=1.0 m2=4.0 m3=12.833333333333334

At this step

Value of clusters
K1{ 1 2 }
K2{ 6 7 8 }
K3{ 10 15 17 20 }

Value of m
m1=1.5 m2=7.0 m3=15.5

At this step

Value of clusters

K1{ 1 2 }

K2{ 6 7 8 10 }

K3{ 15 17 20 }

Value of m

m1=1.5 m2=7.75 m3=17.333333333333332

At this step

Value of clusters

K1{ 1 2 }

K2{ 6 7 8 10 }

K3{ 15 17 20 }

Value of m

m1=1.5 m2=7.75 m3=17.333333333333332

The Final Clusters By Kmeans are as follows:

K1{ 1 2 }

K2{ 6 7 8 10 }

K3{ 15 17 20 }