YAK-Mean
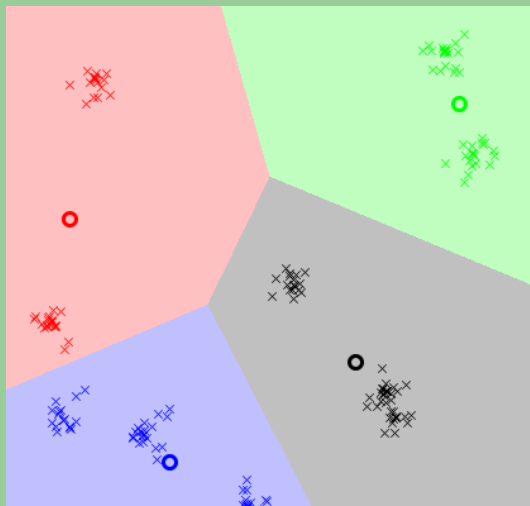## Yet Another K-Mean Visualization

Max Nagl

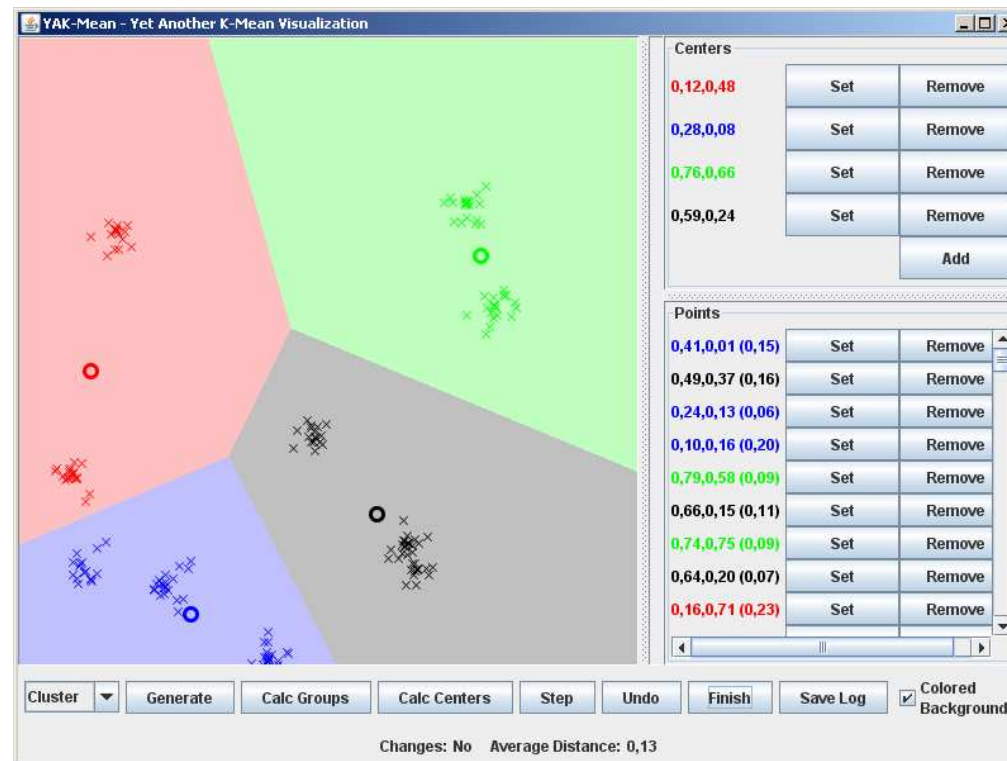## What is YAK-Mean

- YAK-Mean is application to illustrate the K-Means Algorithm
- It is completely written in Java
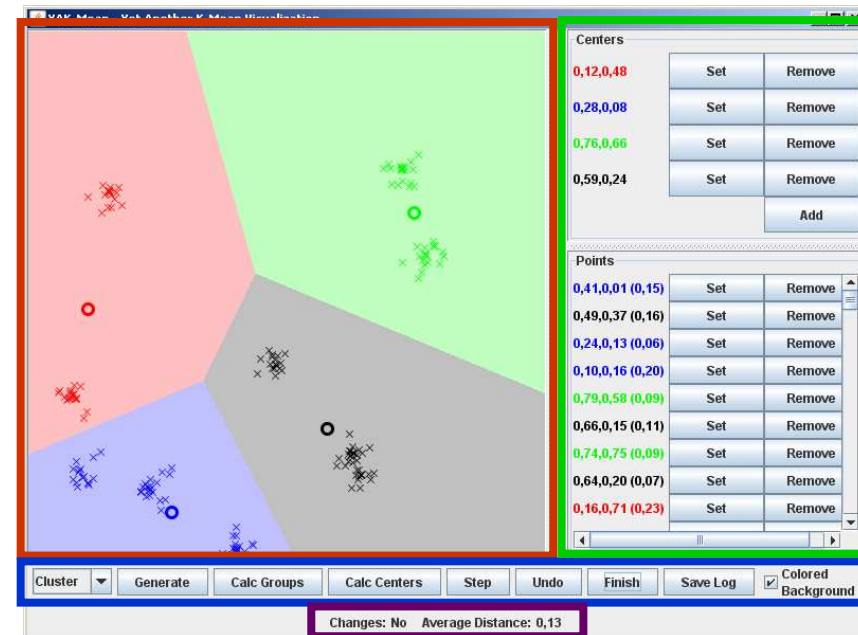- It was designed and implemented by Max Nagl
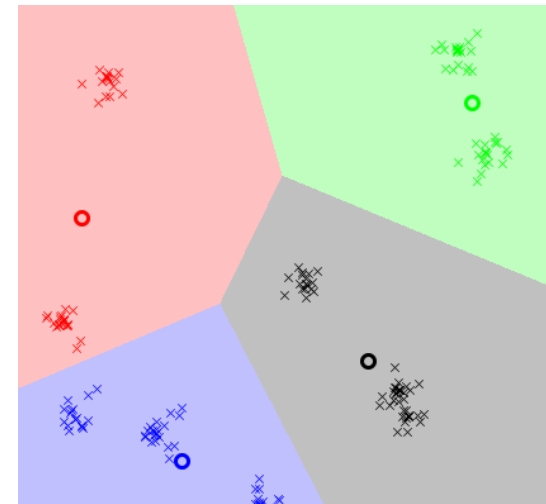
YAK-Means

The Interface

The Interface

- The Interface is subdivided into four main parts:
  - the Visualization
  - the Controls
  - the List of Centers and Buttons
  - the Status bar

The Visualization

- The Visualization shows the centers and data points with their group

- Centers are represented by a circle

- Points are represented by an X

- The color of the circles an the Xs represent their group

- If the function „Colored Background" is activated the background color also shows the closest center

The Controls

- The Application has several main functions:
  - generate random points or load points from a file
  - calculate new groups and centers
  - finish the calculations
  - undo the last step
  - save the log file
  - switch between white and colored background

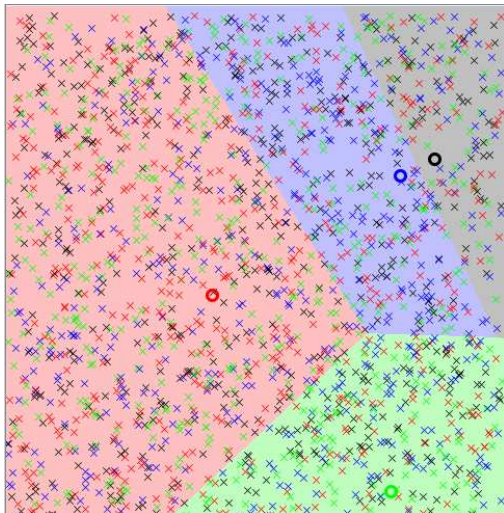| Cluster ▼ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ☑ Colored Background |

Generate Random Points

- YAK-Means has three methods for creating random points
    - completely random points
    - random points in clusters
    - random points in a circle
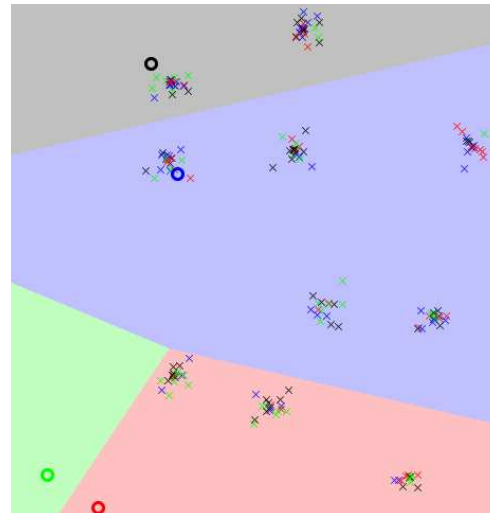- The method can be chosen with the combobox on the left side of the controls
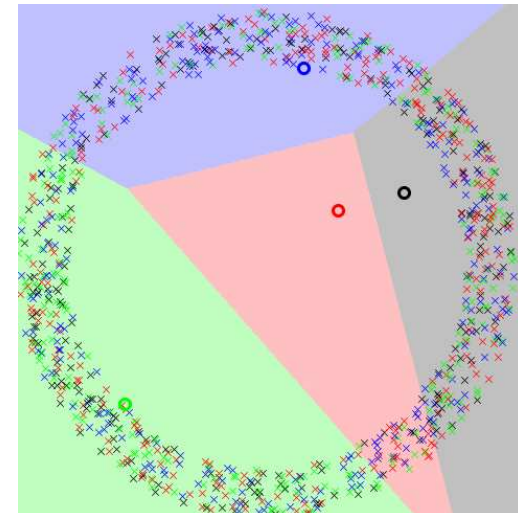
| Cluster ▼ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ☑ Colored Background |

YAK-Means

Generate Random Points

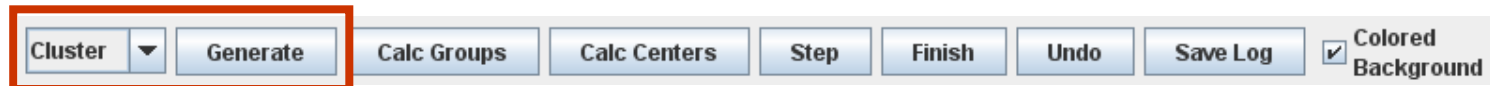Random   Clusters   Circle

| Cluster ▾ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ☑ Colored Background |

Load Points From A CSV File

- in YAK-Means you can load points from a CSV File
- Select "CSV" in the combobox and press "Generate"

| Cluster ▼ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ✔ Colored Background |

The CSV-Format

- In the CSV-file every line represents one point
- The first number represents the x-coordinate, the second the y-coordinate
- The third number is optional and represents the group of the point. If it is missing the point will be assigned to a random group
- The numbers are separated with a comma
- Examples:
  - `2, 7, 1`
  - `3, 6`
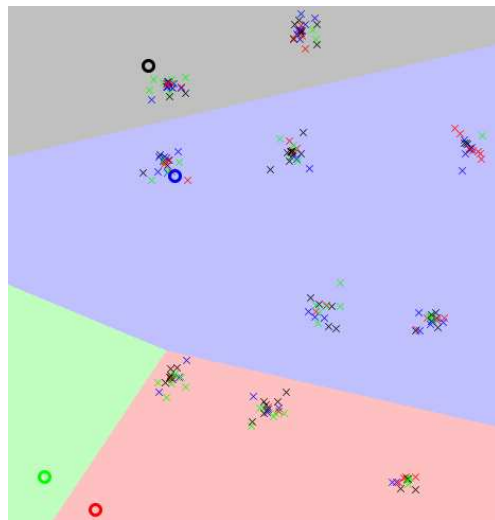
Calculate New Groups

- When you press the button „Calc Groups" for every point the group is calculated according to the closet center

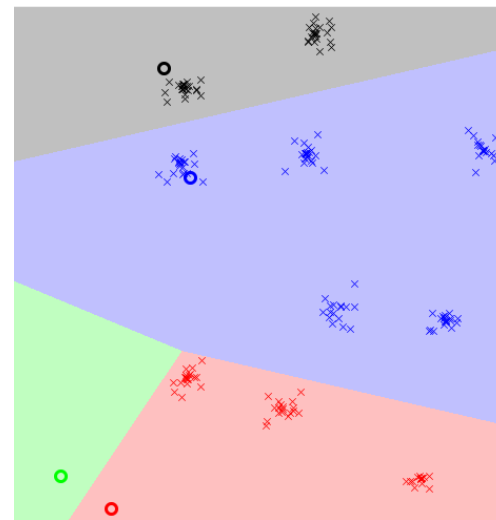- In the visualization the point changes its color

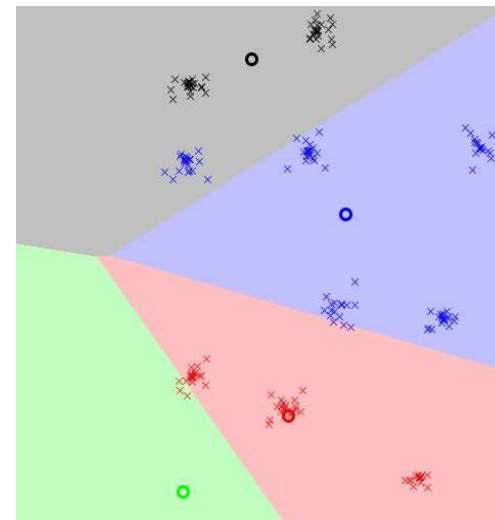| Cluster ▼ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ☑ Colored Background |

YAK-Means

Calculate New Groups

Before

After

Calculate New Centers

- When you press the button „Calc Centers" the centers are new calculated

Before | After

Cluster ▾ | Generate | Calc Groups | **Calc Centers** | Step | Finish | Undo | Save Log | ☑ Colored Background
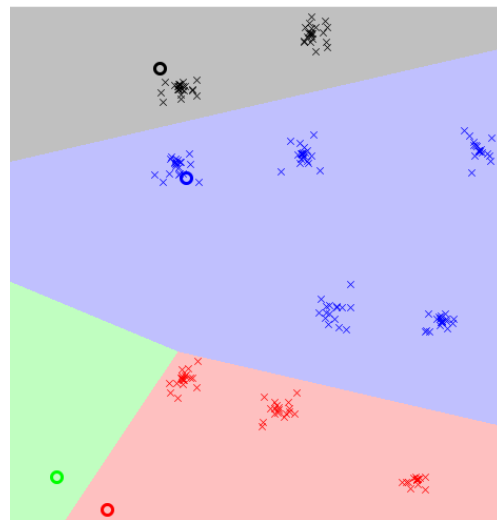
Calculate One Step And Finish

- When you press the button „Step" then at first new centers are calculated and then new groups are calculated

- The button finish repeats this steps until the centers won't change any more

| Cluster ▼ | Generate | Calc Groups | Calc Centers | Step | Finish | Undo | Save Log | ☑ Colored Background |

Undo And Save the Log

- The button "Undo" undoes the last action
- The button „Save Log" saves a log of all actions to a text file
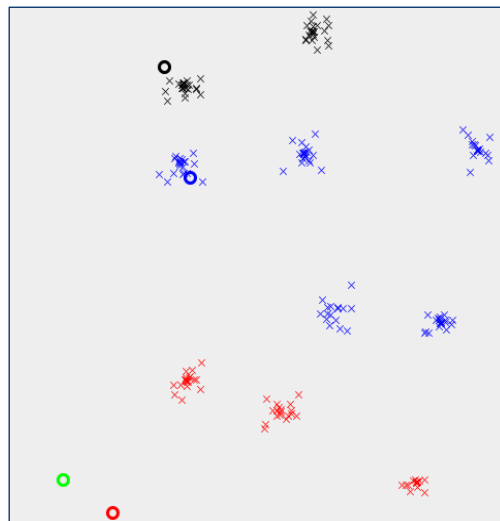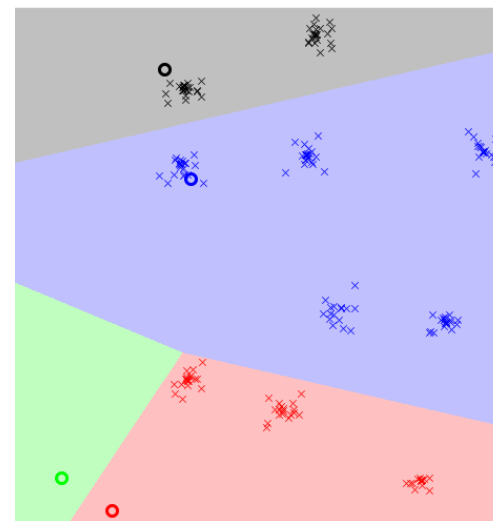
Colored Background

- If the function „Colored Background" is activated the background color also shows the closest center
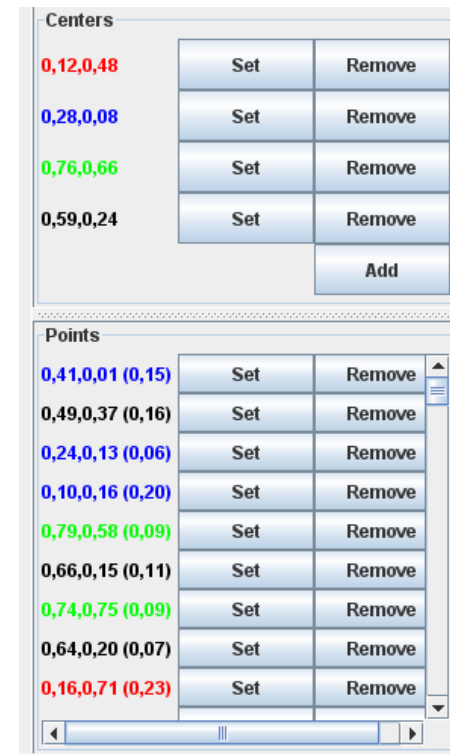
white background   colored background

YAK-Means

The List Of Centers And Points

- On the right side of the application you can see a list of centers and points with their coordinates

- Next so every entry you can see two buttons:

    – delete: deletes the center or the point
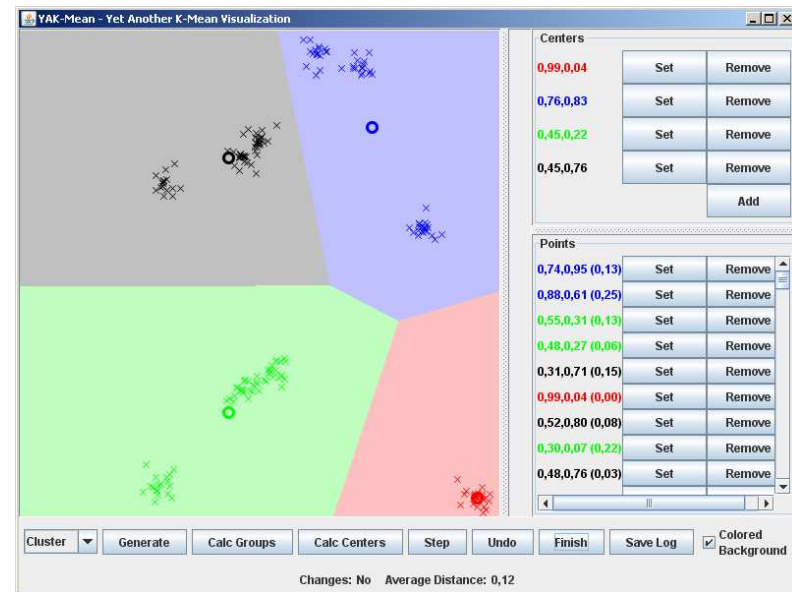
    – set: changes the position

The Status Bar

- The Status bar can be found at the bottom of the window

- This Status bar shows information:
  - did a center change it's position during the last calculation of the centers
  - the average distance between a point and the center. This information is refreshed every time the groups are calculated
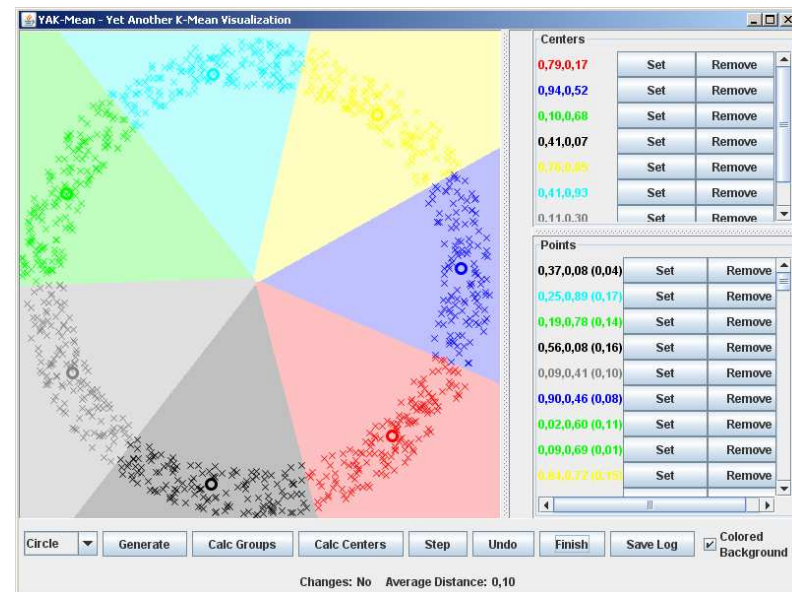
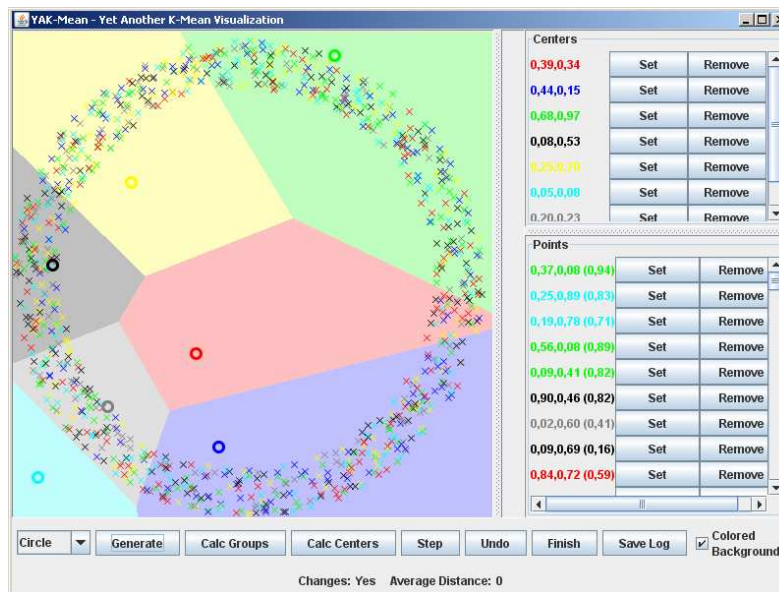Changes: No   Average Distance: 0,13
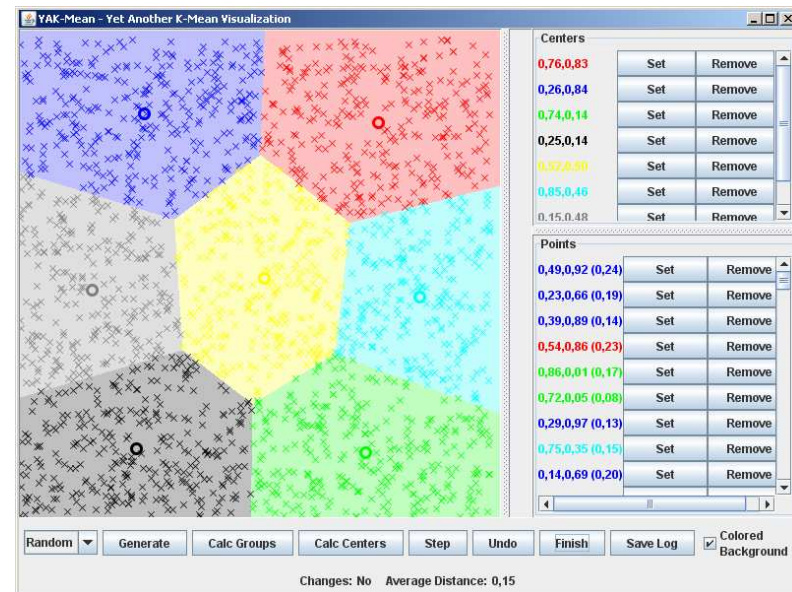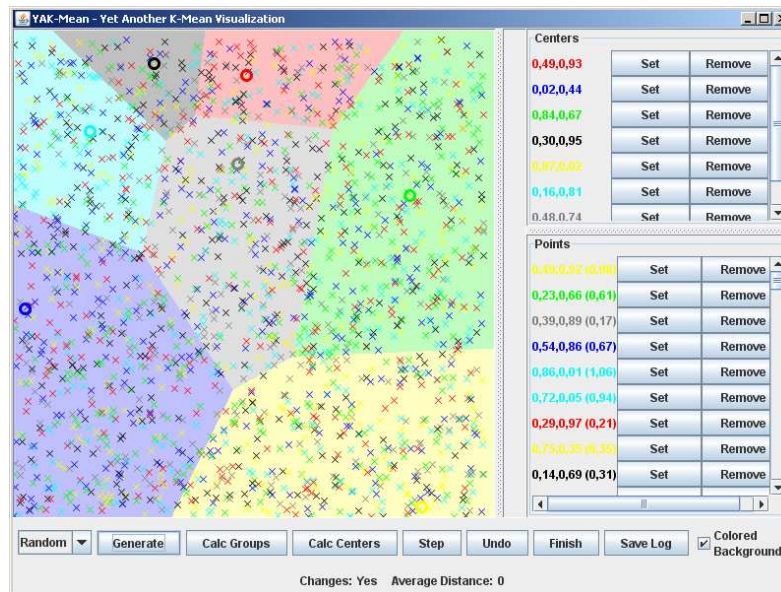
YAK-Means

Screenshots

YAK-Means

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