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FACULTY OF EGINEERING

Digital Image Processing
LECTURE-40

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OUTLINE

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Some Clustering Methods

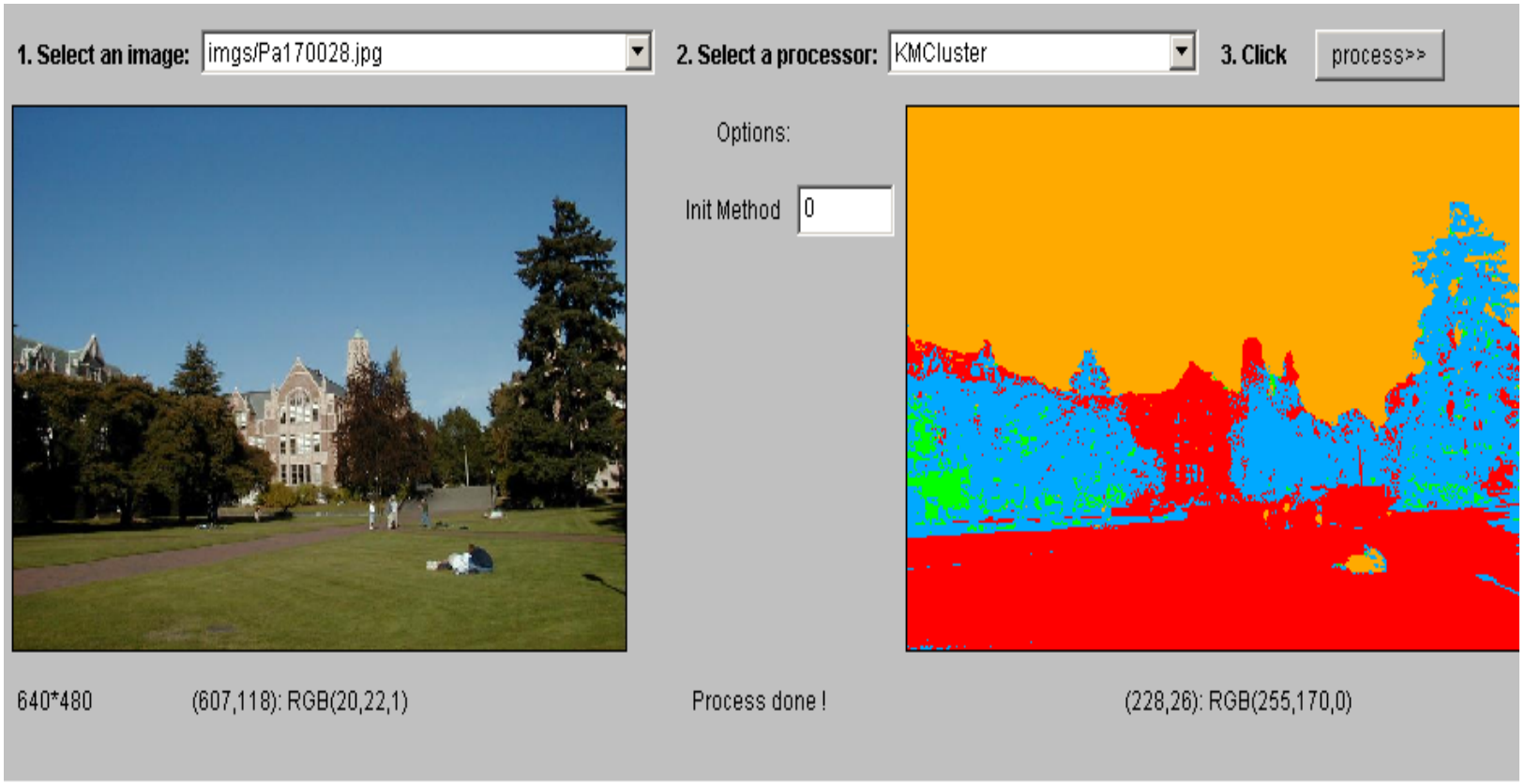
•K-means Clustering and Variants

• Isodata Clustering

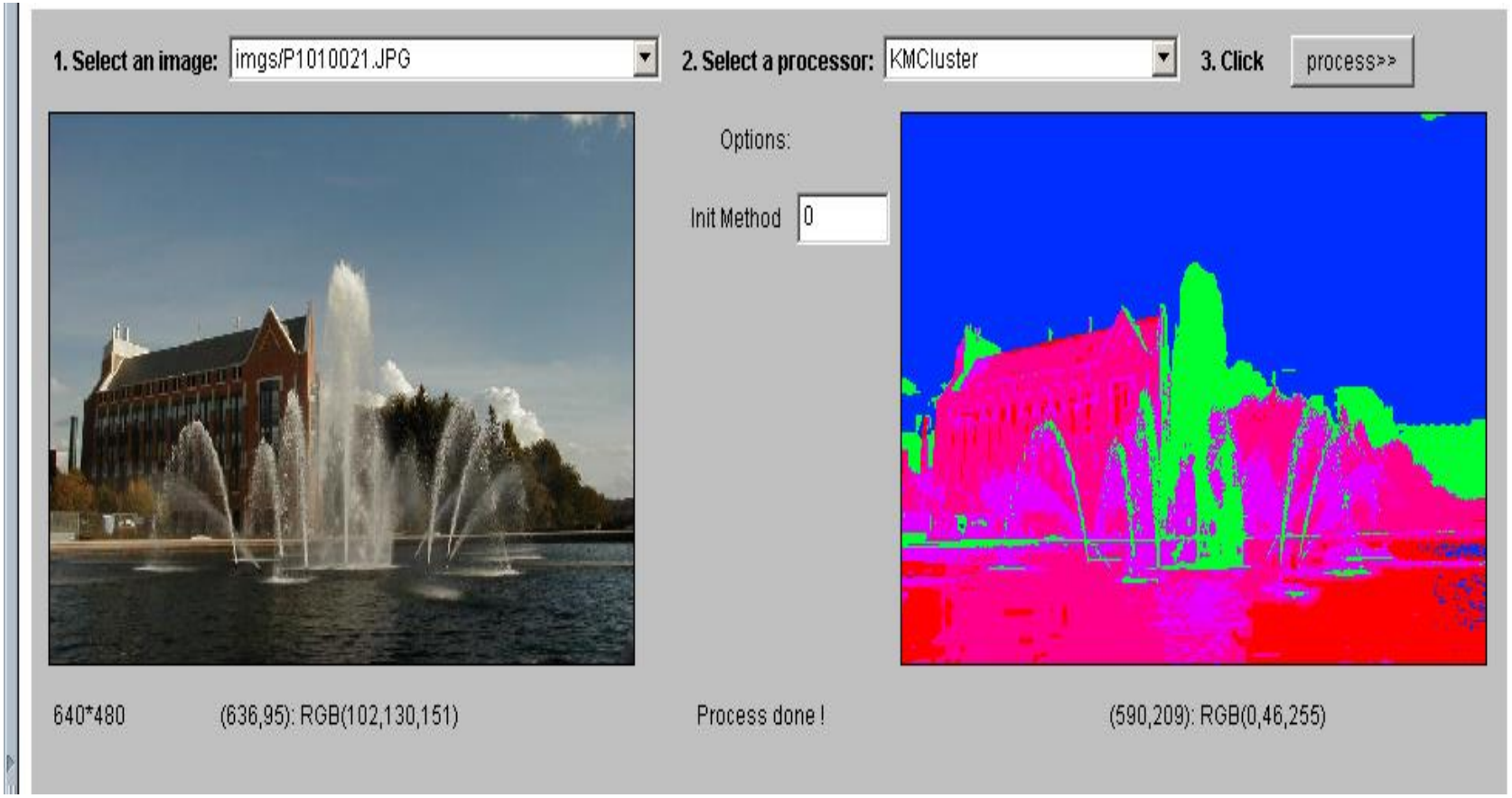
• Histogram-Based Clustering and Recursive Variant

• Graph-Theoretic Clustering

K-Means Example 1



K-Means Example 2



Meng-Hee Heng's K-means Variant

1. Pick 2 points Y and Z that are furthest apart in the measurement space and make them initial cluster means.

2. Assign all points to the cluster whose mean they are closest to and recompute means.

3. Let d be the max distance from each point to its cluster mean and let X be the point with this distance.

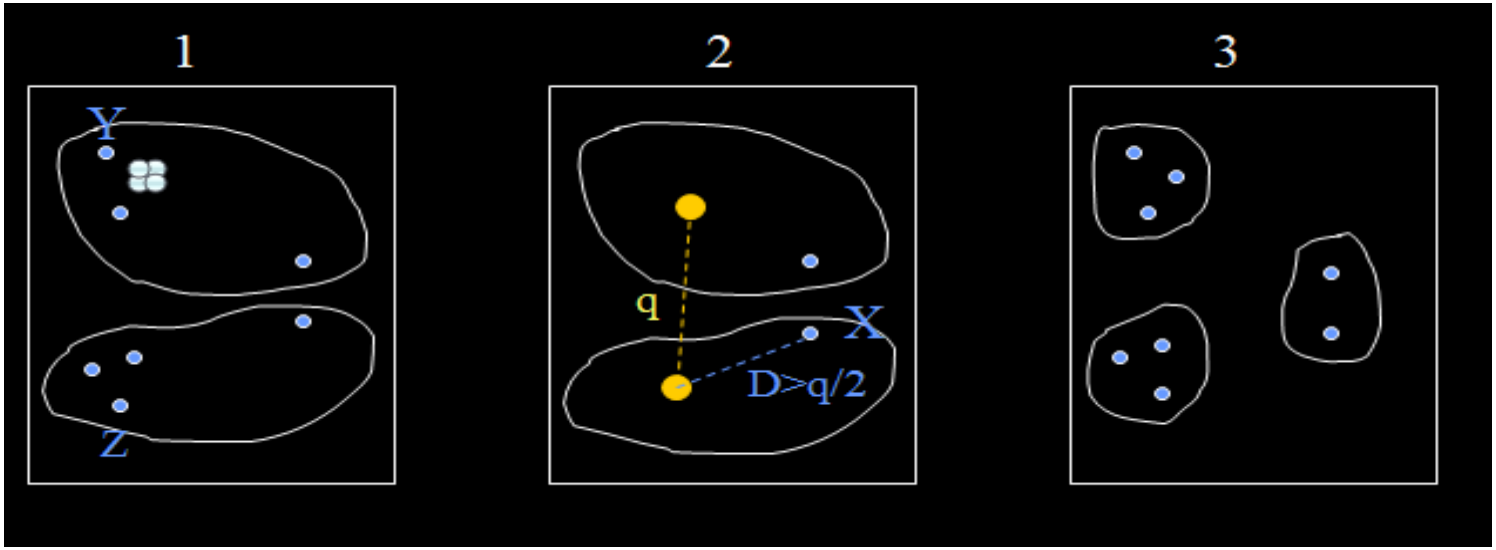
4. Let q be the average distance between each pair of means.

5. If $d > q / 2$, make X a new cluster mean.

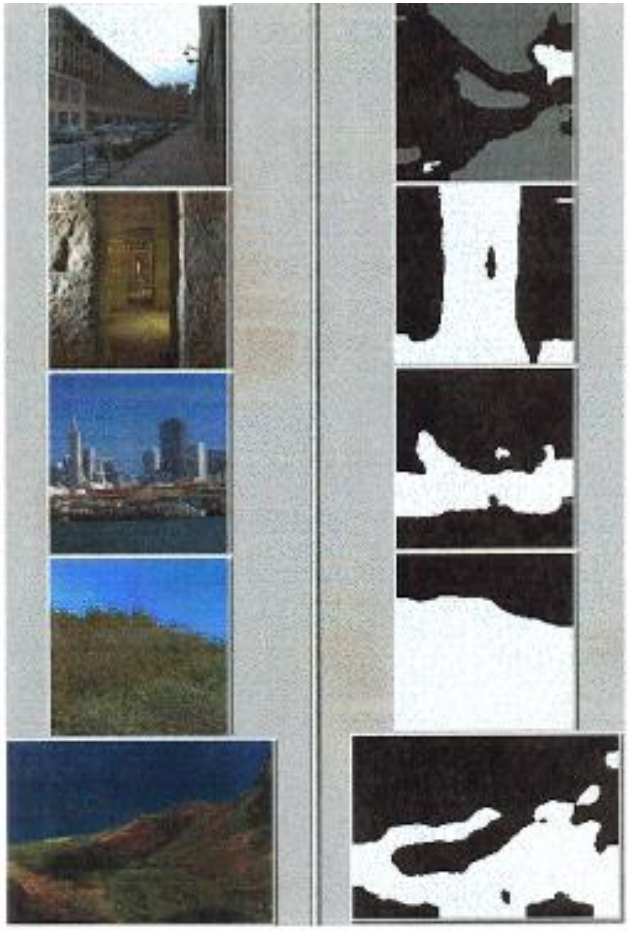
6. If a new cluster was formed, repeat from step 2.

Illustration of Heng Clustering

We used this for segmentation of textured scenes.



Heng Clustering with Texture Feature



MCQ

1. A spatial averaging filter having all the coefficients equal is termed _____

   a) A box filter

   b) A weighted average filter

   c) A standard average filter

   d) A median filter

2. What does using a mask having central coefficient maximum and then the coefficients reducing as a function of increasing distance from origin results?

   a) It results in increasing blurring in smoothing process

   b) It results to reduce blurring in smoothing process

   c) Nothing with blurring occurs as mask coefficient relation has no effect on smoothing process

   d) None of the mentioned

3. What is the relation between blurring effect with change in filter size?

   a) Blurring increases with decrease of the size of filter size

   b) Blurring decrease with decrease of the size of filter size

   c) Blurring decrease with increase of the size of filter size

   d) Blurring increases with increase of the size of filter size

MCQ

4. What does “eliminated” refer to in median filter?

a) Force to average intensity of neighbours

b) Force to median intensity of neighbours

c) Eliminate median value of pixels

d) None of the Mentioned

5. Which of the following is best suited for salt-and-pepper noise elimination?

a) Average filter

b) Box filter

c) Max filter

d) Median filter

References

•Dr. Mike Spann m.spann@bham.ac.uk http://www.eee.bham.ac.uk/spannm

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▪Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.

▪ Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: JohnWiley and Sons, NY.

▪ Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall,Upper Saddle River, NJ.