

18-03-2024

Unsupervised learning: clustering



Band1

Band2

Band3

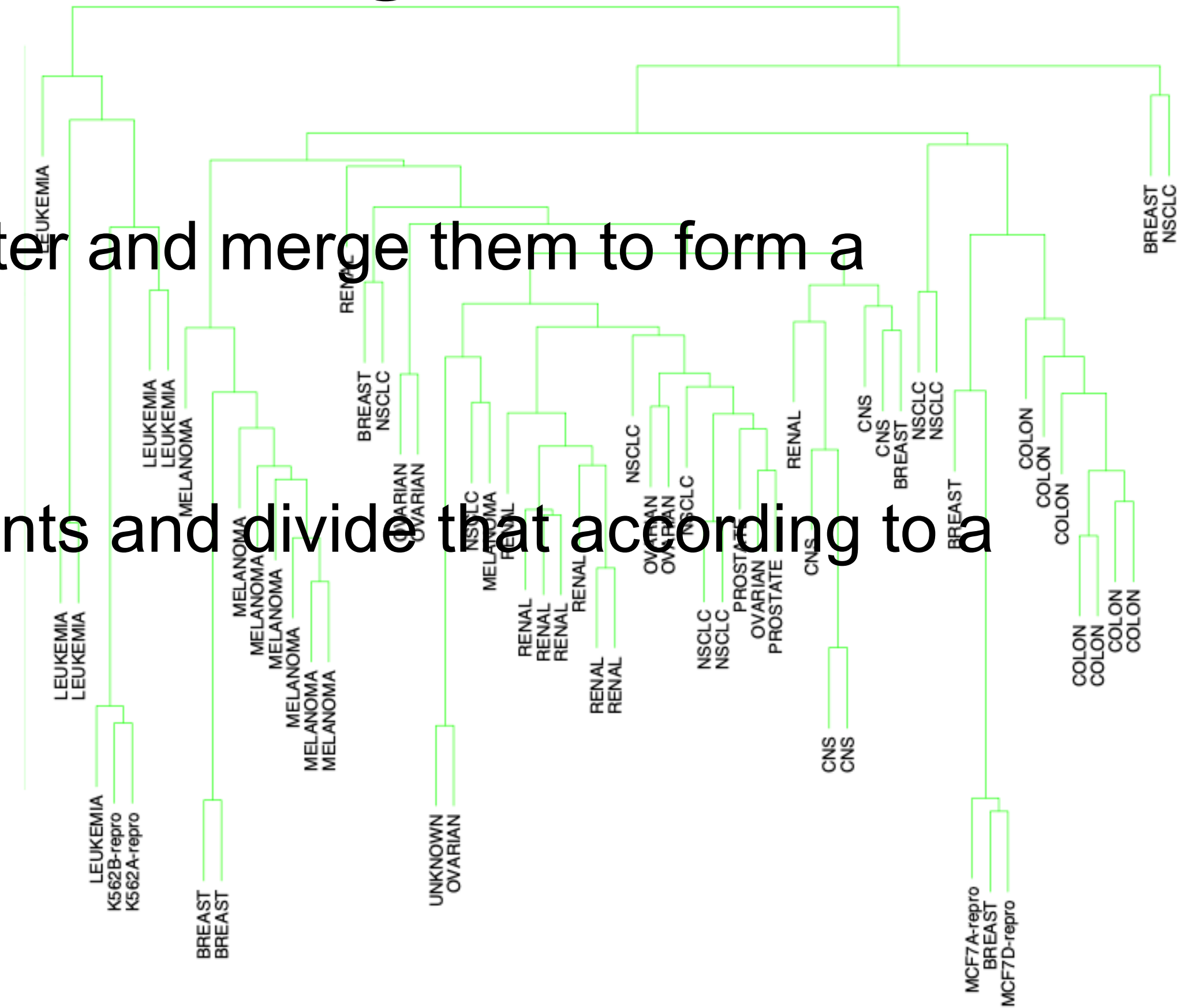
Band4

K-means clustering

23-03-2024

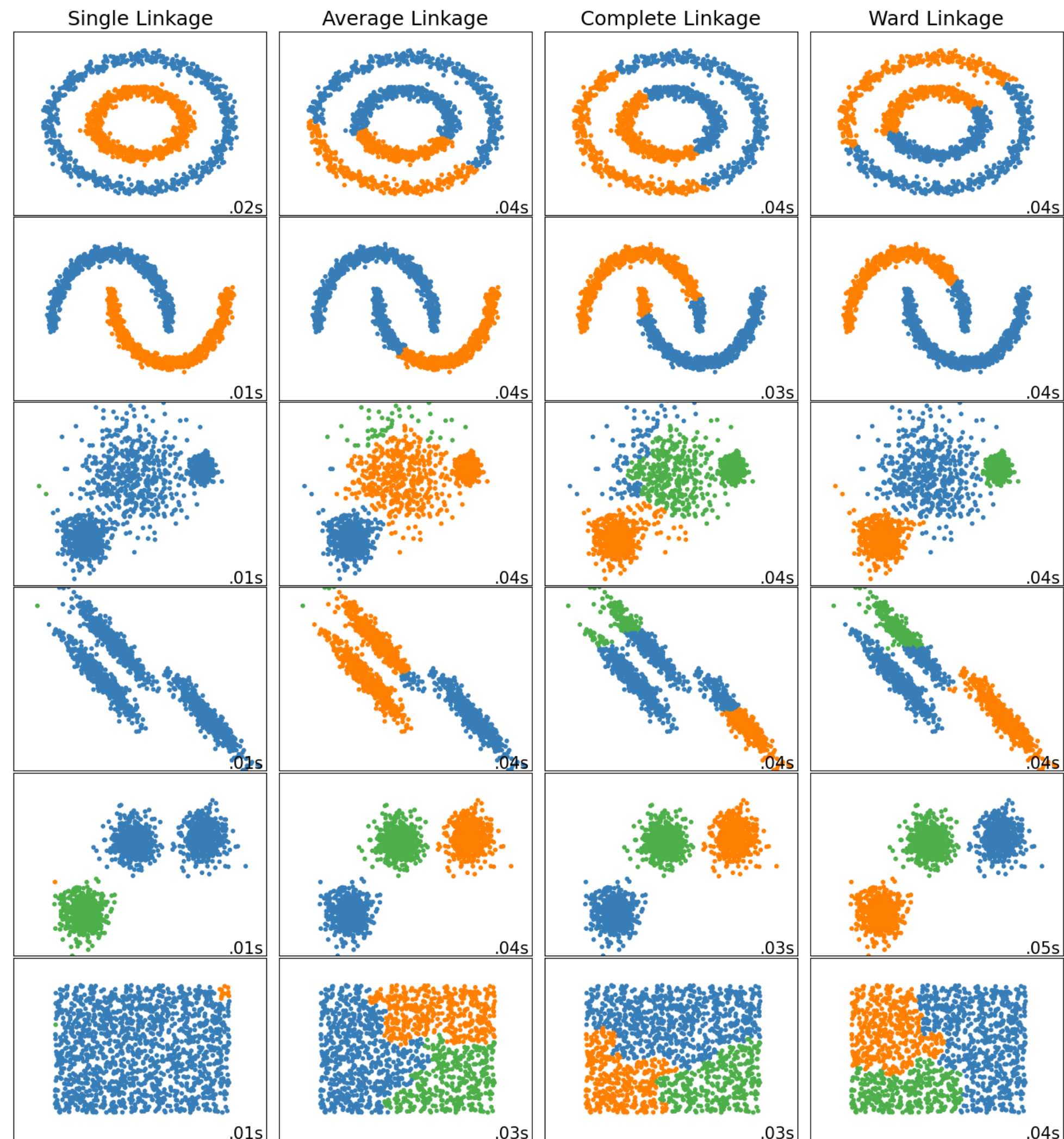
Hierarchical clustering

- Agglomerative (bottom-up)
 - Start with each single point as a separate cluster and merge them to form a required number of clusters
- Divisive (top-down)
 - Start with a single cluster containing all the points and divide them according to a required number of clusters
- How to merge two clusters?
- How to divide a single cluster into two clusters?



Agglomerative (bottom-up) clustering

- Start with each single point as a separate cluster and merge them to form a required number of clusters
- Depending on merging criteria:
 - ▶ Single linkage
 - ▶ Complete linkage
 - ▶ Average linkage
 - ▶ ...



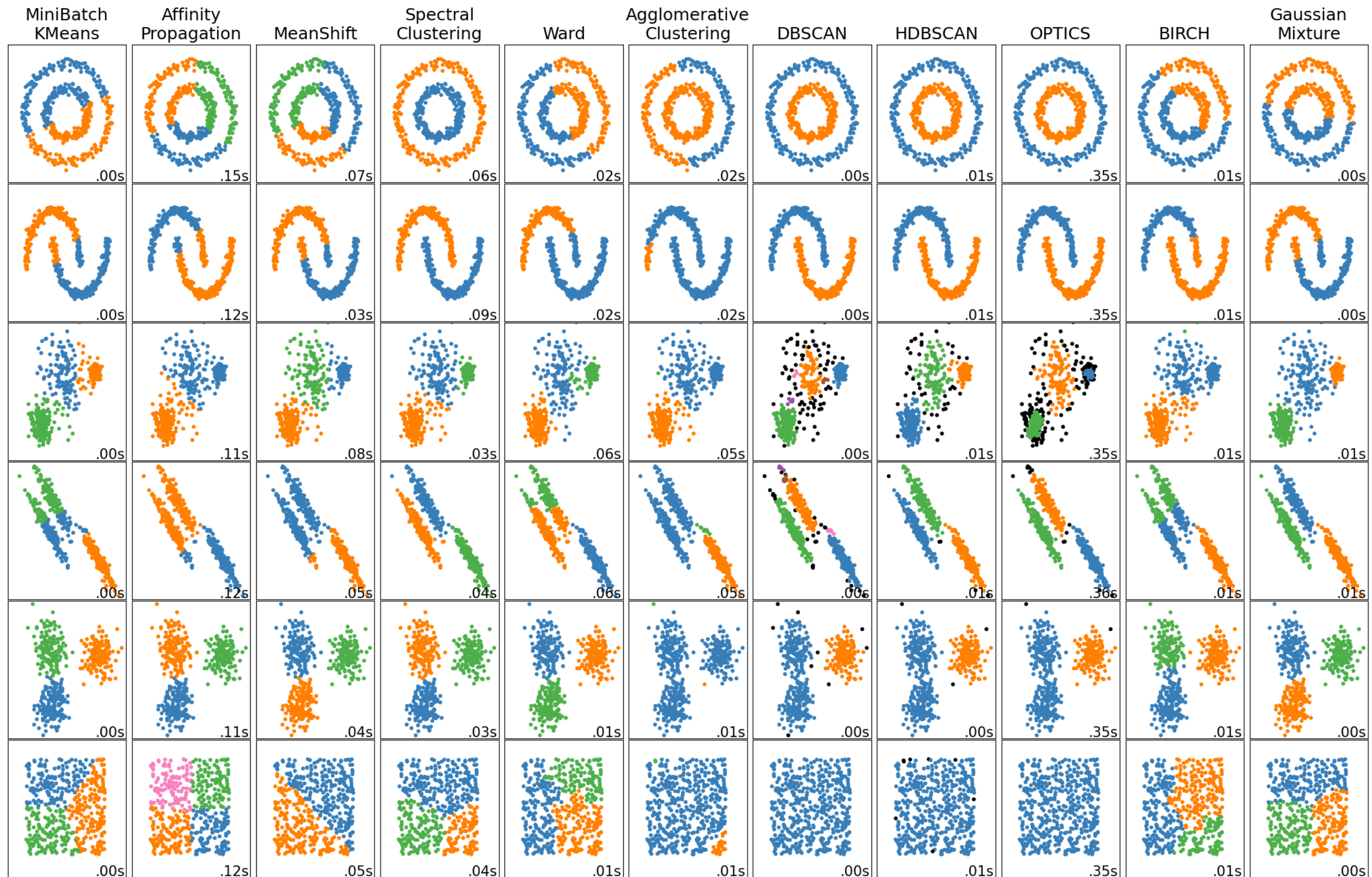
Divisive (top-down) clustering

- Start with a single cluster containing all the points and divide that according to a required number of clusters

Other clustering methods

- Spectral clustering
- Gaussian mixture
- Density-based spatial clustering of applications with noise (DBSCAN)
- ...

Other clustering methods



Application

- Image segmentation



Band1



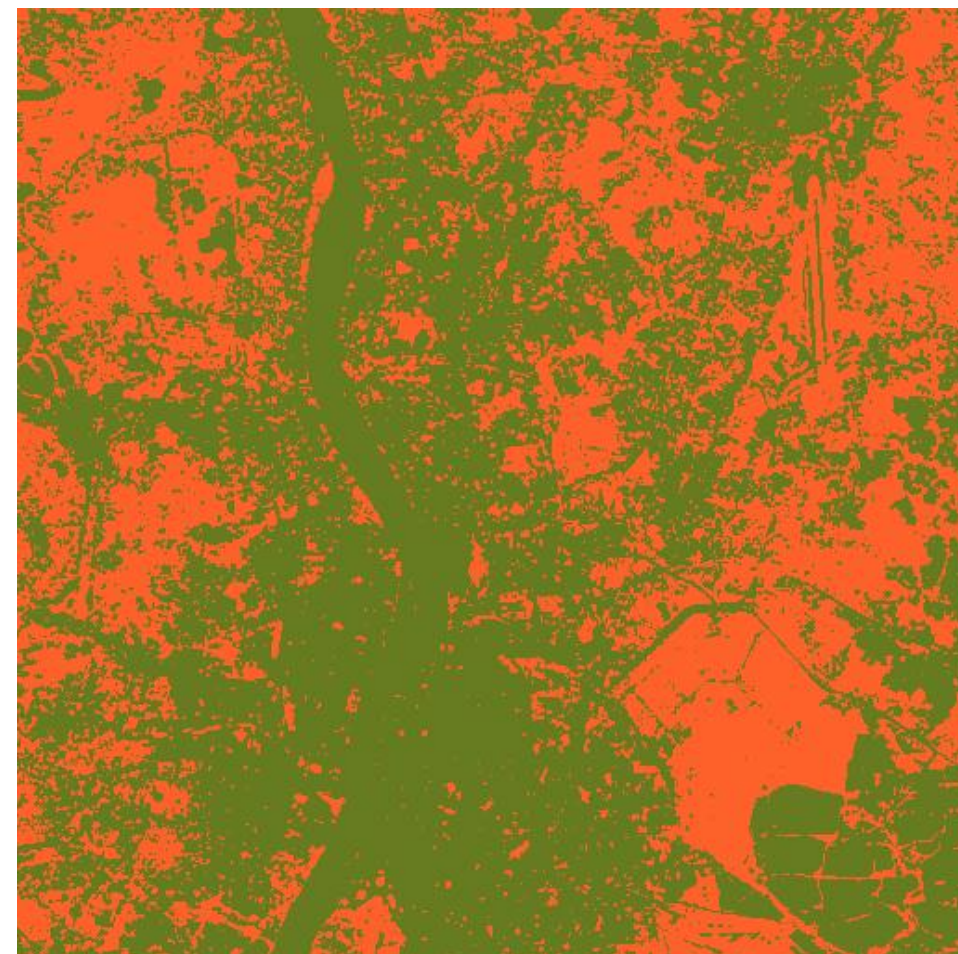
Band2



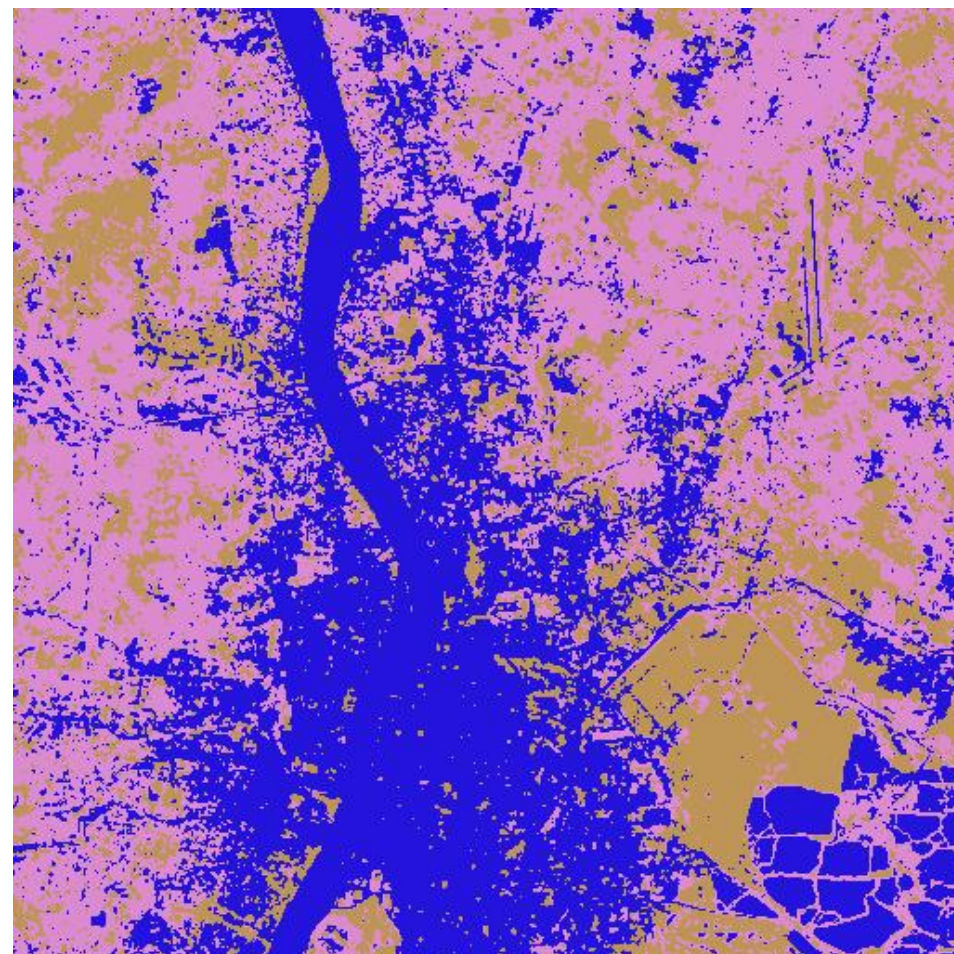
Band3



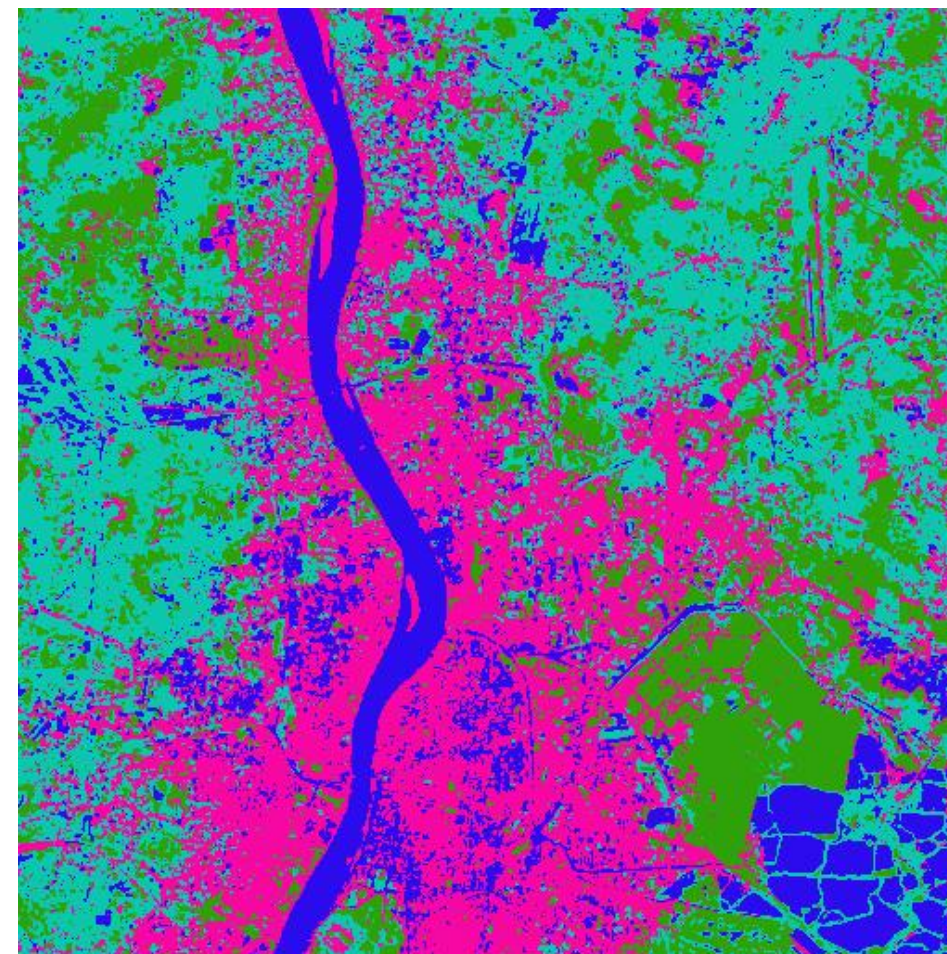
Band4



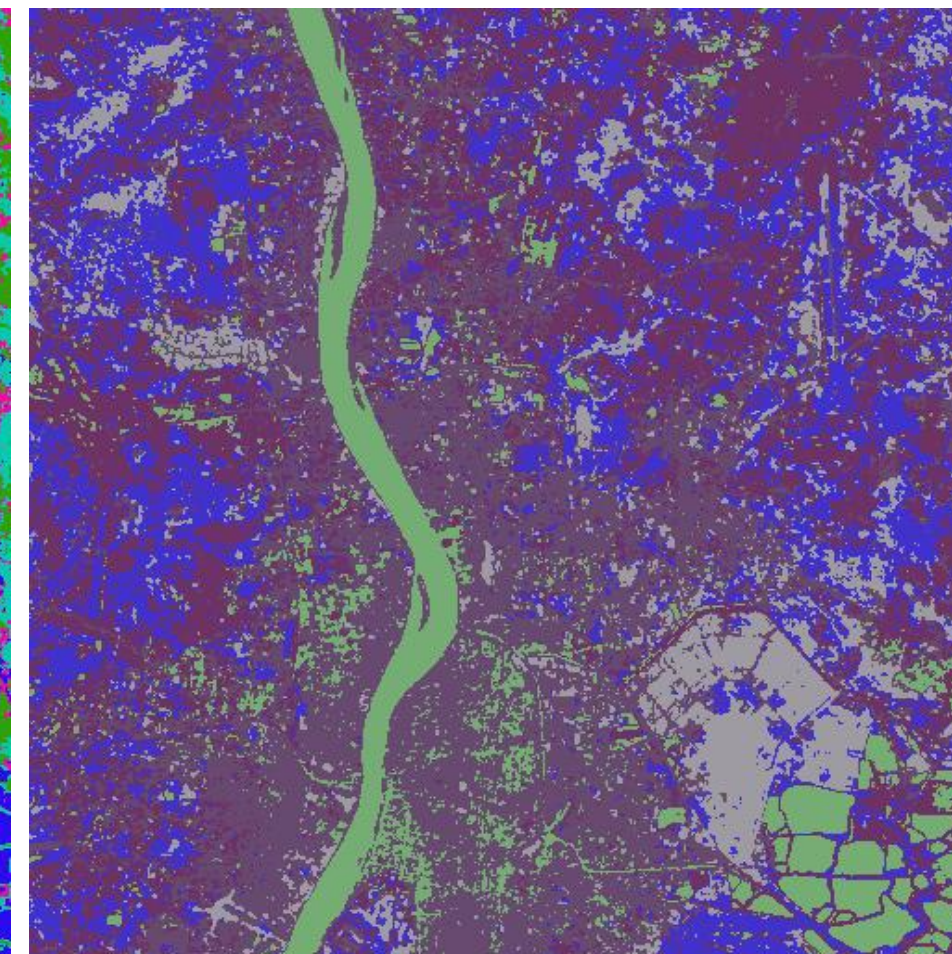
k=2



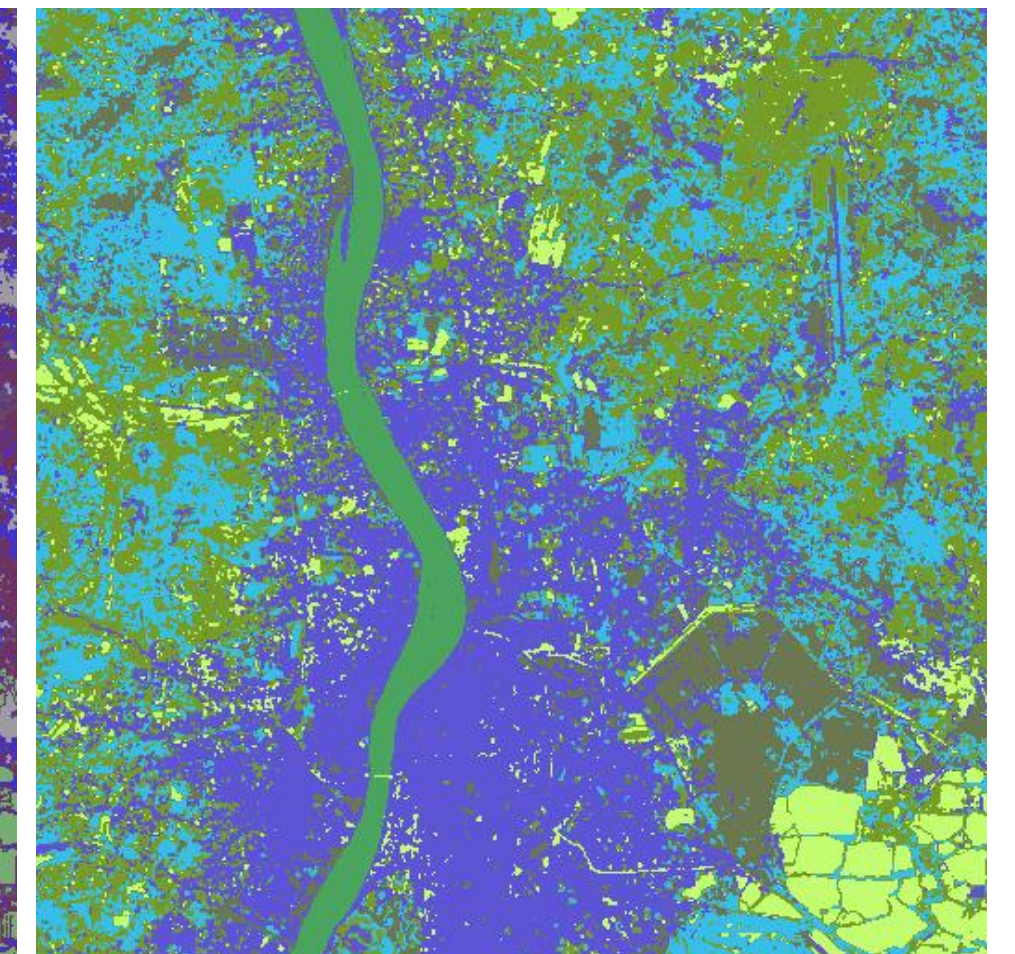
k=3



k=4



k=5



k=6

Application

- Image segmentation



