Object splitting & Distance maps

Object splitting by intensity based watershed

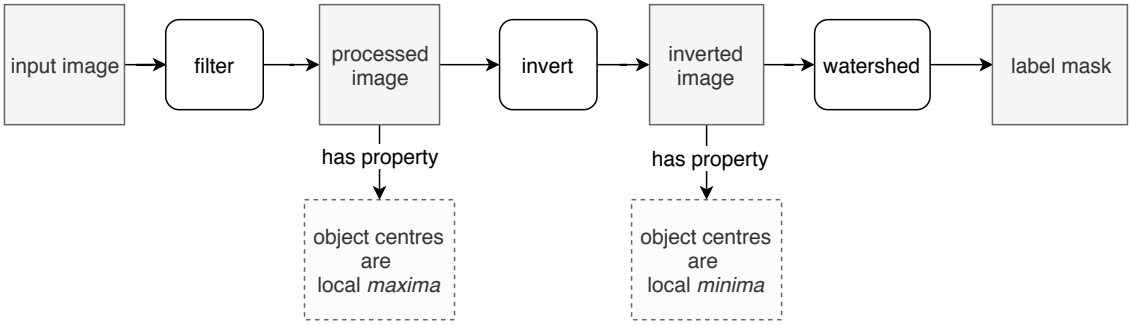
- Objects are often very close such that they might end up having the same label during the connected components analysis.
- There are several ways how to split such "touching objects"; one important method is a so-called "intensity-based" watershed filter.

Activities

- Perform above workflow on an example image and understand the concept.

Object splitting by intensity based watershed
Workflow

- Usually some preprocessing (filtering) is required before the watershed filter can be applied.
- The purpose of the filtering is to ensure that the only local maxima in the image are corresponding to object centres (often there are other maxima that one is not interested in at this point).

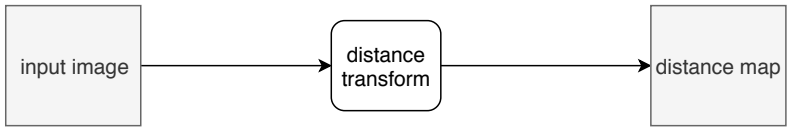


Activities

- Perform above workflow on some examples and create code to automate it

Distance map

- The distance transform changes pixel values from binary pixels to distances.
- It is defined such that the distance is measured to the nearest background pixel (value zero).
- It is very useful, both for several applications: (i) actual distance measurements, (ii) quantify the shape of objects, (iii) shape-based object splitting.

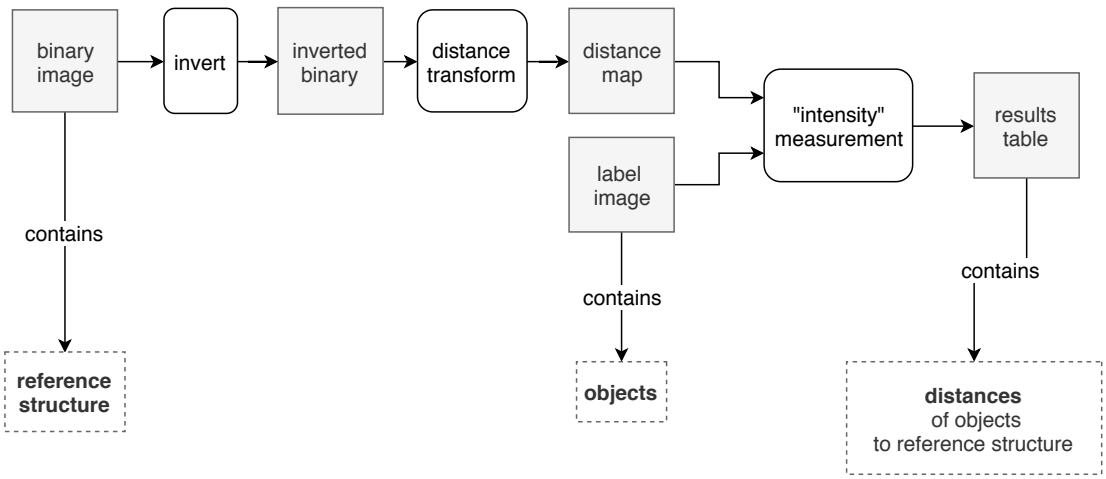


Activities

- Try it out on a binary example image.
- Observe limitations of 8bit output format for distance maps
- Observe limitations of different implementations (e.g., City-Block)

Distance measurement workflow

- Below workflow demonstrates how to measure distances of objects (label image) to a reference structure (binary image).
- Note that distance measurements are always to the closests background pixel (i.e. to the surface of a reference object).
- If you want distances to the center of objects, a thinning step is required.

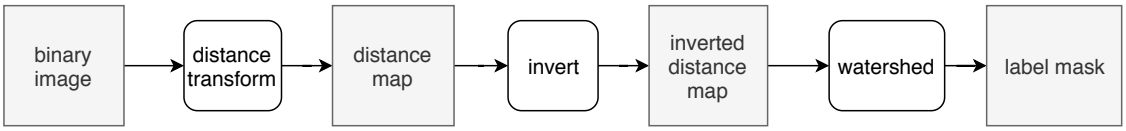


Activities

- Try above workflow on an example.

Object splitting by shape based watershed

- Objects are often very close such that they might end up having the same label during the connected components analysis.
- There are several ways how to split such "touching objects"; one important method is a so-called "shape-based" watershed filter.



Activities

- Perform above workflow on an example image and understand the concept.