Region-Based Segmentation

Find regions directly instead of via edges or by thresholding.

Region Growing

Group pixels or subregions into larger regions based on predefined criteria for growth.

Start with set of "seed" points and from these grow regions by appending to each seed those neighboring pixels that have predefined properties similar to the seed.

Initializing seeds:

- Use a priori information

or

- If pixel values "cluster" then used pixels closest to centroids of clusters.

Algorithm:

Let $f(x,y)$ be input image:

$S(x,y)$ be seed array containing 1s at location of seed pts. and 0s elsewhere.

Q predicate for similarity (ex. $f(x,y) > T$)

1) Form image f_Q such that $f_Q(x,y) = 1$ if if pt. (x,y) satisfies predicate, and 0 otherwise.

2) Let g be an image formed by appending to each seed point in S all the 1-valued points in f_Q that are 8-connected to that seed pt.

3) Label each connected component in g with a different region label (e.g. 1, 2, 3, ...). This is the segmented image.

Fig. 10.51

Predicate $f(x,y) < 68$

Ling's work.