Region - Based Segmentation

Find regions directly instead of using edges or by thresholding.

Region Growing

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

Initialising seeds:
- Use a priori information
- If pixel values "cluster" then used pixels closest to centroid of clusters.

Algorithm:
Let \( I(x,y) \) be input image;
\( S(x,y) \) be seed array containing 1 at location of seed pts. and 0 elsewhere.
A predicate for similarity (e.g. \( f(x,y) > T \))

1) Form image \( F(x,y) \) such that \( F(x,y) \equiv 1 \) if \( f(x,y) \) 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 \( F(x,y) \) 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 \( f(x,y) \leq 68 \)

Lin's work.