REGION GROWING

Theory

Region growing is a bottom-up procedure that starts with a set of seed pixels. The aim is to grow a uniform, connected region from each seed. A pixel is added to a region if and only if:

- It has not been assigned to another region
- It is a neighbour of that region
- The new region created by addition of the new pixel is still uniform

Algorithm

Let f be an image, and R_1, R_2,...R_n a set of regions each consisting of a single seed pixel.

Repeat

for i=1...n

for each pixel p at the border of R_i

for all neighbours of p

Let x,y be the neighbour's coordinates

Let m_i be the mean gray level of pixels in R_i

if neighbour unassigned and $|f(x,y)- m_i|<=D$

Add neighbour to R_i, update m_i

Until no more pixels are being assigned to regions

Example

0	0	5	6	7
1	1	5	8	7
0	1	6	7	7
2	0	7	6	6
0	1	5	6	5

Seed pixels

0	0	5	6	7
1	1	5	8	7
0	1	6	7	7
2	0	7	6	6
0	1	5	6	5

First iteration

0	0	5	6	7
1	1	5	8	7
0	1	6	7	7
2	0	7	6	6
0	1	5	6	5

Final iteration