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 and 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 neighbor 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 neighbors of p
Let x,y be the neighbor's coordinates
Let m_i be the mean gray level of pixels in R_i

if the neighbor is unassigned and $|f(x,y)- m_i|<=D$
Add neighbor 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
0	1	5	6	5
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