

**Lecture No: 3 Convert between Color types**

Convert from color image into gray scale image

For example: if we have sub color image as the following

12	122	74	1	12	89	67	100	120
34	188	12	0	1	34	34	130	235
23	34	90	120	2	34	2	190	211
34	211	30	100	12	23	22	244	10
21	244	123	99	67	12	12	210	9

**Convert it into gray scale image**

Red matrix

12	1	67
34	0	34
23	120	2
34	100	22
21	99	12

Green matrix

122	12	100
188	1	130
34	2	190
211	12	244
244	67	210

Blue matrix

74	89	120
12	34	235
90	34	211
30	23	10
123	12	9

Gray Scale image= (red matrix + green matrix + blue matrix)/3

Note// color image each pixel have 3 value represent 3 bands color (R, G and B).

- **Convert from gray scale image into binary image**

For example if we have the following sub gray scale image

74	89	120
12	34	235
90	34	211
30	23	10
123	12	9

Convert into binary image

To convert image from gray scale image into binary image, we must have threshold value that help us in convert process

Therefore, before convert image we have select threshold value

There are two way to select threshold value

- Global threshold 128 as a middle value between [ 0 255]
- Adaptive threshold value

Step 1- select min and max value in all image

Step2- by using  $T1 = (\min + \max)/2$  consider T1 as initial threshold value

Step3- find summation of all values that greater than T1 let is sum1 , and sum2 summation of all values less than T2.

Step4- take average of sum1 and sum2 by divide each one on number of values.  $Av1 = \text{Sum1} / \text{number of values}$  same as with sum2  $av2$ .

Step 5- adaptive threshold value =  $(Av1 + Av2 )/2$

By using global threshold value to convert gray scale image into binary image. Consider T is a 128. Each pixel have value greater than T become 1 and vise versa

0	0	0
0	0	1
0	0	1
0	0	0
0	0	0

74	89	120
12	34	235
90	34	211
30	23	10
123	12	9

Min value = 9

Max value=235

$T1=(9+235)/2= 122$

$$\text{Sum1} = [74+12+90+30+89+34+34+23+12+120+10+9] = 537$$

$$\text{Sum2} = [123+235+211] = 569$$

$$\text{Av1} = \text{sum1} / \text{no of pixels} = 537 / 12 = 44.75$$

$$\text{Av2} = \text{sum2} / \text{no of pixels} = 569 / 3 = 189.6$$

$$\text{Adaptive threshold value} = [\text{Av1} + \text{Av2}] / 2 = [44.75 + 189.6] / 2 = 117$$

0	0	1
0	0	1
0	0	1
0	0	0
1	0	0