Subject Name: Digital Image Processing
Code: MTCS-202 (C)
M.Tech (Computer Science)
2nd Semester
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Bit Plane Slicing and Bit Plane Compression

Image is mainly grouping of pixel (dots) information. When we write that image is of 600 X 400 sizes, it means that image has 600 pixels in horizontal direction and 400 pixel in vertical direction. So, altogether there are 600 X 400 pixels and each pixel contains some information about image.

Pixel of grayscale image has a value lies in between 0 – 255 (Total 256 or 2^8 Levels) which decides at which position, if pixel value is 0, it means that pixel colour will be fully black and if pixel value is 255, then that pixel will be fully white and pixel having intermediate value will be having shades of black and white.

Since pixel value of grayscale image lies between 0 -255, so its information is contained using 8 bit So, we can divide those image into 8 planes (8 Binary Image). Binary image are those images whose pixel value can be either 0 or 1.

For an 8 bit image "0" is encoded in **00000000** and "255" is encoded in **11111111**

Example:

Apply bit plane slicing on the following image size (3X3)

167	133	111
144	140	135
159	154	148

8bit

Step 1: Binary format for above image is

10100111	10000101	01101111
10010000	10001100	10000111
10011111	10011010	10010100

For 1st digit: Binary format of the **167**

1	0	1	0	0	1	1	1
MSB	7th bit	6th bit	5th bit	4th bit	3rd bit	2nd bit	LSB

Step2: Bit plane slicing of above example

1	1	0
1	1	1
1	1	1

8bit
(MSB bit Plane)

0	0	1
0	0	0
0	0	0

7 bit

1	0	1
0	0	0
0	0	0

6 bit

0	0	0
1	0	0
1	1	1

5 bit

0	0	1
0	1	0
1	1	0

4 bit

1	1	1
0	1	1
1	0	1

3 bit

1	0	1
0	0	1
1	1	0

2 bit

1	1	1
0	0	1
1	0	0

1 bit
(LSB bit Palne)

Example of Bit plane slicing