SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME : 19EC513 – IMAGE PROCESSING AND COMPUTER VISION

III YEAR / V SEMESTER

Unit III- **IMAGE COMPRESSION AND IMAGE SEGMENTATION**

Topic : Run length coding

Run length coding

- Images with repeating intensities along their rows (or columns) can often be compressed by representing runs of identical intensities as run-length pairs, where each run-length pair specifies the start of a new intensity and the number of consecutive pixels that have that intensity.

- The technique, referred to as run-length encoding (RLE), was developed in the 1950s and became, along with its 2-D extensions, the standard compression approach in facsimile (FAX) coding. Compression is achieved by eliminating a simple form of spatial redundancy—groups of identical intensities. When there are few (or no) runs of identical pixels, run-length encoding results in data expansion.

Run-length encoding is particularly effective when compressing binary images. Because there are only two possible intensities (black and white), adjacent pixels are more likely to be identical. In addition, each image row can be represented by a sequence of lengths only—rather than length-intensity pairs as was used in Example 8.8.

The basic idea is to code each contiguous group (i.e., run) of or 1s encountered in a left to right scan of a row by its length and to establish a convention for determining the value of the run. The most common conventions are (1) to specify the value of the first run of each row, or (2) to assume that each row begins with a white run, whose run length may in fact be zero.

Second Byte Value	Condition
0	End of line
1	End of image
2	Move to a new position
3–255	Specify pixels individually

RUN LENGTH CODING

Run length Coding

- lossless Compression
- RLC finds identify the length of the pixel values and encodes the image in the form of a run.
- Each row of the image is written as a sequence
- The length is represented as a run of black and white pixels.
- This is known as Run length Coding

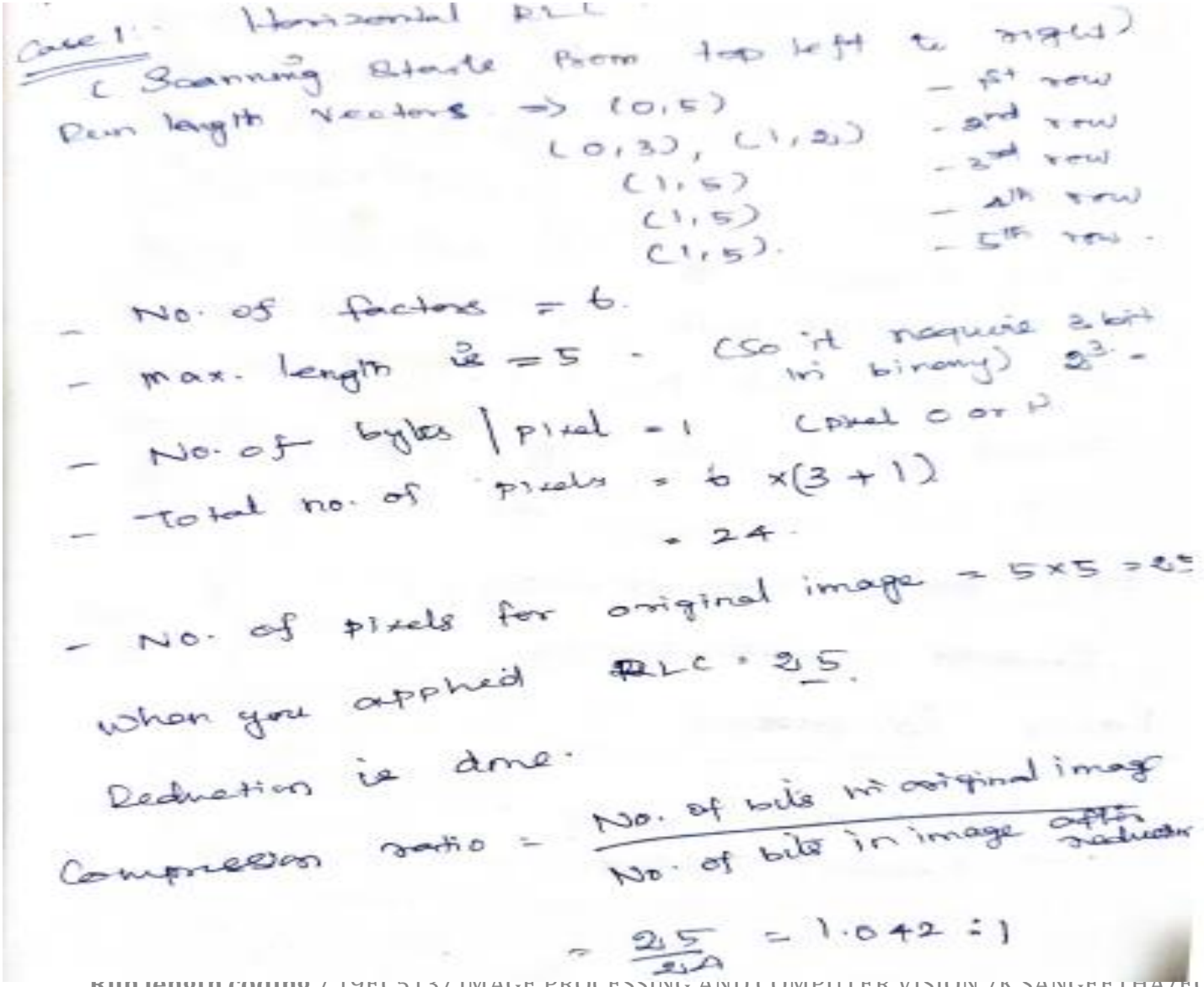
Ex: Apply Run length Coding for a Binary image

5X5 Image Size

0 0 0 0 0
0 0 0 1 1
1 1 1 1 1
1 1 1 1 1
1 1 1 1 1.

→ Scanning should be done.

RUN LENGTH CODING – EXAMPLE 1



Case 1: Horizontal RLC

(Scanning starts from top left to right)

Run length vectors => (0,5) - 1st row
(0,3), (1,2) - 2nd row
(1,5) - 3rd row
(1,5) - 4th row
(1,5). - 5th row.

- No. of factors = 6.
- max. length i.e = 5. (So it require 3 bit in binary) 2^3.
- No. of bytes / pixel = 1 (pixel 0 or 1)
- Total no. of pixels = 6 x (3 + 1)
  = 24.
- No. of pixels for original image = 5 x 5 = 25

When you applied RLC, 25.

Reduction is done.

Compression ratio = No. of bits in original image / No. of bits in image after reduction

= 25/24 = 1.042 : 1

RUN LENGTH CODING – EXAMPLE 2

Case 2 : Vertical RLC

* Run length vectors : (0,2) (1,3) 1st column
  (0,2) (1,3) 2nd
  (0,2) (1,3) 3rd.
  (0,1) (1,4) 4th
  (0,1) (1,4) 5th

* No of vectors = 10.
* max length width = 4. = 2 b.
* No. of bits/pixel = 1.

Total no. of pixels = 10 × [2+1]
= 40. 10 × (3).

THANK YOU !!!