

Segmentation Numerical

Given data:-

$$\text{Pixels values} = [0, 1, 2, 3, 4, 5]$$

$$\text{Frequency} = [2, 2, 2, 2, 2, 1]$$

Step 1:- Total pixels (N)

$$N = 2 + 2 + 2 + 2 + 2 + 1 = 11$$

Step 2:- Mean Intensity

$$\mu_T = \frac{(0 \times 2) + (1 \times 2) + (2 \times 2) + (3 \times 2) + (4 \times 2) + (5 \times 1)}{11}$$

$$\mu_T = \frac{0 + 2 + 4 + 6 + 8 + 5}{11} = \frac{25}{11} \approx 2.27$$

Step 3:- Try threshold at diff values
lets compute between-class variance
for each threshold and pick the
maximum.

1 - Threshold $T = 2$ (optimal Guess)

$$\text{Class 1: } [0, 1, 2]$$

$$\text{Class 2: } [3, 4, 5]$$

• class 1:

$$w_1 = \frac{2 + 2 + 2}{11} = \frac{6}{11}, \mu_1 = \frac{(0 \times 2) + (1 \times 2) + (2 \times 2)}{6} = 1$$

• class 2:-

Date: _____

$$w_2 = \frac{2+2+1}{11} = \frac{5}{11}, H_2 = \frac{(3 \times 2) + (4 \times 2) + (5 \times 1)}{5} = 3.8$$

step 4:- Compute b/w class variance

$$s_B^2 = w_1 \times w_2 \times (H_1 - H_2)^2$$

$$s_B^2 = \frac{6}{11} \times \frac{5}{11} \times (1 - 3.8)^2$$

$$= 0.122$$

conclusion:-

The optimal threshold is $T=2$, as it maximize b/w-class variance.