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Page
Date

Q21 Explain Erosion and Dilation in image Processing

Erosion and dilation are fundamental operations in morphological image processing, often used to process binary images but also applicable to grayscale images.

Erosion:

Function: Erosion removes pixels on object boundaries effectively shrinking objects. It is useful for removing small noise, refining boundries.

Example: If an image structures a 3x3 square erosion will reduce small noise or thin object disconnecting two slightly touching object.

Dilation:

Function: Dilation adds pixels to the boundaries of objects expanding them. It is useful for closing small holes or gaps, filling in small details, or connecting broken parts of an object.

Example: Dilation fills small holes in an image or connects two nearby objects.

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Sp. Assignment

Q. 2 Explain types of color models.

RGB (Red, Green, Blue)

Primary colors of light red, green, blue are combined to create various colors. widely used for electronic display, including monitors, TVs and cameras. Each channel typically has 256 intensity levels resulting in over 16 million color.

CMYK (Cyan, magenta, Yellow, Black)

Subtractive color model with cyan magenta yellow and black. commonly used in color printing. Colors are created by varying amounts of lights. Used primarily in print media, when overlapping colors create darker tones and the balack component.

HSV (Hue, Saturation, Value):

Components:
Hue: Represents the color type.
Saturation: Intensity or purity of the color.
Value: Brightness of the color.
Often used in color segmentation and computer vision application.

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Ep- Assignment

Q3: Write a program to implement morphological operations. Apply Boundary Extraction, Skeletonization Thickening, Thinning.

```
img = imread ('sample.png');
img_bin = imbinarize (rgb2gray (img));

figure;
subplot(2,3,1);
imshow(img_bin);
title('Original Binary Image');

se = strel('square', 3);
img_eroded = img_bin & img_eroded;
subplot(2,3,2);
imshow(boundary);
title('Boundary Extraction');

skeleton = bwmorph(img_bin, 'skel', Inf);
subplot(2,3,3);
imshow(skeleton);
title('Skeletonization');

thickened = bwmorph(img_bin, 'thicken', Inf);
subplot(2,3,4);
imshow(thickened);
title('Thickening');

thinned = bwmorph(img_bin, 'thin', Inf);
subplot(2,3,5);
imshow(thinned);
title('Thinning');
```

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4. Consider (R,G,B) = (29, 98, 129). Convert RGB to CMY Model.

R = 29
G = 98
B = 129

$C = 1 - \frac{29}{255} \rightarrow 1 - 0.1137 = 0.8863$

$M = 1 - \frac{98}{255} = 1 - 0.3843 = 0.6157$

$Y = 1 - \frac{129}{255} = 1 - 0.5059 = 0.4941$

CMY = (0.8863, 0.6157, 0.4941)

5. Consider (C, M, Y) = (231, 106, 15). Convert to RGB Model.

C = 231, M = 106, Y = 15

R = 255 - 231 = 24
G = 255 - 106 = 149
B = 255 - 15 = 240

RGB = (24, 149, 240)