DIGITAL IMAGE PROCESSING LABORATORY EXERCISE #12

Implementation of Image Intensity slicing technique for image enhancement

Image intensity slicing, also known as intensity level slicing, is a technique used in digital image processing to enhance specific ranges of intensities in an image. This method can make certain features in an image more prominent by highlighting specific intensity levels. Here is an overview of the implementation of this technique:

Steps for Implementing Image Intensity Slicing
1. **Read the Image**: Load the image that you want to enhance. This can be done using libraries such as OpenCV in Python.
2. **Determine Intensity Levels**: Decide the range of intensity levels you want to enhance. For example, you might want to enhance all pixels with intensity values between 100 and 150.
3. **Apply Intensity Slicing**:
   - **Binary Slicing**: All pixels within the specified range are set to one value (e.g., white), and all others to another value (e.g., black). This creates a binary image highlighting the desired range.
   - **Partial Enhancement**: Pixels within the specified range are enhanced (e.g., brightened), while others are left unchanged or slightly modified.

```
i=imread('earcell.jpg');
subplot(3,2,1);imshow(i); title('Original Image'); l=im2double(i);
 level=graythresh(l); BW = im2bw(l,level);
subplot(3,2,2); imshow(BW); title('Image graythresh');
level1=0.2*BW;
subplot(3,2,3); imshow(level1); title('0.2 Slice');
level2=0.4*BW;
subplot(3,2,4); imshow(level2);title('0.4 Slice');
level3=0.6*BW;
subplot(3,2,5); imshow(level3);title('0.6 Slice');
level4=0.8*BW;
subplot(3,2,6); imshow(level4); title('0.8 Slice');
```
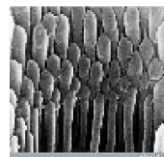
Original Image

Image graythresh

0.2 Slice

0.4 Slice

0.6 Slice

0.8 Slice

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Name:
Year/Block:
Application/Software:

1. Codes
2. Output
3. Answer the following questions:

   A. What are the main differences between binary intensity slicing and partial enhancement in the context of image intensity slicing, and in what scenarios would each method be more appropriate?

   B. How can intensity slicing be implemented to enhance multiple intensity ranges within a single image, and what considerations should be taken into account when choosing the slice values and thresholds for each range?

   C. How does the selection of intensity thresholds and slice values impact the overall effectiveness of image enhancement in various applications, such as medical imaging or remote sensing, and what strategies can be employed to optimize these parameters?