Lab fat exam

ECE3043 Digital Image Processing for Medical Applications

[Slot: L11+L12]

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To Dr. Sharmila N

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Question 1: You are presented with an image in Fig. Q1. You will have to shift the yellow sphere from top left (as shown in Fig.Q1.Image A) to right bottom (as shown in Fig.Q1. Image B)

Image A Image B

Fig. Q1

You can get the Fig. Q1 Image A in JPEG format in the following link:

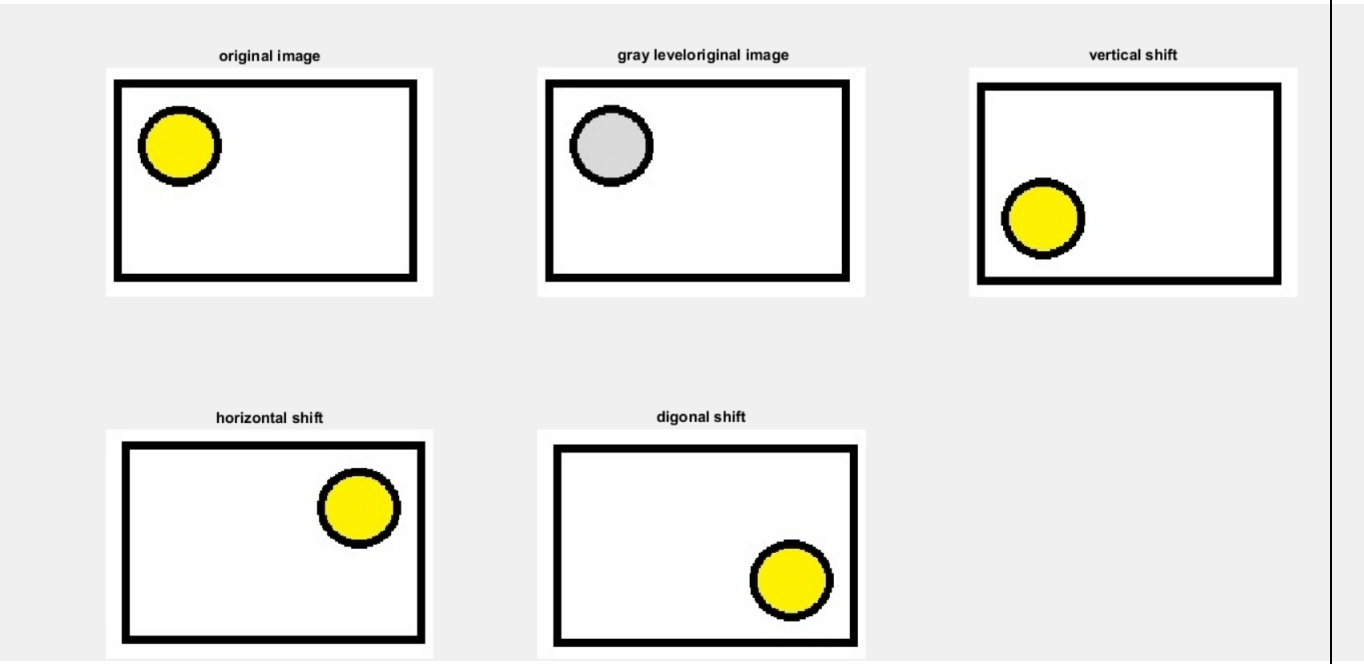
Code:

This code is based on slicing method.

```
clc
clear all
```

```
clear all
clc
A=imread('ImageA.jpg');
org_img=rgb2gray(A);
B=A([end:-1:1],:,:);%for shifting vertically
C=A(:,[end:-1:1],:);% for shifting the image horizontally
D=C([end:-1:1],:,:);% for shifting the image  diagonally.
subplot(2,3,1);imshow(A);title('original image');
subplot(2,3,2);imshow(org_img);title(' gray leveloriginal image');
subplot(2,3,3),imshow(B);title('vertical shift');
subplot(2,3,4),imshow(C);title('horizontal shift');
subplot(2,3,5),imshow(D);title('digonal shift');
```

Output:



From the given output, above the desired output is displayed finally. Using slicing we can shift the image vertically and horizontally, as the result, we can place the image at the required position.

Biomedical application:

To place the image at the desired position image shifting is useful.

Horizontal and vertical shifts estimation is a common problem in image stabilization, i.e., the process of removing effects of unwanted camera movements from the captured

images (video) sequence. Digital image stabilization is the algorithmic process of removing such undesired translation and/or rotation effects present in the captured image sequence. We want to generate a compensated image sequence using digital image processing techniques without mechanical devices such as gyro sensors.

Even though the position of shifted is image is different, the image is shifted without any distortion(it is exactly the same as the image at the original position).So, image shifting process retains the image without distortion.

We can apply this technique in also, phase-contrast X-ray **imaging**, which **uses** phase **shift** caused by the sample as image contrast.

Moving parts of the development process sooner in the biomedical software lifecycle will eliminate traditional constraints that will in turn decrease the cycle and lead times. First, you will no longer need key resources to be available, thereby eliminating the process (work) time waiting to gain access to these resources. Second, the wait time will be reduced during the testing/implementation phase, because dependent resources can be virtualized.

Pixel Shift Technology helps developers reduce the complexity and cost of building Ultra-High Resolution inspection systems without sacrificing the precision, reliability and high-throughput that these systems demand.

Optical time-stretch imaging entails a stringent requirement of state-of-the-art high-speed data acquisition unit in order to preserve high image resolution at an ultrahigh frame rate — hampering the widespread application of such technology. We here propose a pixel super-resolution (pixel SR) technique tailored for time-stretch imaging that can relax the sampling rate requirement. It harnesses a concept of equivalent-time sampling, which effectively introduces sub-pixel shifts between frames. It involves no active opto-mechanical subpixel-shift control and any additional hardware.

For designing flexible biomedical instrument, image shifting has very much contribution.

For example: flexible thermal camera, that used for thermography