EE7150 - Computer Project I: Image Processing Fundamentals

Due Date: Sept 7, 2021

The images to be processed in this project are in uint8 tiff format. For example, figure Fig. 2.24(a) from the textbook is named, drip-bottle-256.tif

To load a tiff image into Matlab, Make sure the image file is in the current directory. Then use,

```
img=imread('drip-bottle-256.tif'); % Reads file as a variable 'img'
```

Note: Grayscale images in the textbook are in uint8 format with 8-bit integer values between 0 and 255. You may observe metadata information on any image using,

```
imageinfo(''drip-bottle-256.tif');
```

To perform mathematical operations, convert to double precision,

```
img_d = double(img) / 255;  % divides by 255 and the result  'img_d ' is in double precision
```

Convert back to uint8 format using,

```
img_7bits = uint8(img_d * 127);   %  Intensity level is halved in 'img_7bits'

figure (2)
imshow(img_7bits, [0 127]);  % Displays 7-bit image
```

1. **Reduce the Number of Intensity Levels in an Image**

   a) Write a computer program to reduce the number of intensity levels in an image from 256 to 2, in integer powers of 2. The desired number of intensity levels should be a variable input to your program.
   b) For the drip-bottle figure Fig. 2.24(a) replicate the results shown in Fig. 2.24 of the textbook.

2. **Zooming and Shrinking Images**

   a) Download the Chronometer (`'Chronometer.tif'`) image in Fig. 2.23(a) from Pilot and use your program to shrink the image by a factor of 4.
   b) Write a program to zoom the image in (a) back to the resolution of the original using "pixel replication". Explain the reasons for their differences.
   c) Repeat part (a)-(b), but in this case use "bilinear transformation". (Hint: Matlab commands: imresize or interp2)