CS 443/543 Homework 1— Dr. Haeyong Chung

Due: Feb. 4 midnight

Dr. Chung is providing an image set (they are 50 animation frames) for this homework (Find HW1_ files.zip in Files on class Canvas). This homework consists of three main steps:

1) You need to implement the ordered dithering algorithms (Refer to our lecture slide or textbook).
2) You must use your implemented algorithms for all 50 images to generate 50 dithered output images.
3) Create an animated gif file with your 50 dithered images.

**Step 1:** Implement the ordered dithering algorithm for 50 gray-scale images (i.e., frame_*_delay-0.1s.gif). Check Chapter3 slide for the pseudo code. Because the original images are based on 8bit color, you have to convert each color image to a gray-scale (8bit gray) image (simply use rgb2gray()). You have to use the following 4x4 dither matrix for your algorithm.

$$\frac{1}{16} \times \begin{bmatrix} 0 & 8 & 2 & 10 \\ 12 & 4 & 14 & 6 \\ 3 & 11 & 1 & 9 \\ 15 & 7 & 13 & 5 \end{bmatrix}$$

**Step 2:** Apply the ordered dithering algorithm for given 50 images, and generate 50 dithered output images. Your dithered images should be binary (black or white) images. You should not type 50 image files names manually. You code should generate a file name string with sprintf, read each input image/frame, apply the dithering algorithm for each image, and finally save an output image in gif.

**Step 3**: Lastly, create a single animated gif file by compiling your 50 dithered output images created from Step 2. You can use a MATLAB code to create an animated gif (Dr. Chung is providing an example code animGIF.m on Canvas; you may need to install Image processing toolkit to run this code), or you can use any animated gif maker like https://ezgif.com/maker or other image editing tools. You must set the delay for each frame to 10/100 second (0.1 second).

**Instructions for submitting your program:**

Submit 1) your dithering code, 2) 50 output images, and 3) one animated gif file in one zip file: You have to upload lastname_HW1.zip onto Canvas by midnight on 2/4/2019.

**Grading:**

- Do not download and use any existing MATLAB dither function to finish this homework. The goal of this hw is to implement the dither algorithm. If you use some existing dither function, you will receive an automatic 0.
- A program that runs into errors upon starting or almost immediate gets an automatic 0.
- There is a 20% penalty for poor documentation & readability. Have plenty of comments.
- No partial credit will be given to programs that lack documentation.