Department of Computer Science
Faculty of Science
Prince of Songkla University

…17st.. April 2019
…08:00-09:50…

Lab 10th **Color image processing**

Objectives

To learn how to convert between color spaces and how to process the color images

1. Learn how to represent RGB color images
2. Learn how to convert between HSV and RGB color spaces
3. Explore contrast enhancement in the RGB and HSV color spaces.

Experimentations

1. Load the peppers.png image and operate by the following instructions:

```
I = imread('peppers.png');
size(I)
class(I)

%Convert RGB to index image
[X,map] = rgb2ind(I,256);
size(X)
class(X)
size(map)
class(map)
subplot(1,2,1), imshow(I), title('Color image (RGB)')
subplot(1,2,2), imshow(X, map), title('Color index image')
```

Question 1) Tell the difference between RGB and index images?

Question 2) If you want to make the index image look like the RGB image. How to operate?

2. Convert the original image to grayscale and compare it with the value component of the HSV image.

```
Ihsv = rgb2hsv(I);
Igray = rgb2gray(I);
figure, subplot(1,2,1), imshow(Igray), title(‘Grayscale’);
subplot(1,2,2), imshow(Ihsv(:,:,3)), title(‘Value component’);
```

Question 3) How does the grayscale version of the original image and the value component of the HSV image compare?

3. Enhance color image in HSV color model in the following commands:

```
L = Ihsv(:,:,3)/255;
LOW_IN = min(L(:));
HIGH_IN = max(L(:));
LOW_OUT = 0;
HIGH_OUT = 1;
GAMMA = 0.5;
J = imadjust(L,[LOW_IN; HIGH_IN], [LOW_OUT; HIGH_OUT], GAMMA);
Ihsv(:,:,3) = 255*J;
rgb = hsv2rgb(Ihsv);
figure, subplot(2,2,1), imshow(L); title('Input luminance');
subplot(2,2,2); imshow(J); title('Luminance adjust');
subplot(2,2,3); imshow(I); title('Original color image');
subplot(2,2,4); imshow(rgb/255); title('Color enhancement');
```

Question 4) What the components are enhanced?

Question 5) How the components are enhanced?

Question 6) Why HSV color model are converted to RGB?

Question 7) How difference between the Original and enhanced color images?