

CMSC 426, Computer Vision  
Homework 0, Part 1: Coding  
Due on: 11:59:59PM on Tuesday, February 6th

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## Overview

You are given an image of colored objects a white background (Check file named TestImgResized.jpg). Your task is to segment out the objects, count the number of colored objects and also count the objects of the same color, i.e., green, blue, yellow and red. To have some fun, we also threw in a white object and a transparent object (we really want you to try to get these as well to make your fundamentals stronger).

## Functions Allowed

Any built-in Matlab function except the colorThresholder App (<http://www.mathworks.com/help/images/ref/colorthresholder-app.html>). If you have a doubt whether a function can be used or not e-mail the TAs .

## Various Steps Involved

### 1. Denoise Images if needed - 10Pts

- (a) You can use any denoising filter like a gaussian or a median filter to 'smooth out' the image to reduce noise.

### 2. Find total number of colored objects. - 70Pts

- (a) Count and find individually red, green, blue and yellow objects. Use color information in any color space you want in conjunction with the previous step output to do this. Don't worry about the white and transparent pins.

### 3. Find individual colored objects - Red, Green, Blue and Yellow - 20pts

- (a) You can use a combination of morphological operations and blob based properties (regionprops) to do this.
- 4. **EXTRA CREDIT: Detect the white and transparent colored pins - 20pts**
  - (a) Do anything you want to find this. (If possible, avoid hard-coding the thresholds).
- 5. **EXTRA CREDIT: Implement a simple 1D Gaussian to detect colored pins - 20pts**
  - (a) Follow points from the gaussian tutorial. You'll need a 1D gaussian for each color).
- 6. **EXTRA CREDIT: Implement a 3D Gaussian to detect colored pins - 20pts**
  - (a) Follow points from the gaussian tutorial. You'll need a **3D gaussian** for each color.

## Submission Guidelines

Write a small (1-4 pages) report of your approach with input and output images after each step. Use red colored boxes for red objects, yellow colored boxes for yellow objects, blue colored boxes for blue colored objects green colored boxes for green objects and black colored boxes for white/transparent objects. Submit your code and report as a zip file with the **naming convention YourDirectoryID hw0.zip** onto ELMS/Canvas. **Be sure to include your answers for Part 2 (short answer) in the same zip file!**

## Collaboration Policy

You are restricted to discuss the ideas with at most two other people. But the code you turn-in should be your own and if you **DO USE** (try not to and it is not permitted) other external code from other students - do cite them. For the full honor code refer to the CMSC426 Spring 2018 course website.