

# Robotics (CPS 1/296) : Homework 2

Due March 1, 2007

## 1 Color Interpolation

For this part of the homework, you will need to implement a color interpolation algorithm for an image from a Bayer pattern sensor. It is sufficient to implement bilinear interpolation, but you are free to try more sophisticated algorithms. Using the provided images, you will need to do the following:

- Implement your interpolation algorithm
- Figure out the color filter pattern
- Figure out an appropriate level of gamma correction
- Figure out a colorspace conversion matrix (by trying to invert the transform used to produce the color image that you have been given)
- Compare your results to the provided image

Try to get your output to be as close as possible to the target output, but *don't* be dismayed if you can't match it exactly. It's more important to demonstrate that you have followed a reasonable chain of reasoning to arrive upon your final solution.

## 2 Inferring the distance to the camera

Here is what is known about the scene you are viewing and the camera that was used:

- The lens has a focal length of 50mm.
- The pen caps are 3cm high.
- Each pixel on the sensor is 10.1 microns

Estimate the distance from the pen caps to the camera. Show your work!