ASSIGNMENT 1(LMS)

WRITE CLEAR COMMENTS AND OBSERVATIONS

SUBMIT A ZIP FILE WITH PDF, OPENCV CODE AS WELL
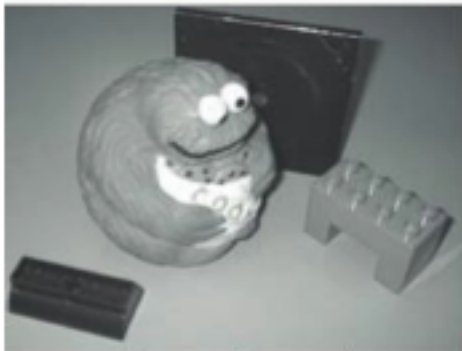
10 marks (weightage 0 to 5)

Question 1

- Choose an RGB image (Image1); Plot R, G, and B separately (Write clear comments and observations)
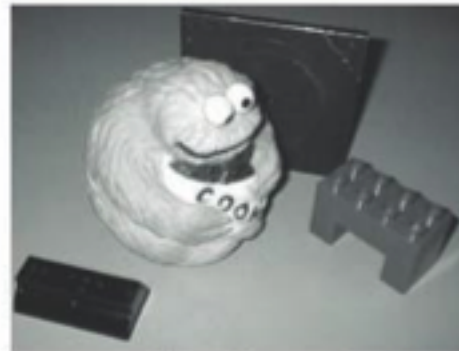

Original

Red Channel

Green Channel

Blue Channel

Question 2

- Convert Image 1 into HSL and HSV. Write the expressions for computing H, S and V/I.
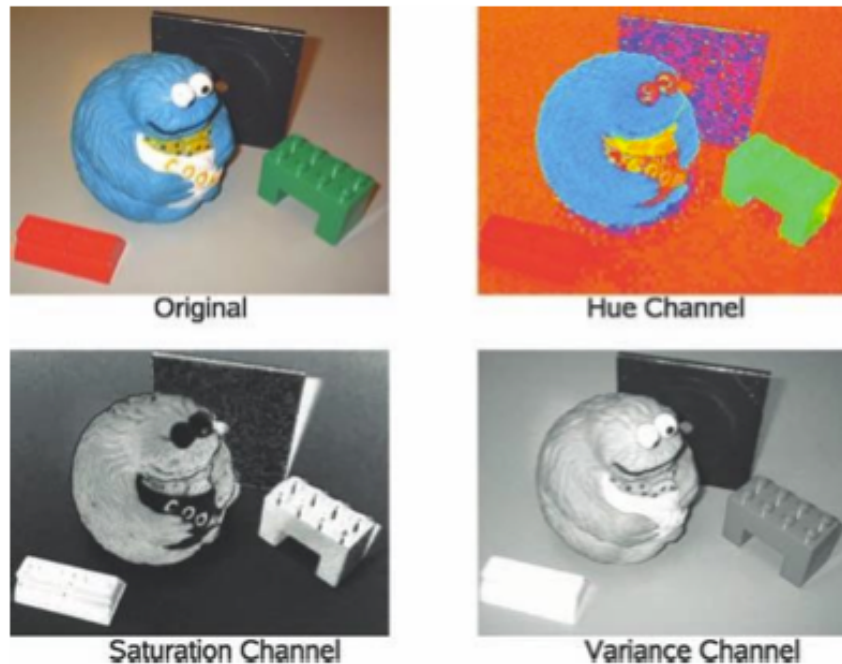- (Write clear comments and observations)

Figure 1.10 Image transformed and displayed in HSV colour space

Question 3

- Convert Image 1 into L*a*b* and plot

Question 4

□ Convert Image 1 into Grayscale using the default OpenCV function. Write the expressions used for the conversion.

Figure 1.8   An example of RGB colour image (left) to grey-scale image (right) conversion

Question 5

- Take Image 2 (a selfie of yourself) and implement a skin color detector i.e segment only skin pixels. [Choose any method you think is appropriate]. Describe or Illustrate when your detector will work and when it will fail.

Question 6

- Try some color manipulation

  (mainly color transformation, not mere color substitution)

- [Make yourself fairer or darker]

Question 7

- Take a grayscale image (Image 3) and illustrate
  - Whitening
  - Histogram equalization

Question 8

- Take a low illumination noisy image (Image 4), and perform Gaussian smoothing at different scales. What do you observe w.r.t scale variation?

Question 9

- Take an image (Image 5) and add salt-and-pepper noise. Then perform median filtering to remove this noise.
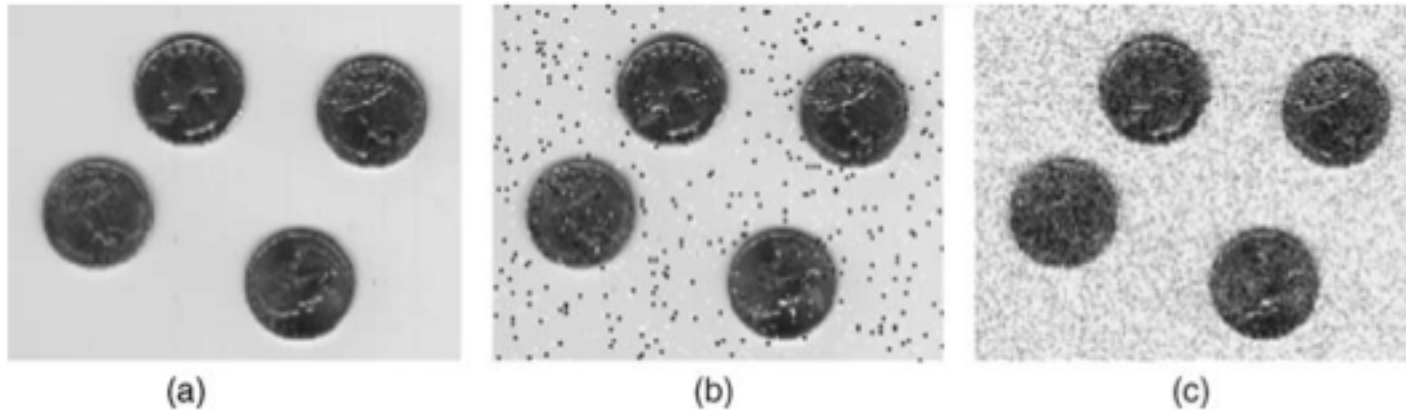

(a)   (b)   (c)

Figure 4.3   (a) Original image with (b) 'salt and pepper' noise and (c) Gaussian noise added

Question 10

- Create binary synthetic images to illustrate the effect of Prewitt (both vertical and horizontal) plus sobel operators (both vertical and horizontal)
  - Clue: check when you have a vertical/horizontal strip of white pixels – vary width of the strip from 1 pixel to 5 pixels
  - What do you observe?

Question 11

- What filter will you use to detect a strip of 45 degrees

Question 12

- Take an image and observe the effect of Laplacian filtering
- Can you show edge sharpening using Laplacian edges

Original Image · Laplacian "edges" · Sharpened Image

Figure 4.14 Edge sharpening using the Laplacian operator

Question 13

- Take an image and show that applying
    - Laplacian after Gaussian filtering
    - Gaussian filtering after Laplacian
- results in similar images

Question 14

- Implement a bounding box detector of number plates of a car. Make sure the method works on 5 different cars. You are free to make some assumptions on the size of the number plate and use any image enhancement techniques along with morphological operations