

Assignment-1 (Playing with Images)
CSL7360 - Computer Vision

NOTE:

1. This assignment contains 10 problems.
 2. Detail submission guidelines shall be shared by TAs soon. Not following submission guidelines can lead to serious penalties.
 3. **Deadline:** January 29, 2022, 10:30 PM.
 4. **Maximum Points:** 100
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1. **(Spot the diff)** Given a stitched image containing two very similar scenes, find out the differences. (a) Submit your implementation. (b) Write down your algorithm in brief. (c) Show the image where differences are suitably marked. (d) Write down scenarios when your implementation may not work.
2. **(Distance in images-1)** Given an image of the map of India, find out the pixel distance between two states. [Hint: use off-the-shelf OCR] (a) Submit your implementation. (b) Write down the limitations of your approach.
3. **(Distance in images-2)** Given an image of a circle, find out the area and perimeter in the pixel unit. Submit your implementation such that it takes the image file as an argument and prints the area and perimeter in new lines.
4. **(Towards reading time)** Given an image of a clock find out the angle between the hour and minute hands. (a) Submit your implementation. (b) Write down your approach for finding out the angle. (c) Write down the limitations of your approach.
5. **(Fun with Landmarks)** Choose three images of a world landmark from the Google Landmark dataset (Link: <https://storage.googleapis.com/gld-v2/web/index.html>). The name of your chosen landmark should begin with the first letter of your first name. For example: If your name is Adhrit,

you could choose Amarnath. (a0) Resize all images to 256×256 . Convert it to gray. (a) Show the average of all three images. (c) Subtract Image 1 with Image 2. (d) Add salt noise with 5% probability in one of the images. (e) Remove the noise. (f) Use the following 3×3 kernel: $\{-1, -1, -1; 0, 0, 0; 1, 1, 1\}$ for performing convolution in one of the images and show the output.

6. **(Digit Recognition)** You will be given 100 handwritten images of 0 and 1. You have to compute horizontal projection profile features and use Nearest Neighbour and SVM classifiers to recognize the digits. Report accuracy and show some visual examples. Dataset (choose only 0 and 1): https://github.com/myleott/mnist_png.git
7. **(White on Black or Black on White):** Given a word image find out if the word is bright text on a dark background or dark text on bright background.
8. **(Template Matching)** Write your name in capital letters on a piece of white paper and a random letter from your name. Click photographs of these. Implement the Template Matching algorithm and discuss your observation.
9. **(Histogram Equalization)** Choose one image from Problem 5. Show histogram of pixel values with bin size 10. Perform histogram equalization and show the output image.
10. **(Reading Mobile Number)** You will be given image of a mobile number. Use off-the-shelf OCR and find out the last three digits of the mobile number.

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