CS 450 Computer Vision and Machine Learning (Spring 2025)

Homework Assignment 1

Use Jupyter Notebook for the next few exercises. For each assignment, you need to upload your notebook with the outputs. You can use Google and the Python documentation for help.

1. Load the "astronaut" image from the skimage data module and do the following:
    a. Apply a Roberts edge detection filter on the three color components separately and stack the three edge images back together to form a new image. Display the original and new image side by side.   [5]

    b. Reduce the image length and width each to 25% of the original, and scale it back up to the original size. Display the original and modified images side by side. (Hint: lookup skimage.transform.rescale()) [5]

2. Download the Oxford 102 Category Flowers dataset from here: https://www.robots.ox.ac.uk/~vgg/data/flowers/102/ for this problem. Do the same retrieval experiment as demonstrated in class, but use both Euclidean Distance and Manhattan distance, and use both the HSV color space and RGB to calculate the color histogram. Show the top 25 images from the four separate retrieval sets and say which you believe is the best.

[10]