CS 450 Computer Vision and Machine Learning (Spring 2025)

Homework Assignment 2

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. Do the following:
    a. Apply two Gaussian filters with sigmas 2 and 4 respectively on a grayscale version of the “astronaut” image from the skimage data module. Now subtract the latter output (sigma=4) from the former one (sigma=2). Display the two outputs and this difference image side by side. [10]

    b. Use **SP.jpg (attached)** for this question. This image has salt and pepper noise. Use a median filter to remove this noise. Display the original and new images side by side. (You can look up median filtering in the official skimage documentation) [5]

2. Write a function called tinyImage that creates a feature vector out of a color image as follows: the image is first resized to 16x16 pixels (skimage.transform.resize), then all pixels (16x16x3=768) are stretched out in the form of one vector. Repeat last week’s retrieval experiment on Oxford Flowers with this feature vector instead of color histogram. You may use any distance measure. [10]

3. **Reading (<u>ungraded</u>): Read up online on the Viola-Jones Face Detector. We will talk about it in class in the coming weeks.**