**CS4187 Computer Vision & Interactivity**

Assignment 1 Report

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Setup:

I have included only src folder for each question. Simply replace them with the relevant project. If any problems are encountered please contact. Done on Xcode.

***Question 1:***

For this question, we setup variables for images and matrices. Load the images into variables and convert them to matrices. We use two nested for loops to achieve the result.

On each iteration, we check for green background color in the first image and replace them with pixels from the second image. We still have some green pixels on boundaries of the man. We can achieve much better results by filtering the boundary pixels to balance green.

Also we can use edge detection techniques.

A picture containing photo, person, person, standing

Description automatically generated

***Question 2:***

Procedure:

1. Copy images to bin folder of the project. Define ofImage, Mat variables in ofApp.h
2. Also, setup Gui for sliders to control kernel size and variance for Gaussian Filter.
3. Load images and convert them to matrices, call gui in ofApp.cpp under setup().
4. Under update, which is refreshed several times, call the respective functions for box filter, gaussian filter and median filter setting a condition for an odd-dimension matrix.
5. Under draw(), set background color if needed and call drawMat to display images. Also, call gui.

Results:

For Lena, I observed that it is Gaussian Noise. Hence, Gaussian Filter is the best filter for de-noising because it retains edge information for further processing like edge extraction whereas box filter also does the job, but we see that it is blurred significantly.

A picture containing photo, guitar

Description automatically generated

*Gaussian Filter denoises Lena to some extent.*

A close up of a person

Description automatically generated

*Median Filter Works for Circuit*

For Circuit, it is evident that it is a Salt and Pepper Noise and the median filter does the job of removing noise perfectly.

Question 3:

A close up of a person

Description automatically generated

We first use videograbber class, set height and width for our video. Declare variables for img , mat and histogram. We also use mousex and mousey to get the location of mouse click and a bool whether to check if we clicked the mouse or not. In setup of ofApp.cpp, we use videograbber. In update, we capture every frame as an image, convert to mat and grayscale.

We set up a new histogram for each frame that updates on every refresh. When a mouse click is fired, we capture the location and clicked is set to true, so the if statement that inverts all the pixels with the same intensity is handled.