

MTRE4490 Machine Learning for Robot Perception

Project #1

Due by 11:59 pm on 01/24/20 (Friday)

In this project, you are required to develop a python program to validate some basic image processing skills. In particular, your python program will complete the following tasks:

1. Continuously grabs 4,500 frames from the internal camera of your laptop.
2. Save the frames into a video file: live_camera.avi.
3. Open the video file of live-camera.avi
4. Read from the video file frame by frame.
5. For each frame (image),
 - Show the frame on a window.
 - Print its shape.
 - Use additional three windows to show the red, green and blue channel of the image separately.
 - Resize the image to 70% of its original size.
 - Convert the new image from the RGB color space to the HSV color space.
 - Assigned 0.5 to the V values of all pixels in the image.
 - Use another window to show the histogram of the S channel in the image.
 - Equalize the histogram of the S channel of the image and show its new histogram in a new window.
 - Convert the processed image from the HSV space to the RGB space.
 - Use a 7x7 Gaussian filter to remove the noise in the image.
 - Show the filtered image on another window.
 - Save the filtered image (frame) to a new video file: modified_video.avi
6. Open the video file “modified_video.avi” and play back the video in a window.
7. Save your Python code as “image_operation.py”, put all group members’ names on the first line with a leading string “### “, and upload it to the D2L drop box.

Grading Rubric

10 points: Project submitted correctly.

10 points: Code runs without any syntax errors.

10 points: The video file of “live_camera.avi” is generated correctly.

20 points: The RGB channels of the frame are showed correctly.

10 points: The histogram of the S channel is showed correctly

20 points: The equalized histogram of the S channel is showed correctly

20 points: The video file of “modified_video.avi” can be played back correctly.