ECPS204 Setup-Part A

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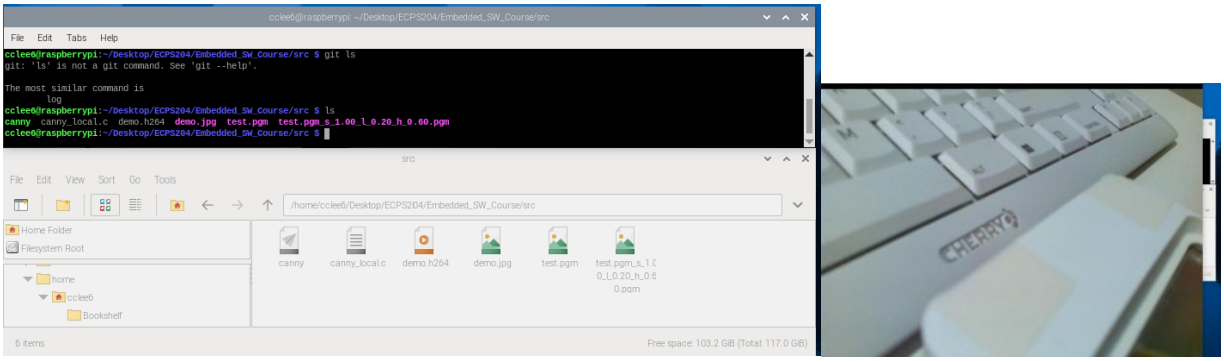
Project Description (2 pts)

- The purpose of this project is to set up Raspberry Pi with the camera and canny.c compilation environment. Furthermore, we want to test different results of canny.exe with at least 4 sets of parameters input.
- We expect to see the directory of the files used and captured images and videos. Furthermore, we expect to see the difference between each trails with comments prepared.

1. Experimental Setup (4 pts)

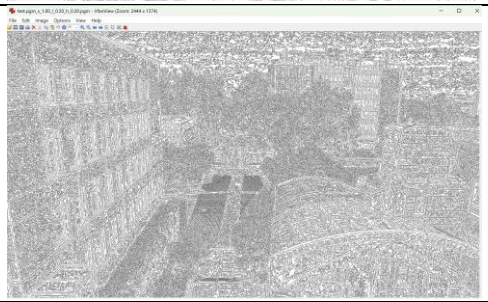
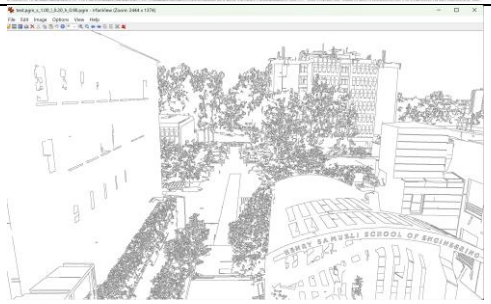
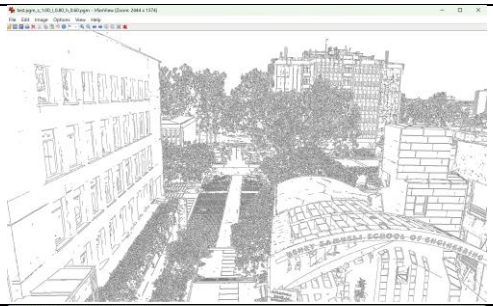
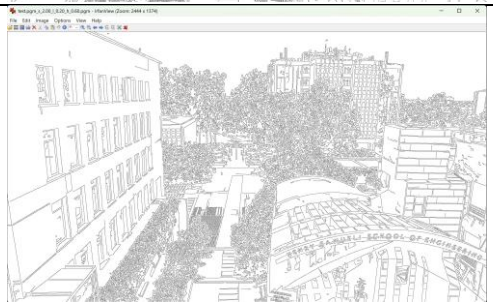
- For this project, we set up a Git repository to exchange files between my RPi and laptop. Following the instructions, I get each step done and recorded.
- We had to use libcamera to do simple camera control since we're using RPi 5 with newer SW.
- In the canny parameters' comparison part, we choose to change one parameter at a time to control the changes.

2. Results (6 pts)



This is the directory and files we used for this project. On the right-hand side is the captured image.

Canny application with different parameters and comparison.

Parameter Sets <sigma>/<tlow>/<thigh>	**Results**	**Comment and observation**
1.0/0.2/0.6		Example Command
1.0/0.2/0.2		By tuning **<thigh>** down to 0.2, there are too much noise kept.
1.0/0.2/0.9		By tuning **<thigh>** up to 0.9, there are way less noise kept.
1.0/0.8/0.6		By tuning **<tlow>** up to 0.8, this set is probably not making sense. Since the lower threshold is now higher than higher threshold.
2.0/0.2/0.6		By tuning **<sigma>** up to 2, edges become clearer and simpler (strong edges).

3. Problems and Discussion (6 pts)

- First, we were a little stuck by the camera library but that was an easy fix by switching to libcamera.
- Setting up the repository took us a little bit of time since we would need the passkey to operate git access on the RPi.
- Other parts are fine and clear.

4. Conclusion (2 pts)

- After setting up the environment and RPi, the camera functioned as expected.
- After testing canny with different parameters, we came up with the conclusion that the <sigma> defines the magnitude of smoothing; <tlow> defines the lower threshold to remove an edge; <thigh> defines the higher threshold to keep an edge.