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

1. **Results (6 pts)**

一張含有 文字, 軟體, 螢幕擷取畫面, 電腦圖示 的圖片

AI 產生的內容可能不正確。一張含有 電子產品, 輸入裝置, 周邊設備, 筆記型電腦 的圖片

AI 產生的內容可能不正確。

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

|  |  |  |
| --- | --- | --- |
| **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). |

Canny application with different parameters and comparison.

1. **Problems and Discussion (6 pts)**

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

1. **Conclusion (2 pts)**

* After setting up the environment and RPi, the camera functioned as expected.
* After testing canny with different parameters, I 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.