

EE 371 Lab 6 Report

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Introduction

In this lab, I implemented some filters on the camera, including one gray scale filter and two edge detectors.

Procedure

I implemented the gray scale filter because I initially thought that it would be useful for designing the edge detector. By calculating the weighted average of the RGB values using $0.3 * R + 0.59 * G + 0.11 * B$, I made everything look gray on the screen.

After implementing the gray scale filter, I found that I could achieve the effect of an edge detector by applying multiple filters. There are 3 filters included in the filter module, which assign delta values to the corresponding RGB parts. By using only delta_R value and setting values for green and blue to 0, the edges are marked as black while other part of the image is switching back and forth between black and red. By extracting the black feature, the filter can work as an edge detector.

However, this edge detector is pretty noisy so I tried to reduce the noise. The second edge detector was more like by mistake. I assigned delta_R to the value of blue and left the values of red green as 0, then I extracted the part of the image whose RGB

value is 0 for this and the previous clock cycle. The screen turned black, but when I used the filter that assigns delta_B to the value of blue, there are some blue edges on the screen with the background of black.

Results

The gray scale filter worked well though it was not useful to the edge detectors. My first edge detector, as I previously said, was very noisy though the edges are clear while the second detector does not have much noise but the edges are shallow when the thing it is pointing to is not bright.

Problem Faced & Feedback

Though my edge detectors meet the functions that an edge detector should have, they are still flawed. It is a better option to extract all the data from the SDRAM and do convolution on the whole data set.

I spent 30 hours on this lab, which is way longer than it appears to be. I initially tried to do a task on game but I could not find a way to start without introducing classes. I also spent a lot of time trying to see if there was any way I could do convolution on the whole data but I failed. The rest of the time was trying different filters to see if I could reduce the noise.