IC Lab Final Project Report

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1. Type 0:

The slide window size is 5. Moreover, I use the weight set {1, 0, 1, 0, 1} to multiply the windows {p1, p2, p3, p4, p5}. Hence, I will find N adjacent bin have the maximum value with function p1+p3+p5. Then, other operation is all same as midterm project in type 1.

1. Type 1:

The strategy is similar to type 0. However, I will group the pixel 0, 1, 4, 5 as one histogram, 2, 3, 6, 7 as one histogram, 8, 9, 12, 13 as one histogram and 10, 11, 14, 15 as one histogram. Just like the picture below, will sum the same color pixel as one histogram. So, the spatial correlation will be used. And other strategy is same as type 0.

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |

1. Type 2:

Take pixel 0 as example, when the data come into the window, it will compare the sum of histogram, pixel 0 + pixel 4 and pixel 0 + pixel 1, then choose the larger one into the window. And the size of window is 5 with no weight set. So, the histogram in window may sometimes be pixel 0 + pixel 4, sometimes be pixel 0 + pixel 1. This operation is that if the pixel is not the peak position, then there will be at least one of the neighbor pixel have same golden answer. Hence, I try to group them just like type 1.

Then, I will also calculate the neighbor 3 pixels simultaneously. Then check the error of the distance is too large or not. If yes, then I will correct the answer to one of neighbor pixels; if no, will remain the same.

Pixel 0:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |  | 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |  | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |  | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |  | 12 | 13 | 14 | 15 |

Pixel 1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |  | 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |  | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |  | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |  | 12 | 13 | 14 | 15 |

Pixel 4:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |  | 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |  | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |  | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |  | 12 | 13 | 14 | 15 |

Pixel 5:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |  | 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |  | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |  | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |  | 12 | 13 | 14 | 15 |

And so on.

1. Type 3:

The strategy is same as type 2.

1. Area\*Timing

Use two SRAM 64 bit 128 words to minimize the area. Moreover, to reduce the timing writing back to DRAM, I calculated the distance meanwhile control the axi4 signal to write the histogram back to the DRAM. So, I don’t need the write back state to waste more cycle.