Answers to questions in

Lab 2: Edge detection & Hough transform

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**Instructions**: Complete the lab according to the instructions in the notes and respond to the questions stated below. Keep the answers short and focus on what is essential. Illustrate with figures only when explicitly requested.

Good luck!

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**Question 1**: What do you expect the results to look like and why? Compare the size of *dxtools* with the size of *tools*. Why are these sizes different?

**Answers:**

Applying only the dx partial derivate, will show fluctuations in the x-direction. Because of this, we expect vertical edges (or rather, edges horizontal to the x-axis, which happens to be down-facing) to be elucidated more clearly: | |

Applying the dy partial derivate approximation, will result in the opposite: =.

Using Robert’s 2 x 2 cross gradient operator for estimating the partial derivate, the size of the resulting image is 255 x 255 pixels (with the original image being 256 x 256 pixels). If we instead use 3 x 3 Sobel operators, the resulting image will be of size 254 x 254 pixels. The answer to why this discrepancy arises lies in the fact that a 2 x 2 operator is able to get closer to the edges of the image than a 3 x 3 operator. Thus, the smaller operator can calculate more partial derivates.

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**Question 2**: Is it easy to find a threshold that results in thin edges? Explain why or why not!

Answers:

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**Question 3**: Does smoothing the image help to find edges?

Answers:

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**Question 4**: What can you observe? Provide explanation based on the generated images.

Answers:

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**Question 5**: Assemble the results of the experiment above into an illustrative collage with the *subplot* command. Which are your observations and conclusions?

Answers:

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**Question 6**: How can you use the response from *Lvv* to detect edges, and how can you improve the result by using *Lvvv*?

Answers:

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**Question 7**: Present your best results obtained with *extractedge* for *house* and *tools*.

Answers:

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**Question 8**: Identify the correspondences between the strongest peaks in the accu-mulator and line segments in the output image. Doing so convince yourself that the implementation is correct. Summarize the results of in one or more figures.

Answers:

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**Question 9**: How do the results and computational time depend on the number of cells in the accumulator?

Answers:

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**Question 10**: How do you propose to do this? Try out a function that you would suggest and see if it improves the results. Does it?

Answers:

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