Assignment 2

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The problem given was to find the edges of a document in an image given the document was upright in the image. The approach I took for this assignment involved 2 steps, filter the image to get a binarized image in which the document is white and everything else is black, then find the edges of the document on this binarized image by assuming the document is upright in the image and centered. My method assumes the image is centered, upright and is neither too small nor does it take up the entire image.

A. Filter Image

1. Filter the image using a Gaussian filter
2. Get binary mask from non-grayscale image using threshold given by otsu's method
3. Grayscale the image
4. Use binary mask on grayscale image
5. Find edges using Canny method
6. Add thickness to edges using standard deviation filter
7. Further filter the image using median filter
8. Fill holes in the image and get the binarize mask as the final image to use

B. Finding edges heuristically: partially inspired by the method given below

https://github.com/apoorva0803/Auto-Crop/blob/master/auto_crop.m

1. Find the top edge by starting from the center of image and moving up using a **window**. Since the image is binarized, if the **window** becomes all zeros, then we have reached an edge. If edge is too close to center or too close to the side of the image, then the found edge is assumed to be bad, thus is not marked as a good edge.
2. For the other edges, use the same method as **step 1** above.
3. Given the found edges and edge_markers, correct for possible bad edges using the following rules:
    a. A corresponding pair of edges refers to (top, bottom) or (left, right).
    b. For any edge, if it is marked as a good edge but its corresponding pair is not, then assume the document is centered and use symmetry to find where the corresponding pair should be.
    c. If the corresponding pair are both marked bad edges, then use the center 60% of image dimension. i.e. top and bottom are both marked as bad edges, then use the center 60% of image height to locate top and bottom.
    d. If the cropped proportion only account for less than 10% of image, then use center 60% of all image dimensions as cropped area.