Generation of Pencil Sketch App

Group - 1

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INTRODUCTION

- Pencil sketch drawings are a very popular form of art.In a typical pencil sketch image, only the most characteristic lines of the underlying subject are drawn,using a dark color on a white background.

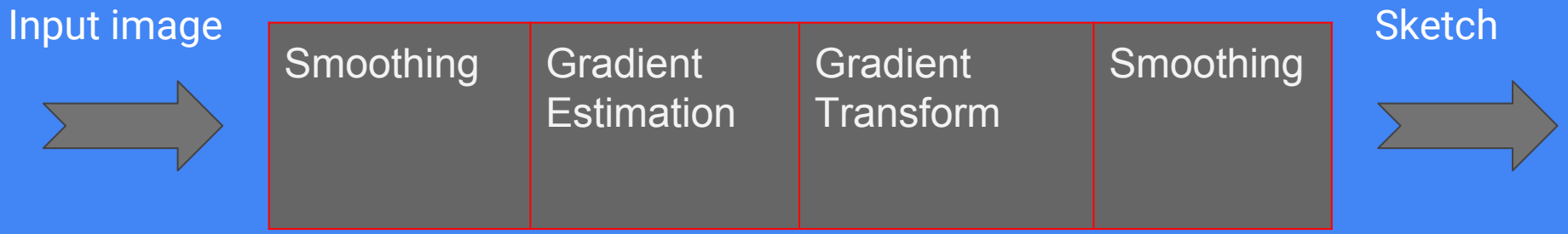
- Pencil sketch drawings are in some sense similar to pen-and-ink drawings.

Pencil Sketch Images

Properties Of Pencil Sketch

- Objects are depicted by contours, which are long and significant edges.
- Edges are drawn in dark, with the darkness roughly proportional to the local gradient,while the background is kept purely white.
- Textured regions can be depicted by a collection of short lines/edges.

Steps To Follow



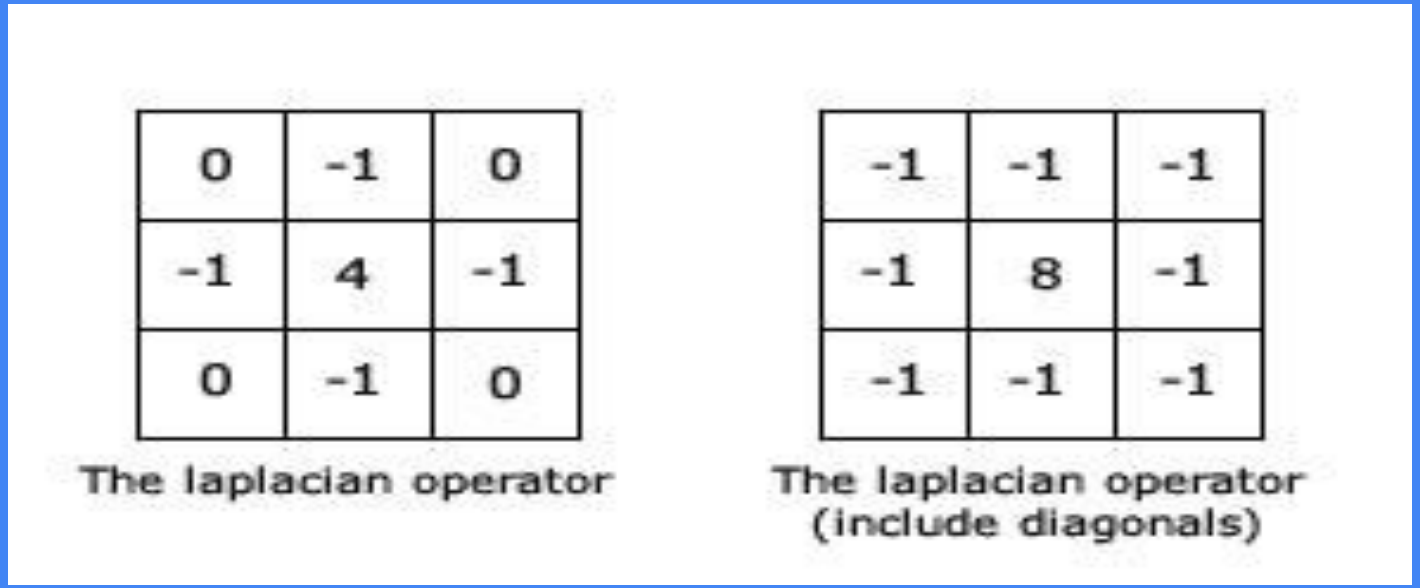
Step 1: Smoothing

- In general, an unprocessed image may contain excessive noise, which reacts strongly to the subsequent gradient estimation.
- Therefore, as the first step, the input image is smoothed by a Gaussian low-pass filter, just as the pre-processing of the Canny’s edge detector.

Step 2: Gradient Estimation

- Next task is to detect points of significant gradient (roughly speaking, the edges).
- As noted above, not only the locations of the edges but also the gradient at those locations should be kept. For illustration purpose, we use the following Laplacian operator for gradient estimation.

Laplacian Operator



0	-1	0
-1	4	-1
0	-1	0

The laplacian operator

-1	-1	-1
-1	8	-1
-1	-1	-1

The laplacian operator (include diagonals)

Step 3: Gradient Transform

To achieve the objective of linking darker pencil color to edges of larger gradient, we apply the following transform :

$$g = \begin{cases} 120 - g, & \text{if } g > 0 \\ 255 & \text{otherwise.} \end{cases}$$

where 120 is an empirically-chosen parameter, which can be user-adjustable in the software.

Intermediate Images

- Note that, even with the smoothing operation in Step 1, one can still find that, from Fig. (b), there are excessive noisy details still visible in the image, making it dissimilar to a pencil sketch. This is especially the case since we used the Laplacian operator, which is very sensitive to noise.

- To get a succinct pencil sketch image, we need to eliminate most of the details.

- To this end, in practice we threshold the gradient image before applying the transformation.

Step 4 : Final Smoothing

- The results from the previous three steps typically give the visual effect of a pencil sketch, except that there may be many broken contours that appear to be unnatural.
- To alleviate these problems, we adopt another smoothing step to further blend the contours with the background and to link the broken contours.

Progress Up Till Now

- Steps 1 and 2 have been completed.
- Working on step 3 is going on.Our current results are attached in the folder.
- More focus is on accurate results (according to research paper) in the future time.