

Report

Laplace Mask 1, threshold: 15



For pixel (r, c) , calculate gradient by the following mask, (r, c) corresponds to the center of the mask

	1	
1	-4	1
	1	

For zero-crossing edge detection, if $\text{gradient}(r, c) \geq \text{threshold}$ and one of its 8-neighbors' $\text{gradient} \leq -\text{threshold}$, $\text{output}(r, c) = 0$, else $\text{output}(r, c) = 255$

Laplace Mask 2, threshold: 10



For pixel (r, c) , calculate gradient by the following mask, (r, c) corresponds to the center of the mask

$$\frac{1}{3} \begin{array}{|c|c|c|} \hline 1 & 1 & 1 \\ \hline 1 & -8 & 1 \\ \hline 1 & 1 & 1 \\ \hline \end{array}$$

For zero-crossing edge detection, if $\text{gradient}(r, c) \geq \text{threshold}$ and one of its 8-neighbors' $\text{gradient} \leq -\text{threshold}$, $\text{output}(r, c) = 0$, else $\text{output}(r, c) = 255$

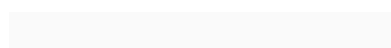
Minimum variance Laplacian, threshold: 20



For pixel (r, c) , calculate gradient by the following mask, (r, c) corresponds to the center of the mask

$$-\frac{1}{3} \begin{array}{|c|c|c|} \hline 2 & -1 & 2 \\ \hline -1 & -4 & -1 \\ \hline 2 & -1 & 2 \\ \hline \end{array}$$

For zero-crossing edge detection, if $\text{gradient}(r, c) \geq \text{threshold}$ and one of its 8-neighbors' $\text{gradient} \leq -\text{threshold}$, $\text{output}(r, c) = 0$, else $\text{output}(r, c) = 255$



Laplace of Gaussian, threshold: 3000



For pixel (r, c) , calculate gradient by the following mask, (r, c) corresponds to the center of the mask

0	0	0	-1	-1	-2	-1	-1	0	0	0
0	0	-2	-4	-8	-9	-8	-4	-2	0	0
0	-2	-7	-15	-22	-23	-22	-15	-7	-2	0
-1	-4	-15	-24	-14	-1	-14	-24	-15	-4	-1
-1	-8	-22	-14	52	103	52	-14	-22	-8	-1
-2	-9	-23	-1	103	178	103	-1	-23	-9	-2
-1	-8	-22	-14	52	103	52	-14	-22	-8	-1
-1	-4	-15	-24	-14	-1	-14	-24	-15	-4	-1
0	-2	-7	-15	-22	-23	-22	-15	-7	-2	0
0	0	-2	-4	-8	-9	-8	-4	-2	0	0
0	0	0	-1	-1	-2	-1	-1	0	0	0

For zero-crossing edge detection, if $\text{gradient}(r, c) \geq \text{threshold}$ and one of its 8-neighbors' gradient $\leq -\text{threshold}$, $\text{output}(r, c) = 0$, else $\text{output}(r, c) = 255$

Difference of Gaussian, threshold: 1



For pixel (r, c), calculate gradient by the following mask, (r, c) corresponds to the center of the mask

-1	-3	-4	-6	-7	-8	-7	-6	-4	-3	-1
-3	-5	-8	-11	-13	-13	-13	-11	-8	-5	-3
-4	-8	-12	-16	-17	-17	-17	-16	-12	-8	-4
-6	-11	-16	-16	0	15	0	-16	-16	-11	-6
-7	-13	-17	0	85	160	85	0	-17	-13	-7
-8	-13	-17	15	160	283	160	15	-17	-13	-8
-7	-13	-17	0	85	160	85	0	-17	-13	-7
-6	-11	-16	-16	0	15	0	-16	-16	-11	-6
-4	-8	-12	-16	-17	-17	-17	-16	-12	-8	-4
-3	-5	-8	-11	-13	-13	-13	-11	-8	-5	-3
-1	-3	-4	-6	-7	-8	-7	-6	-4	-3	-1

For zero-crossing edge detection, if $\text{gradient}(r, c) \geq \text{threshold}$ and one of its 8-neighbors' $\text{gradient} \leq -\text{threshold}$, $\text{output}(r, c) = 0$, else $\text{output}(r, c) = 255$