

1	1	1	0	0	1	1	1
1	1	1	0	0	1	1	1
1	1	1	0	0	1	1	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
1	1	1	0	0	1	1	1
1	1	1	0	0	1	1	1
1	1	1	0	0	1	1	1

Image

1	0	-1
1	0	-1
1	0	-1

Vertical Edge Filter

0	0	0
1	1	1
-1	-1	-1

Horizontal Edge Filter

1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1
1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1
1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1
1	0	0	0	-1	0	1	0	0	0	-1	0	0	0	0	0	0
1	0	0	0	-1	0	1	0	0	0	-1	0	0	0	0	0	0
1	0	0	0	-1	0	1	0	0	0	-1	0	0	0	0	0	0
1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1
1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1
1	1	0	1	-1	1	1	0	0	0	-1	1	1	1	0	1	-1

1	0	-1
1	0	-1
1	0	-1

Image with Vertical Edge Filter

1	0	-1	0	0	-1	1	0
1	0	-1	0	0	-1	1	0
1	0	-1	0	0	-1	1	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
1	0	-1	0	0	-1	1	0
1	0	-1	0	0	-1	1	0
1	0	-1	0	0	-1	1	0

Output Image

$$\begin{aligned}
 0 + (-3) + 3 &= 0 \\
 0 + (-1) + 1 &= 0 \\
 0 + (-2) + 2 &= 0 \\
 \text{Total} &= 0
 \end{aligned}$$

I applied a 3×3 vertical edge detection filter and performed a convolution operation, multiplying and summing values at each step. Each row summed to 0, meaning this specific region of the image does not show a strong vertical edge, resulting in an output pixel of 0 (no change).

0	1	0	1	0	1	0	0	0	0	1	1	1	0	0	0
1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1
-1	1	-1	1	-1	1	-1	0	-1	0	-1	1	1	1	-1	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
-1	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
0	1	0	1	0	1	-1	0	-1	0	-1	1	-1	1	-1	1
1	1	1	1	1	1	0	0	0	0	1	0	1	0	1	0
-1	1	-1	1	-1	1	1	0	1	0	1	1	1	1	1	1
						-1	-1	-1			-1	-1	-1		

Image with Horizontal Edge Filter

0	0	0	0	0	0	0	0	0
1	1	1	0	0	1	1	1	1
-1	-1	-1	0	0	-1	-1	-1	-1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
-1	-1	-1	0	0	-1	-1	-1	-1
0	0	0	0	0	0	0	0	0
1	1	1	0	0	1	1	1	1

Output Image

$$\begin{aligned}
 &0 + 0 + 0 = 0 \\
 &(-3) + (-1) + (-1) = -6 \\
 &3 + 1 + 2 = 6 \\
 &\text{Total} = 0
 \end{aligned}$$

I applied a 3×3 horizontal edge detection filter and performed a convolution operation, multiplying and summing values at each step. The first row summed to 0, meaning there is no change at the top. The second row summed to -6, indicating a strong negative response, which suggests a dark region in the middle. The third row summed to 6, indicating a strong positive response, which suggests a bright region at the bottom. Since the final output is 0, it means the changes are balanced, leading to cancellation when summed. The image doesn't contain a strong horizontal edge.