EEE 508 Digital Image and Video Processing/Compression

Project -2 Edge Enhancement

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1. Observations and Plots:

The images used for this project was “airplane_grayscale.png”, it is shown in figure 1.

Figure 1. The original airplane image.

1.1 Robert Gradient image

By finding the magnitude of the sum of the results produced by the convolution of the two Robert gradient masks with the original image, a gradient image was produced, figure 2. It can be observed that smooth regions have become dark, thereby highlighting the edges in the image.

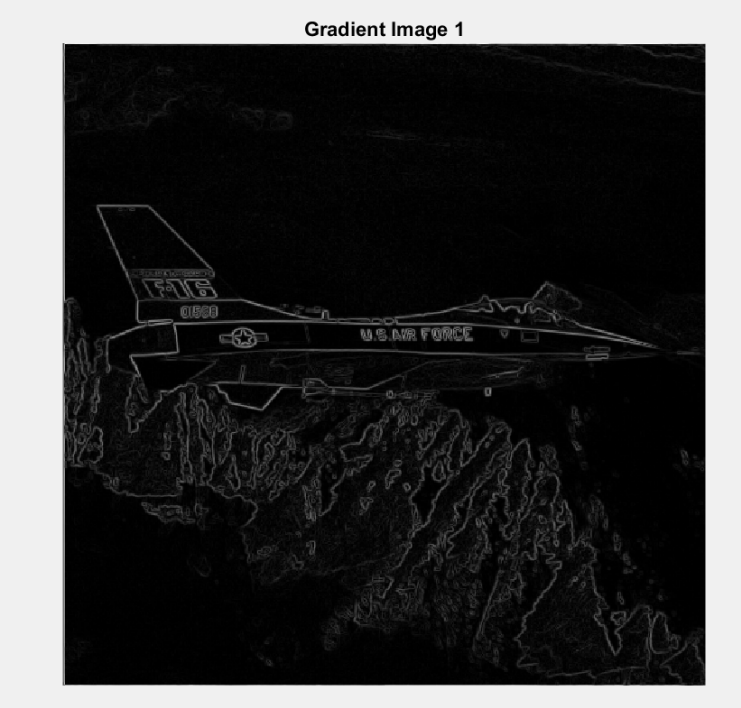

Figure 2. Robert gradient image

1.2 Gradient image 2

The gradient image 2, figure 3, was produced by using gradient image value if the pixel value was greater than threshold(T = 25), else the original pixel value was used. It can be observed that the edges here are more emphasized without destroying the smooth background of the image.

Figure 3. Gradient image 2

1.3 Gradient image 3

The gradient image 3 in figure 4, was produced by setting the edges to a specific threshold (Lg=255) if the pixel value was greater than threshold(T = 25), else the original pixel value was used. It can be observed that the edges here are more emphasized like gradient image 2, but the edges have a color white. Since the background is almost white, the edges seem to mix with the background in certain places.

Figure 4. Gradient image 3

1.4 Gradient image 4

The gradient image 4, figure 5, was produced by setting the background to a specific threshold (Lb = 0) when the pixel value was lesser than threshold(T = 25), else the gradient image value was used. It can be observed that the edges remained like the gradient image 1, while the background is black, highlighting the edges in the image.

Figure 5. Gradient image 4

1.5 Gradient image 5

The gradient image 5 in figure 6, was produced by setting the edges to a specific threshold (Lg=255) if the pixel value was greater than threshold(T = 25), else the threshold (Lb = 0) was used. This produced a binary gradient image, where the background and edges are clearly separated.

Figure 6. Gradient image 5