Explanation

The Prewitt filter is similar to the Sobel filter in that it works by calculating the gradient of image intensity at each pixel within an image. It finds the direction of the most significant increase of brightness from light to dark and the rate of change in that direction. When using this filter, images can be processed in the X and Y directions separately or together. You can specify the direction of derivatives to be taken, vertical or horizontal (by the arguments, yorder and xorder respectively).

Laplacian edge detector compares the second derivatives of an image. It measures the rate at which first derivative changes in a single pass. Laplacian edge detection uses one kernel and contains negative values in a cross pattern. One shortcoming of Laplacian edge detector is that it's sensitive to noise. That is, it might end detecting noises as edges.

From the resulting images from our Prewitt and Laplacian function, we can see that the Laplacian filter gives a much clearer edge of the image compared to the Prewitt filter which has a very low contrast and does not outline the edges sharply. This could be a problem when viewing an image that is a night view. In such images the silhouette of the image would be completely blurred.

Furthermore, there is a difference when ksize for the Laplacian filter are set to ksize = 1, and ksize =5. For ksize=5, the image edges are much more visible and outlined with a sharper outline compared to ksize = 1(Please see the images for proof)

Prewitt Function Steps:

1. Define the function to implement the Prewitt filter.
2. Create a variable inside the Prewitt filter to hold the result of the gaussian filtered image which removes any noise from the image.
3. Define the filtering matrix for Prewitts on the vertical filter.
4. Define the filtering matrix for Prewitts on the horizontal filter.
5. Perform the vertical filtering using the Filter2D function for Prewitts on the vertical coordinates
6. Perform the horizontal filtering using the Filter2D function for Prewitts on the vertical coordinates
7. Get the absolute value of the filtered vertical filter
8. Get the absolute value of the filtered horizontal filter
9. Get the weighted value of both filter dimensions and return the value

Laplacian Function Steps:

1. Define the function to implement the Laplacian filter.
2. Utilize the Laplacian filter function in OpenCV to pass in the image the ksize (the Laplacian filter dimension), and the depth dimension.
3. Return the value of the filtered image

Link to complete folder: Link