

Assignment 2

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Computer Vision
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Table of Contents

Assignment 2.....	3
Assignment	
Details.....	
.....	3
Implementation.....	
.....	3
Resources.....	
.....	3
Output	
Images.....	
.....	4
References.....	6

1. Assignment 2

1.1 Assignment Details

This assignment required me to implement three well known filters on an image. These filters include Box Filter, Sobel Filter, and Gaussian Filter.

1.2 Implementation

To implement these filters, I used OpenCV. My program first implements the Box Filter on a picture of a dog. The original image of the dog is shown along with three other windows. These other windows show the original image with a Box Filter applied, with three different kernel sizes. I programmed one window to show the Box Filter with a 15x15 size kernel window, another window to display with a 45x45 size window, and a third window to display with a 75x75 size window. I wanted to use rather extreme values so that the drastic difference of using different kernel sizes would be obvious.

Next, the user presses the “Enter” button to command the program to run the Sobel Filter. I implemented this similar to how I implemented the Box Filter. Instead of a dog picture, I used a picture of a bicycle to display as the original image. Then three other windows display with three different kernel sizes; 1x1, 3x3, and 9x9.

Finally, once the user presses “Enter” again, the program is commanded to run the Gaussian Filter. My implementation uses the same original image as the Sobel Filter; the bicycle picture. It also shows three different windows with three different kernel sizes. These sizes are the same sizes that were used for the Box Filter implementation: 15x15, 45x45, 75x75.

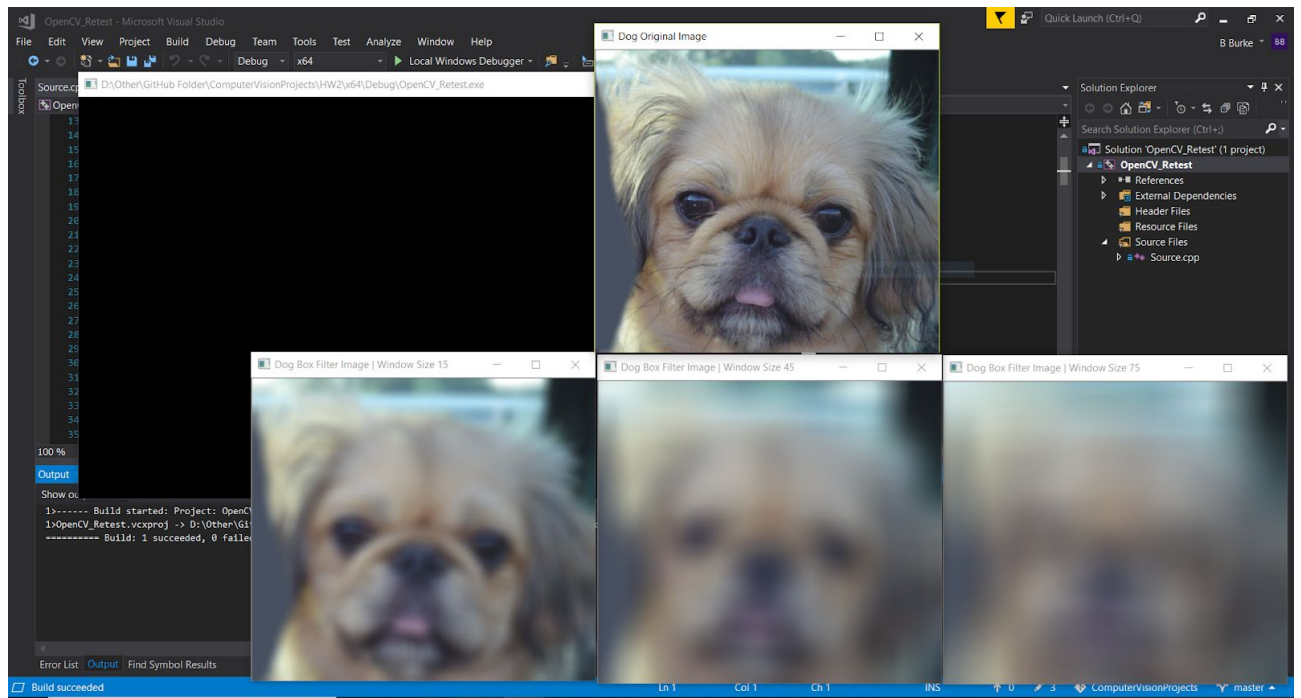
1.3 Resources

I used several resources for this project. The following list explains the reference and includes a brief explanation:

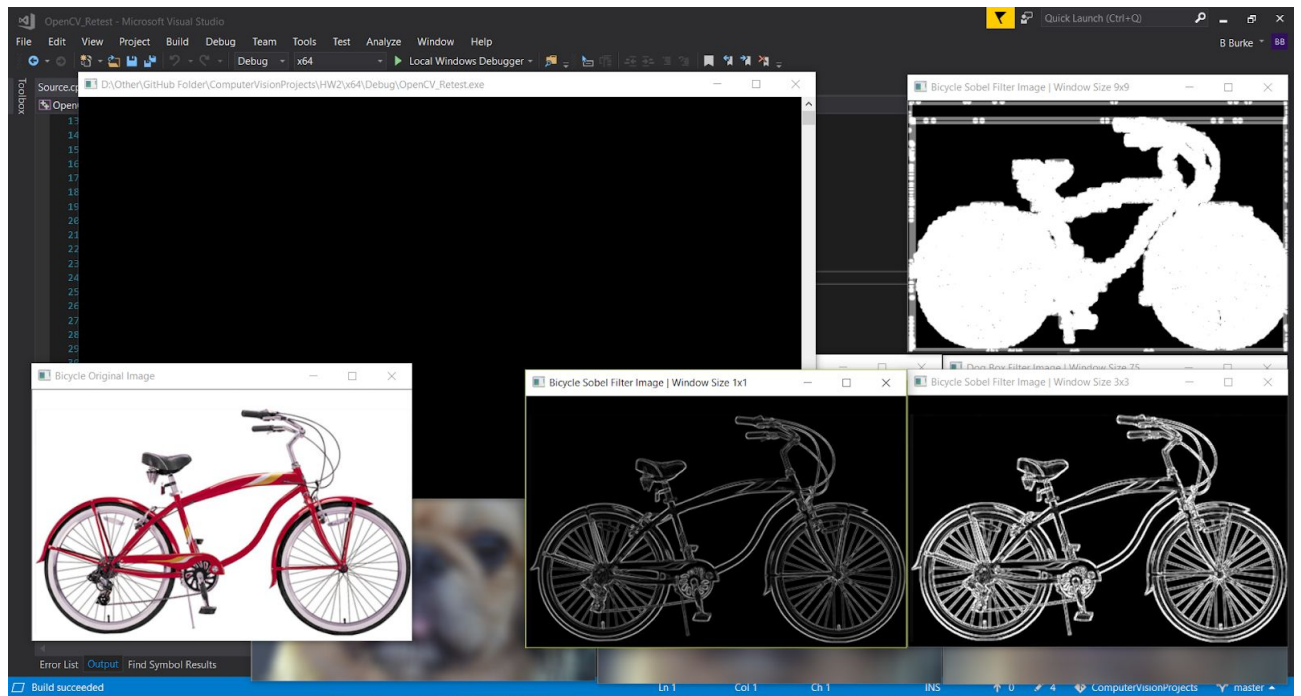
- OpenCV Documentation
 - Gaussian Blur - How to implement the Gaussian Blur function.
 - `convertScaleAbs` - How to convert Mat objects into 8-bit format.
 - Sobel - How to implement the Sobel function.
 - Sobel Derivatives - An example of how to implement the Sobel function.
 - Tutorialspoint.com for Box Filter - Explained how the Box Filter function can be implemented. Included some example code.
 - Box Filter - How to implement the Box Filter function.
 - Smoothing Images - Provided some example code for how to implement the Box Filter and Gaussian Filter functions.

1.4 Output Images

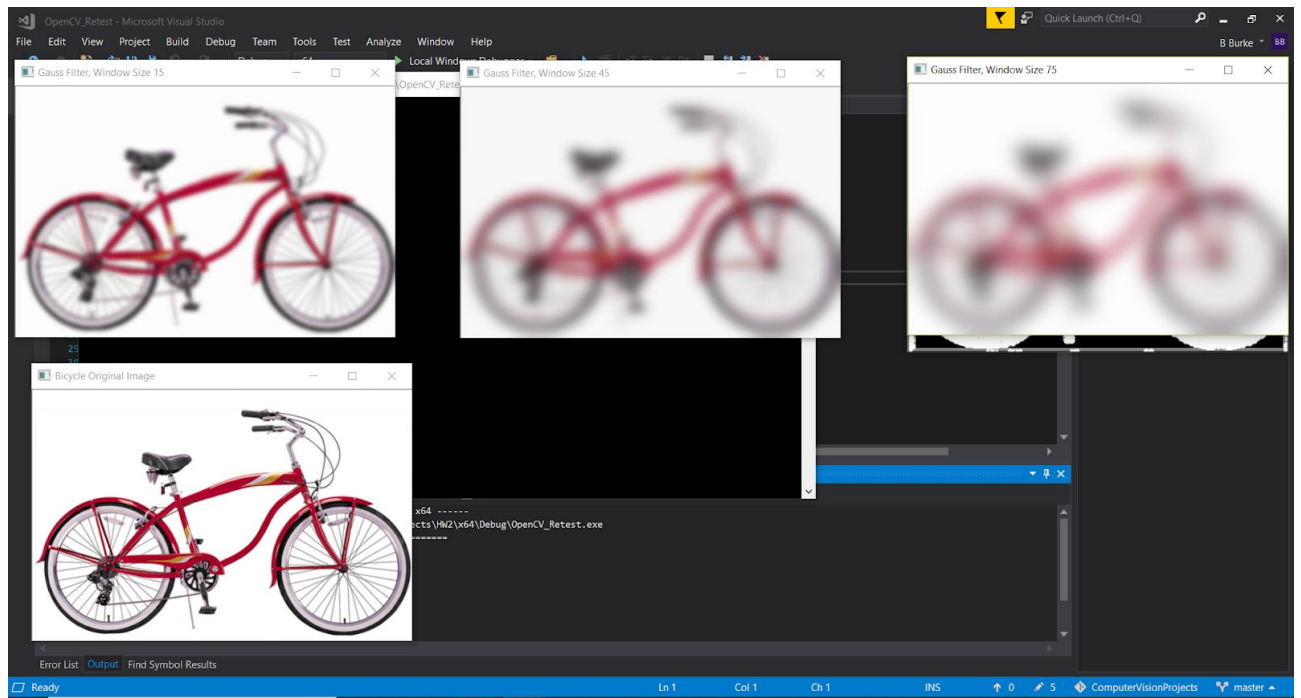
Box Filter



Sobel Filter



Gaussian Filter



References

- [1] (n.d.). Retrieved March 03, 2018, from https://docs.opencv.org/3.2.0/d4/d86/group_imgproc_filter.html#gaabe8c836e97159a9193fb0b11ac52cfl
- [2] (n.d.). Retrieved March 03, 2018, from https://docs.opencv.org/3.2.0/d2/de8/group_core_array.html#ga3460e9c9f37b563ab9dd550c4d8c4e7d
- [3] (n.d.). Retrieved March 03, 2018, from https://docs.opencv.org/3.2.0/d4/d86/group_imgproc_filter.html#gacea54f142e81b6758cb6f375ce782c8d
- [4] (n.d.). Retrieved March 03, 2018, from https://docs.opencv.org/3.2.0/d2/d2c/tutorial_sobel_derivatives.html
- [5] Point, T. (2018, January 08). OpenCV Box Filter. Retrieved March 03, 2018, from https://www.tutorialspoint.com/opencv/opencv_box_filter.htm
- [6] Image Filtering. (n.d.). Retrieved March 03, 2018, from <https://docs.opencv.org/3.0-beta/modules/imgproc/doc/filtering.html#boxfilter>
- [7] (n.d.). Retrieved March 03, 2018, from https://docs.opencv.org/3.1.0/d4/d13/tutorial_py_filtering.html