Cemal ÜNAL

Hacettepe University

Beytepe - ANKARA

Input Images and Their Results

In this experiment I realized that XDoGFilter is using to detect edges of given input images. When I apply the thresholding operation to the XDoGFiltered image, I observed that light gray tones and white regions turned into white, dark gray tones turned into black.

a   Input Image-1

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):
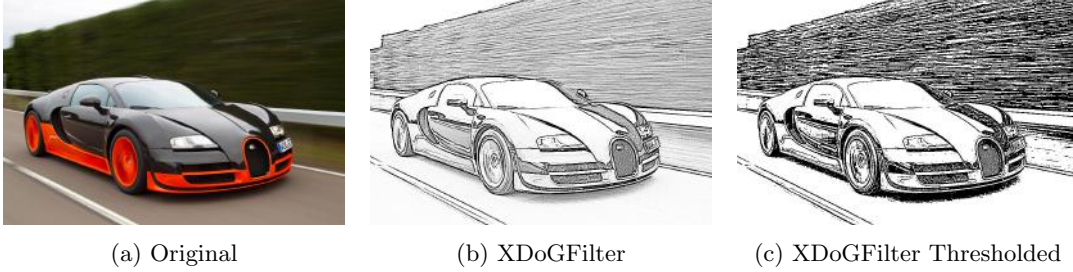

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 1: Values($\gamma = 0.98, \Phi = 200, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)
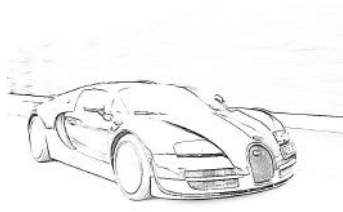
- Results in Changes Gamma Value

If Gamma value decrease, again we can see the edges of input image but the details of given image will be decrease.
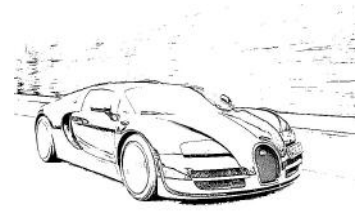
If Gamma value increase, we get an image which has high details. Here are the results related to gamma values figured below:

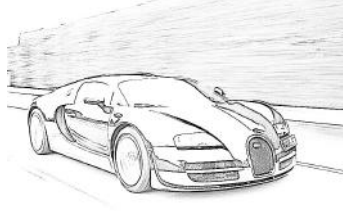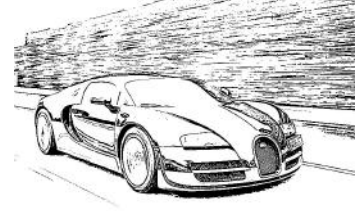(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 2: Values($\gamma = 0.90, \Phi = 200, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)

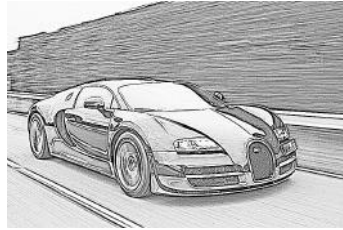(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
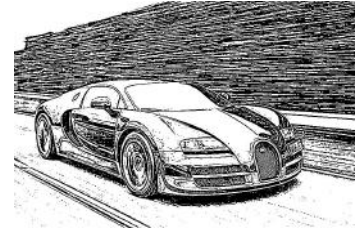
Figure 3: Values($\gamma = 0.945, \Phi = 200, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 4: Values ($\gamma = 0.99, \Phi = 200, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)

- Results in Changes Phi Value

If Phi value decrease, we obtain a darker version of input image in gray tones.

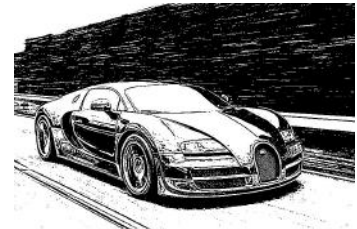If Phi value increase, we obtain a lighter version of input image.
Here are the results related to Phi values figured below:

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 5: Values ($\gamma = 0.98, \Phi = 10, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)
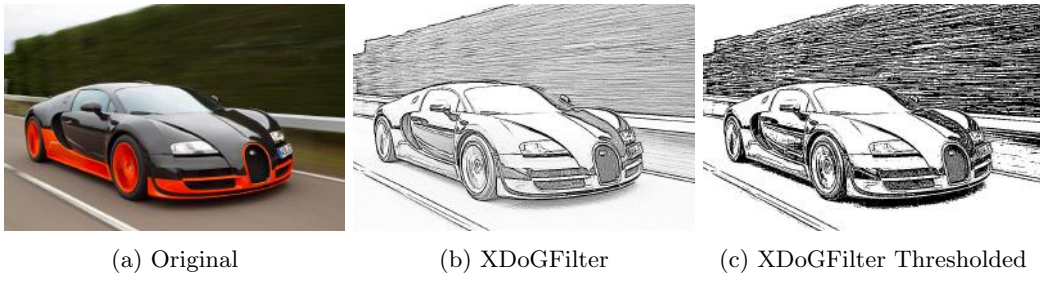
(a) Original	(b) XDoGFilter	(c) XDoGFilter Thresholded

Figure 6: Values $(\gamma = 0.98,\ \Phi = 200,\ \epsilon = -0.1,\ k = 1.6,\ \sigma = 0.8)$

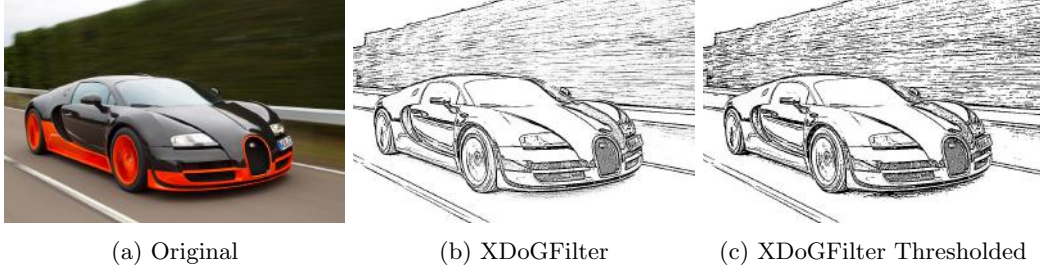|		
(a) Original	(b) XDoGFilter	(c) XDoGFilter Thresholded

Figure 7: Values $(\gamma = 0.98,\ \Phi = 800,\ \epsilon = -0.1,\ k = 1.6,\ \sigma = 0.8)$

- Results in Changes Epsilon Value

If Epsilon value decrease, we can observe that the gray tones is turning to more lighter version.

If Epsilon value increase, we can observe that the gray tones is turning to more darker version. If the Epsilon value will increase enough, then the image will nearly turn into black.
Here are the results related to Epsilon values figured below:

(a) Original	(b) XDoGFilter	(c) XDoGFilter Thresholded
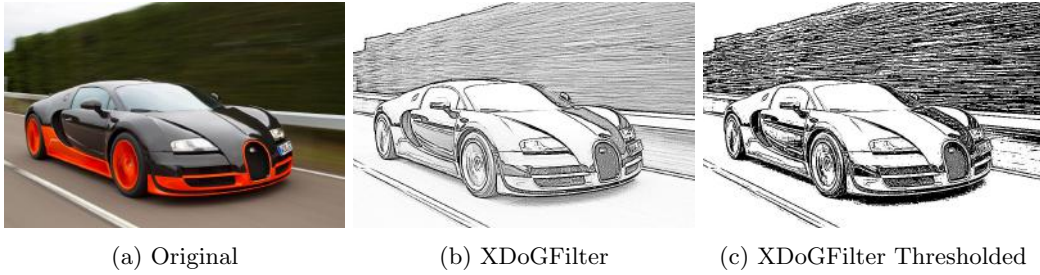
Figure 8: Values $(\gamma = 0.98,\ \Phi = 200,\ \epsilon = -0.1,\ k = 1.6,\ \sigma = 0.8)$

(a) Original	(b) XDoGFilter	(c) XDoGFilter Thresholded
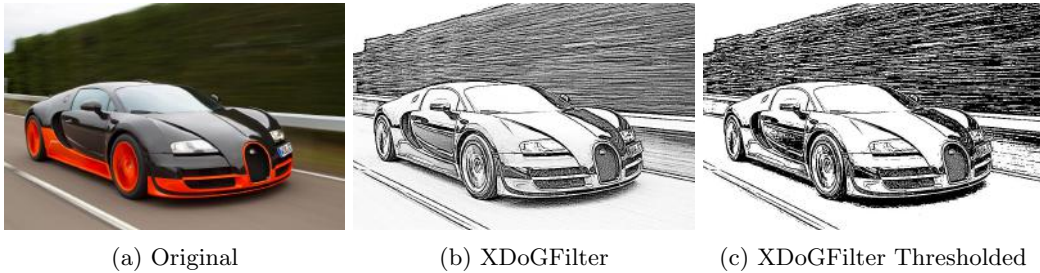
Figure 9: Values $(\gamma = 0.98,\ \Phi = 200,\ \epsilon = -0.00001,\ k = 1.6,\ \sigma = 0.8)$

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
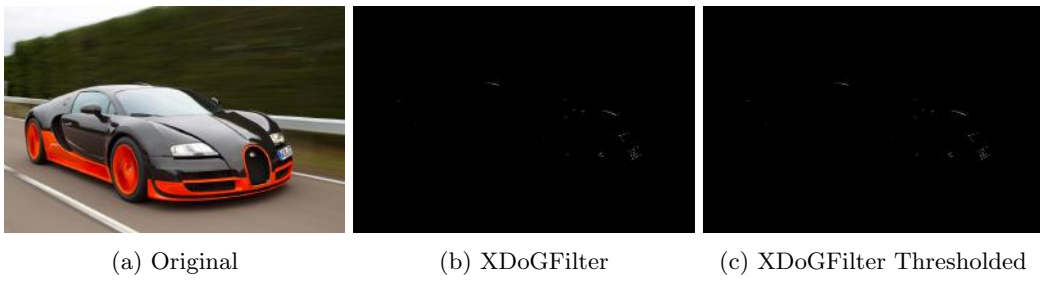
Figure 10: Values ($\gamma = 0.98$, $\Phi = 200$, $\epsilon = 0.1$, $k = 1.6$, $\sigma = 0.8$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 11: Values ($\gamma = 0.98$, $\Phi = 200$, $\epsilon = 0.00001$, $k = 1.6$, $\sigma = 0.8$)

- Results in Changes Sigma Value

If Sigma value decrease, we can observe that the edges of image will be thinner.
If Sigma value increase we can observe that the edges of image will be thicker.
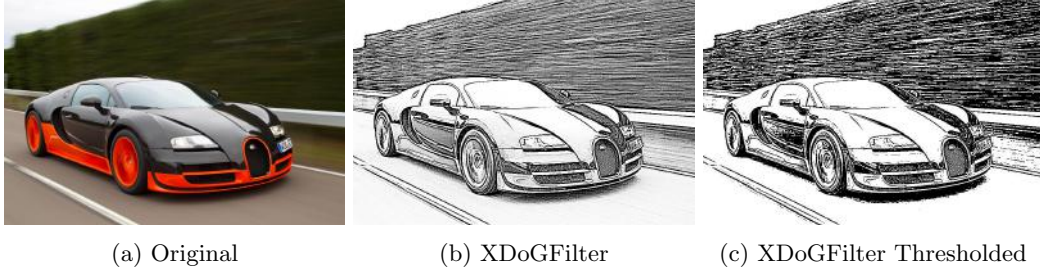Here are the results related to Epsilon values figured below:

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
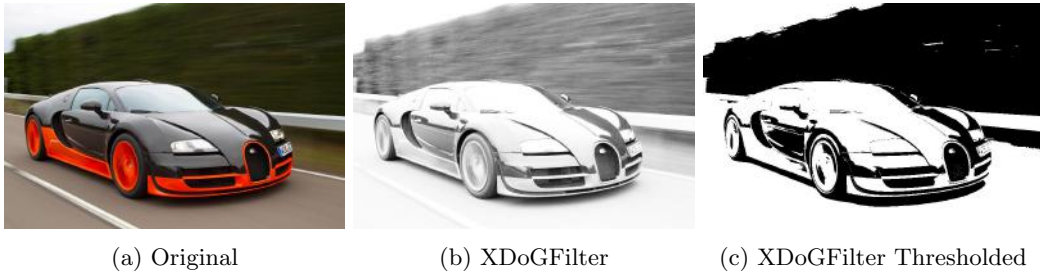
Figure 12: Values ($\gamma = 0.98$, $\Phi = 200$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 0.1$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
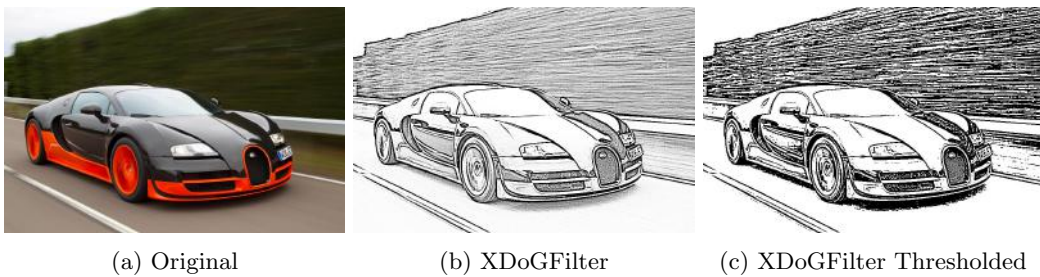
Figure 13: Values ($\gamma = 0.98$, $\Phi = 200$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 1$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 14: Values ($\gamma = 0.98$, $\Phi = 200$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 3$)

b   Input Image-2

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

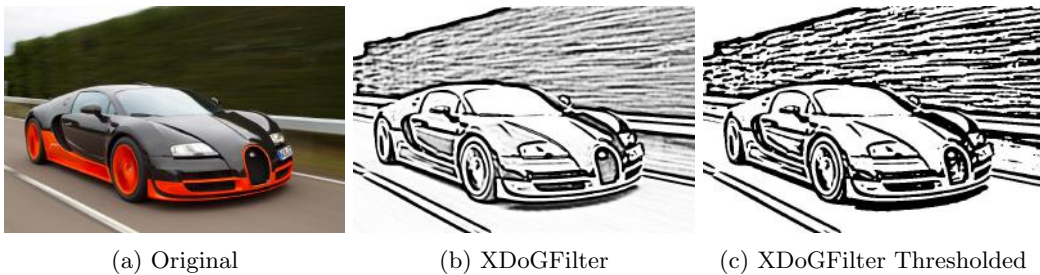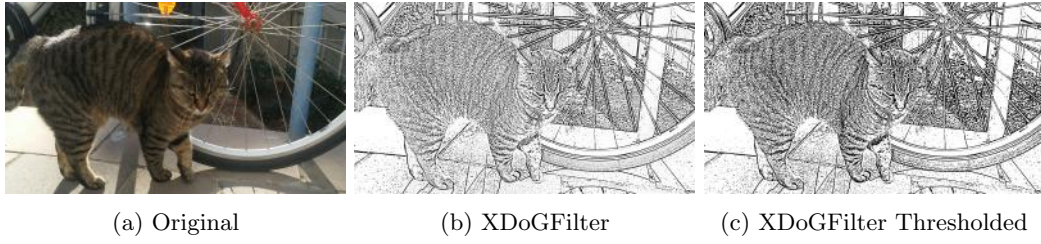Figure 15: Values ($\gamma = 0.98$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 3$)

- Results in Changes Gamma Value

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 16: Values ($\gamma = 0.90$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 3$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
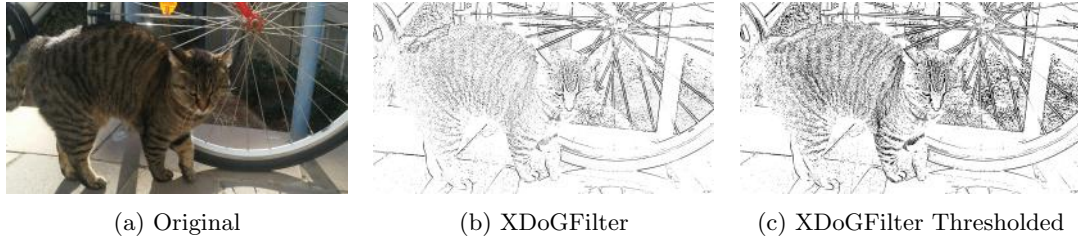
Figure 17: Values ($\gamma = 0.945$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 3$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 18: Values ($\gamma = 0.99$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 3$)

- Results in Changes Phi Value

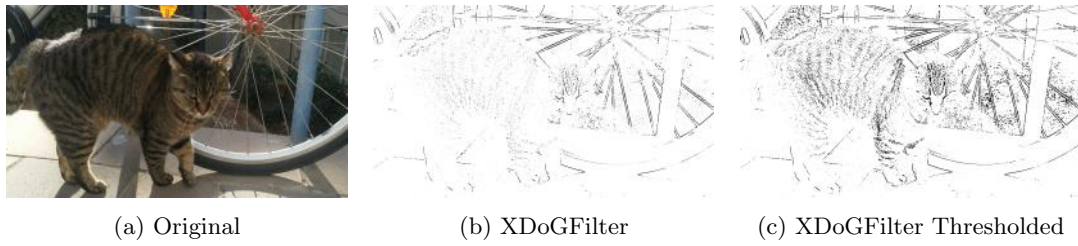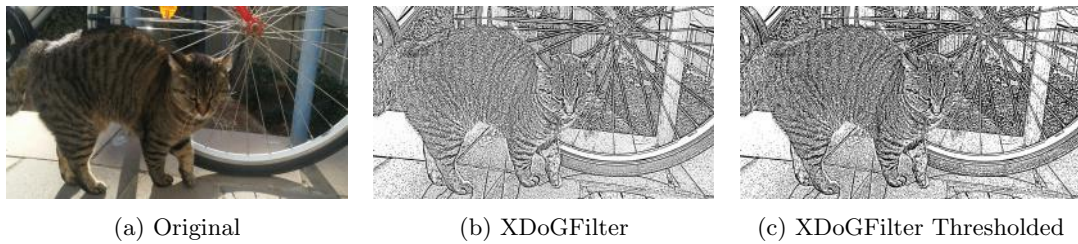(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 19: Values $(\gamma = 0.98, \Phi = 10, \epsilon = -0.1, k = 1.6, \sigma = 3)$

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 20: Values $(\gamma = 0.98, \Phi = 300, \epsilon = -0.1, k = 1.6, \sigma = 3)$

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 21: Values $(\gamma = 0.98, \Phi = 900, \epsilon = -0.1, k = 1.6, \sigma = 3)$

- Results in Changes Epsilon Value

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 22: Values $(\gamma = 0.98, \Phi = 300, \epsilon = -0.1, k = 1.6, \sigma = 3)$

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 23: Values $(\gamma = 0.98, \Phi = 300, \epsilon = -0.00001, k = 1.6, \sigma = 3)$

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 24: Values($\gamma = 0.98$, $\Phi = 300$, $\epsilon = 0.1$, $k = 1.6$, $\sigma = 3$)

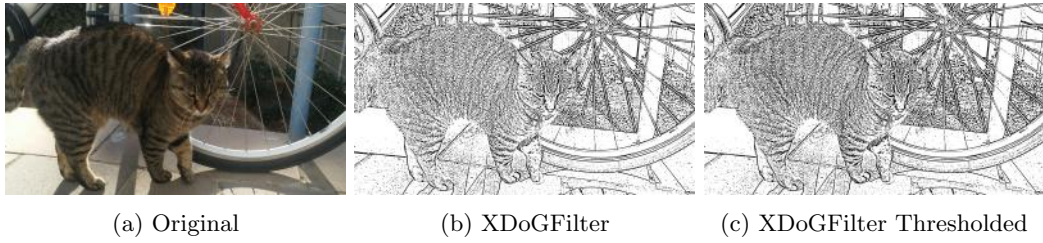(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 25: Values($\gamma = 0.98$, $\Phi = 300$, $\epsilon = 0.00001$, $k = 1.6$, $\sigma = 3$)

- **Results in Changes Sigma Value**

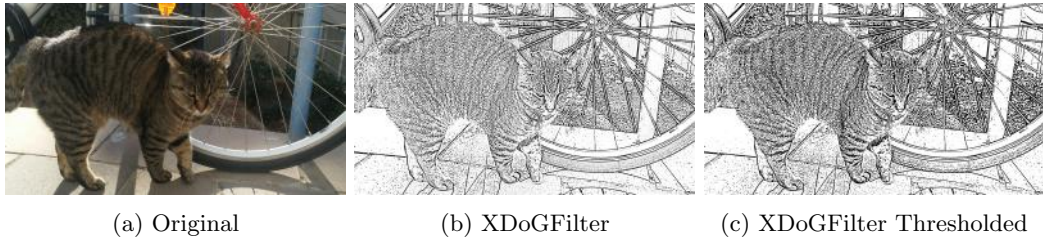(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded
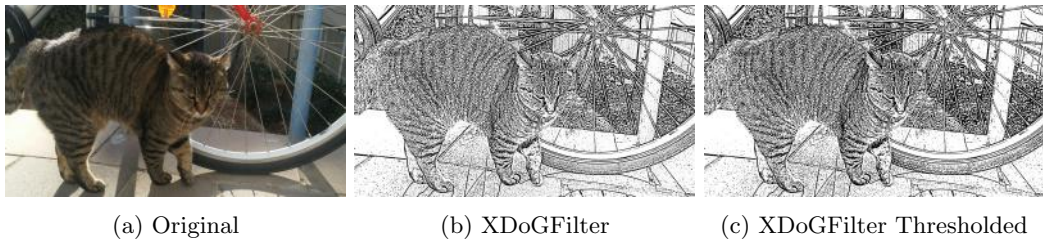
Figure 26: Values($\gamma = 0.98$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 0.1$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 27: Values($\gamma = 0.98$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 4$)

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 28: Values($\gamma = 0.98$, $\Phi = 300$, $\epsilon = -0.1$, $k = 1.6$, $\sigma = 8$)

c Input Image-3

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 29: Values($\gamma = 0.98, \Phi = 350, \epsilon = -0.1, k = 1.6, \sigma = 1$)
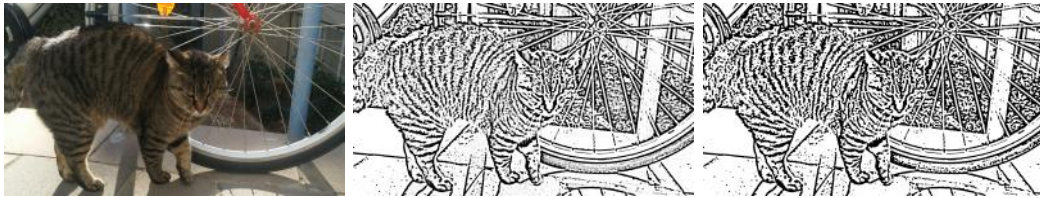
d Input Image-4

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 30: Values($\gamma = 0.98, \Phi = 350, \epsilon = -0.1, k = 1.6, \sigma = 1.5$)

e Input Image-5

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):
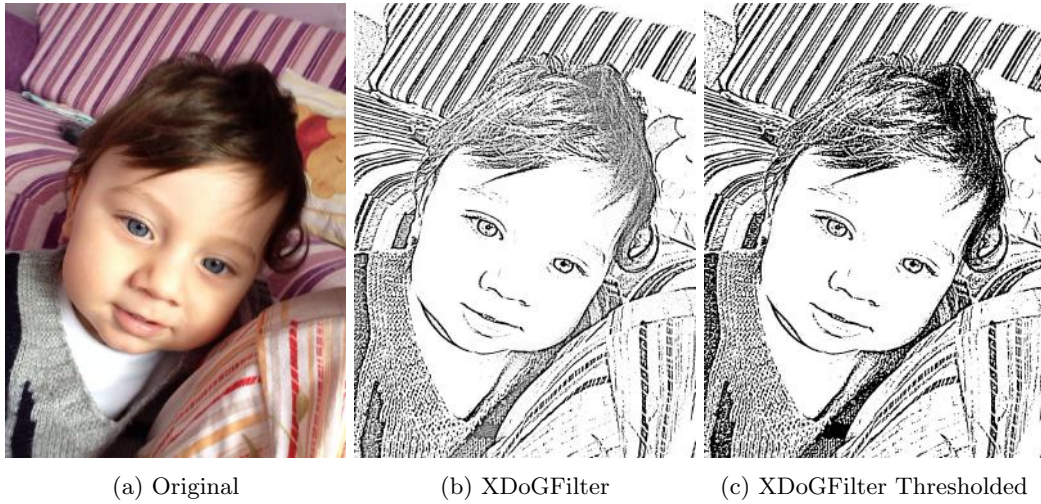

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 31: Values($\gamma = 0.98, \Phi = 200, \epsilon = -0.1, k = 1.6, \sigma = 1$)

f Input Image-6

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):
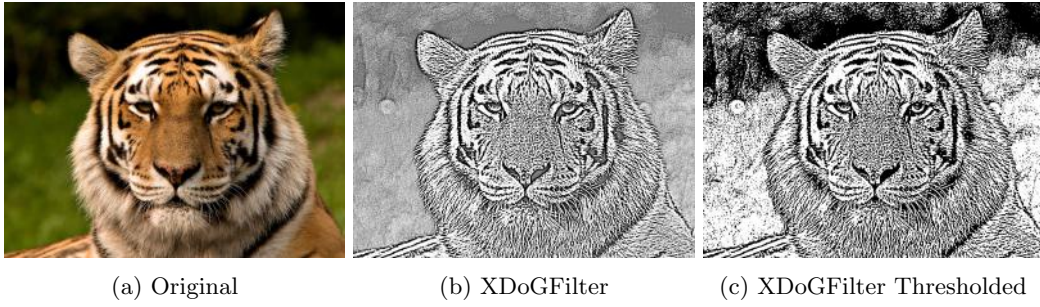

(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 32: Values($\gamma = 0.99, \Phi = 150, \epsilon = -0.1, k = 1.6, \sigma = 2$)

g Input Image-7

- More Acceptable Result

Here can be seen the results with given input image. Actually XDoGFiltered image and XDoG-Filtered then thresolded image looks satisfying. We can easily see the edges of this car image. As seen in figure below (given values also shown there):

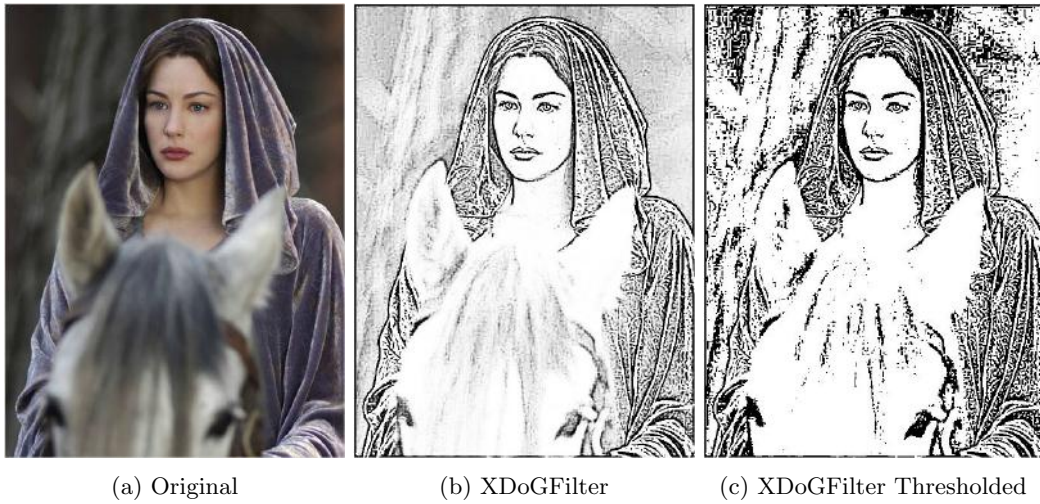(a) Original   (b) XDoGFilter   (c) XDoGFilter Thresholded

Figure 33: Values($\gamma = 0.98, \Phi = 230, \epsilon = -0.1, k = 1.6, \sigma = 0.8$)