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CANNY EDGE DETECTION ON IMAGES USING TRACKBARS IN OPENCV PYTHON

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This post will be helpful in learning OpenCV using Python programming. Here I will show how to implement OpenCV functions and apply them in various aspects using some great examples. Then the output will be visualized along with the comparisons.

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Parameters

dx	16-bit x derivative of input image (CV_16SC1 or CV_16SC3).
dy	16-bit y derivative of input image (same type as dx).
edges	output edge map; single channels 8-bit image, which has the same size as image .
threshold1	first threshold for the hysteresis procedure.
threshold2	second threshold for the hysteresis procedure.
L2gradient	a flag, indicating whether a more accurate \(L_2\) norm \(=\sqrt{(dI/dx)^2 + (dI/dy)^2}\) should be used to calculate the image gradient magnitude (L2gradient=true), or whether the default \(L_1\) norm \(=|dI/dx|+|dI/dy|\) is enough (L2gradient=false).

imshow()

None=cv.imshow(winname, mat)

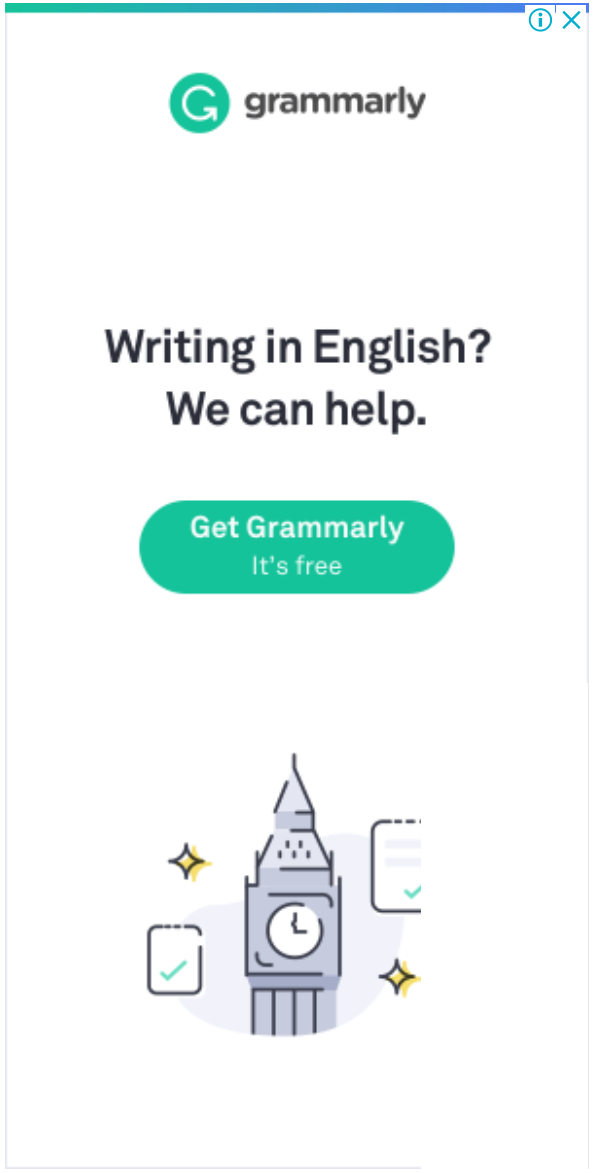
Displays an image in the specified window.

Parameters

winname	Name of the window.
mat	Image to be shown.

imread()

retval=cv.imread(filename[, flags])



Loads an image from a file

Parameters

filename	Name of file to be loaded.
flags	Flag that can take values of cv::ImreadModes

GaussianBlur()

dst=cv.GaussianBlur(src, ksize, sigmaX[, dst[, sigmaY[, borderType]]])

Blurs an image using a Gaussian filter.

Parameters

src	input image; the image can have any number of channels, which are processed independently, but the depth should be CV_8U, CV_16U, CV_16S, CV_32F or CV_64F.
dst	output image of the same size and type as src.
ksize	Gaussian kernel size. ksize.width and ksize.height can differ but they both must be positive and odd. Or, they can be zero's and then they are computed from sigma.
sigmaX	Gaussian kernel standard deviation in X direction.
sigmaY	Gaussian kernel standard deviation in Y direction; if sigmaY is zero, it is set to be equal to sigmaX, if both sigmas are zeros, they are computed from ksize.width and ksize.height, respectively (see getGaussianKernel for details); to fully control the result regardless of possible future modifications of all this semantics, it is recommended to specify all of ksize, sigmaX, and sigmaY.
borderType	pixel extrapolation method, see BorderTypes

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None=cv.namedWindow(winname[, flags])

Creates a window.

Parameters

winname	Name of the window in the window caption that may be used as a window identifier.
flags	Flags of the window. The supported flags are: (cv::WindowFlags)

waitKey()

retval=cv.waitKey([, delay])

Waits for a pressed key.

Parameters

delay	Delay in milliseconds. 0 is the special value that means “forever”.

destroyAllWindows()

None=cv.destroyAllWindows()

Destroys all of the HighGUI windows.

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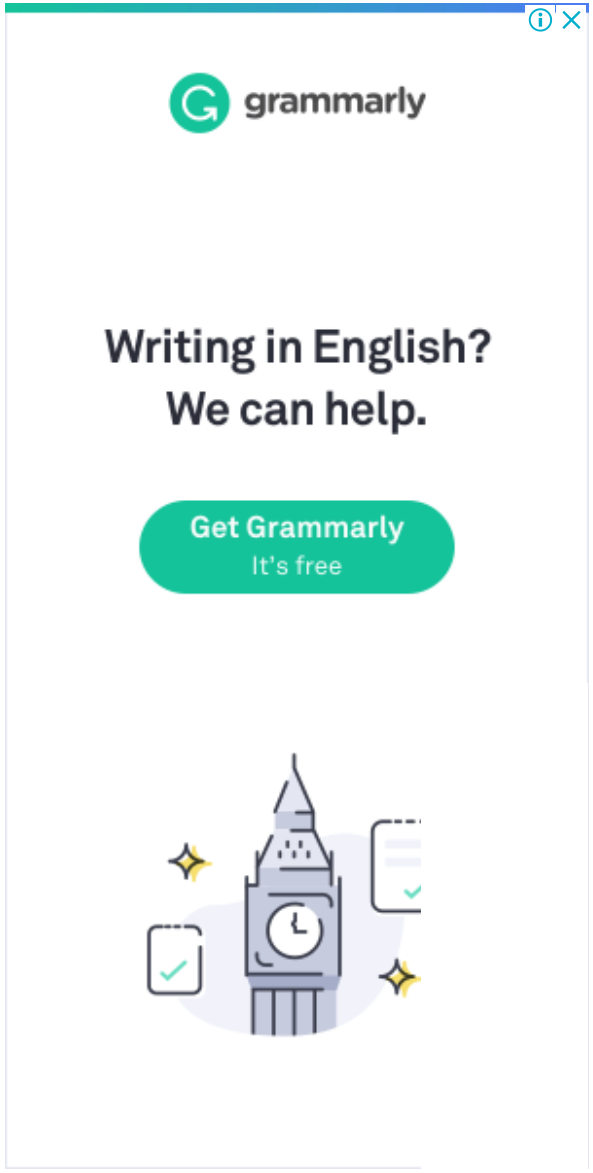
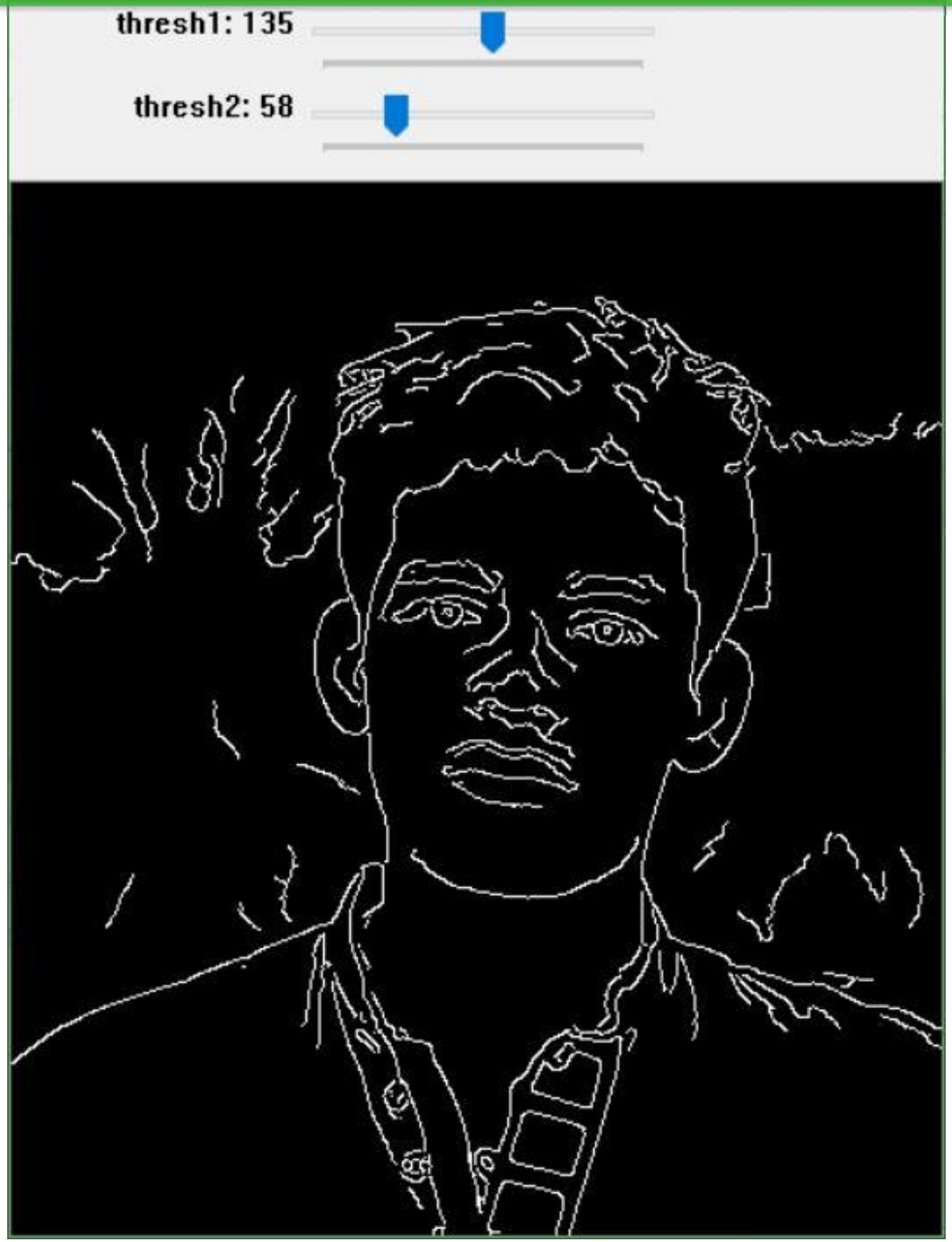
```
    original=cv2.imread("./hanif.jpg",1)
    img=original.copy()
    img=cv2.GaussianBlur(img,(5,5),0)

    cv2.namedWindow('canny')


    thresh1=100
    thresh2=1
    cv2.createTrackbar('thresh1','canny',thresh1,255,funcCan)
    cv2.createTrackbar('thresh2','canny',thresh2,255,funcCan)
    funcCan(0)
    cv2.imshow('Frame',original)


    cv2.waitKey(0)


cv2.destroyAllWindows()
```

Output:





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3D model from a single photo

A recognizable avatar created in runtime from a single photo!

Goals:

The goal is to make you understand how to apply Canny edge detection on images in Python with OpenCV library

Documentation:

getTrackbarPos()
retval=cv.getTrackbarPos(trackbarname, winname)

Returns the trackbar position.

Parameters

trackbarname	Name of the trackbar.
winname	Name of the window that is the parent of the trackbar.

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We will also discuss the basic of image processing and provide the detail explanation related to the OpenCV functions.

Requirements:

- OpenCV 3.4+
- Python 3.6+
- Numpy
- Image, Webcam or Video input
- Documentation Source: OpenCV Official Documentation

First, you need to setup your Python Environment with OpenCV. You can easily do it by following Life2Coding's tutorial on YouTube: Linking OpenCV with Python 3

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edges=cv.Canny(image, threshold1, threshold2[, edges[, apertureSize[, L2gradient]]])
edges=cv.Canny(dx, dy, threshold1, threshold2[, edges[, L2gradient]])
edges=cv.Canny(image, threshold1, threshold2[, edges[, apertureSize[, L2gradient]]])
edges=cv.Canny(dx, dy, threshold1, threshold2[, edges[, L2gradient]])

Finds edges in an image using the Canny algorithm [33] .

This is an overloaded member function, provided for convenience. It differs from the above function only in what argument(s) it accepts.

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Parameters

image	8-bit input image.
edges	output edge map; single channels 8-bit image, which has the same size as image .
threshold1	first threshold for the hysteresis procedure.
threshold2	second threshold for the hysteresis procedure.
apertureSize	aperture size for the Sobel operator.
L2gradient	a flag, indicating whether a more accurate \(L_2\) norm \(=\sqrt{(dI/dx)^2 + (dI/dy)^2}\) should be used to calculate the image gradient magnitude (

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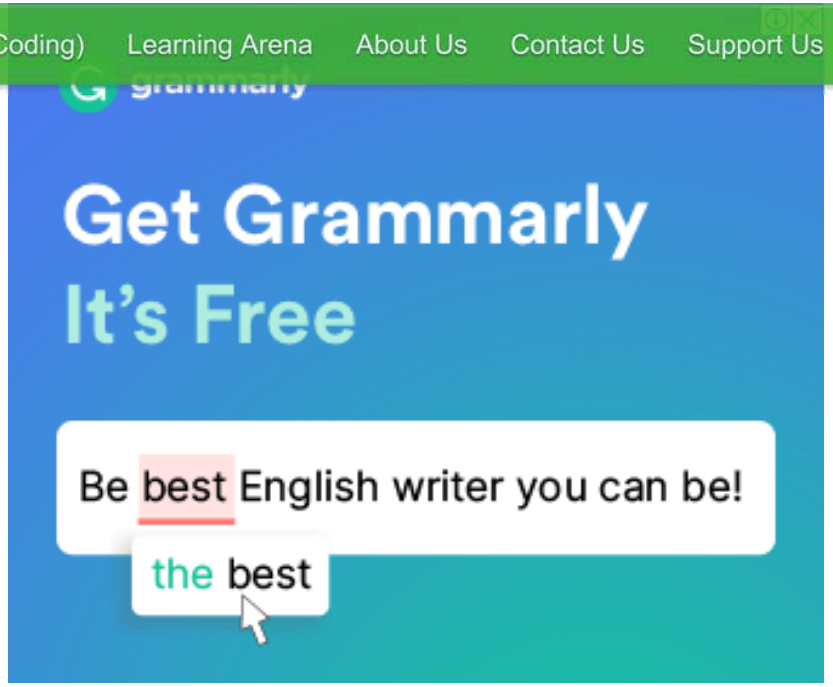


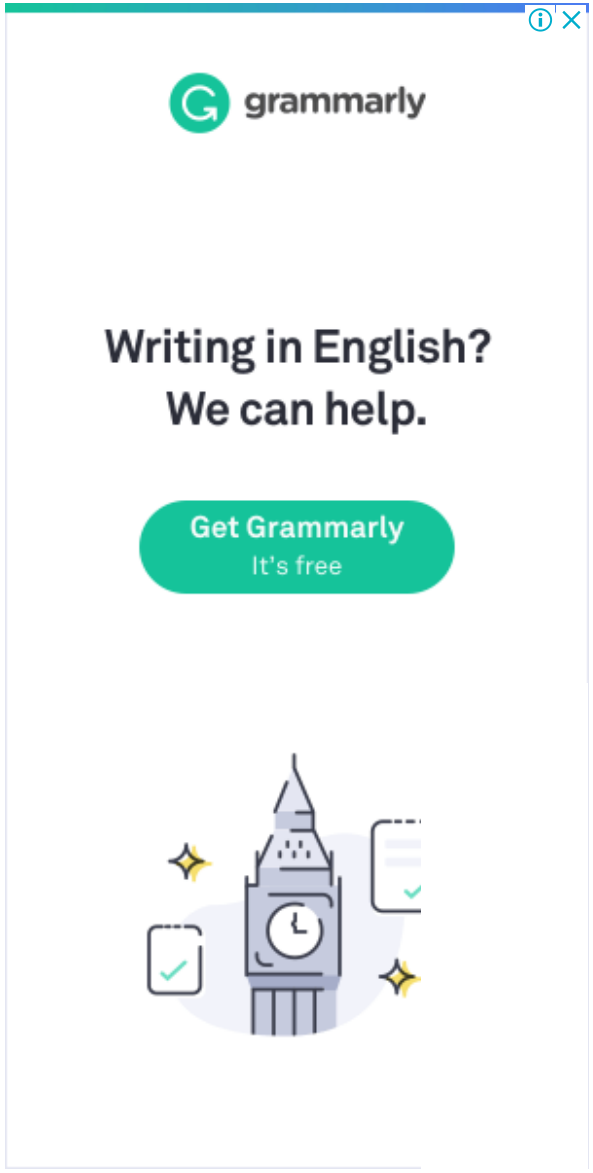
Steps:

- Read the image using **cv2.imread()**
- Create the trackbars for adjusting the Canny thresholds using **cv2.createTrackbar()**
- Apply **cv2.GaussianBlur()** to smooth the image
- Wait for keyboard button press using **cv2.waitKey()**
- Exit window and destroy all windows using **cv2.destroyAllWindows()**

Example Code:

```
import cv2

def funcCan(thresh1=0):
    thresh1 = cv2.getTrackbarPos('thresh1', 'canny')
    thresh2 = cv2.getTrackbarPos('thresh2', 'canny')
    edge = cv2.Canny(img, thresh1, thresh2)
    cv2.imshow('canny', edge)
```



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