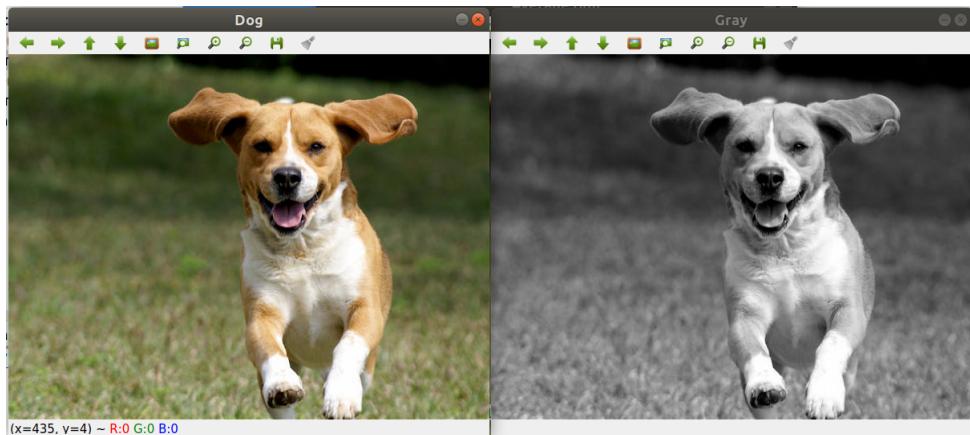


Assignment 1

Shourabh Payal (MT2020054)

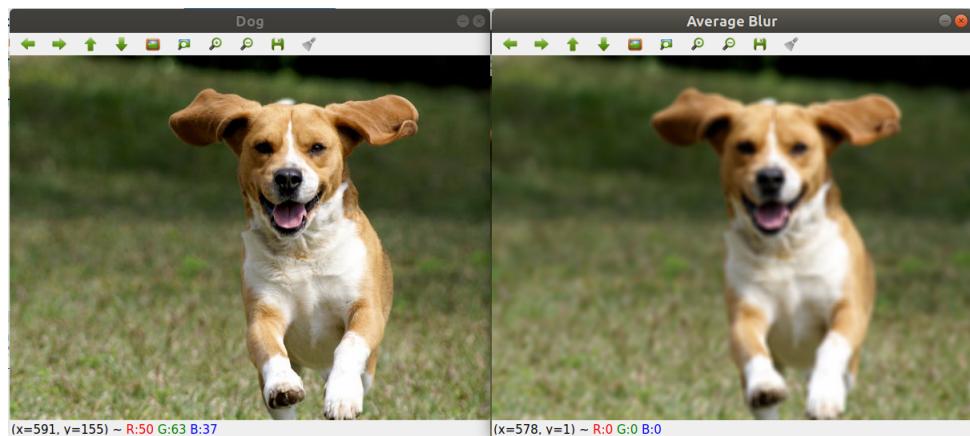
1. Gray Scale

A gray scale image contains only shades of gray and no color. Gray scale is a range of monochromatic shades from black to white.



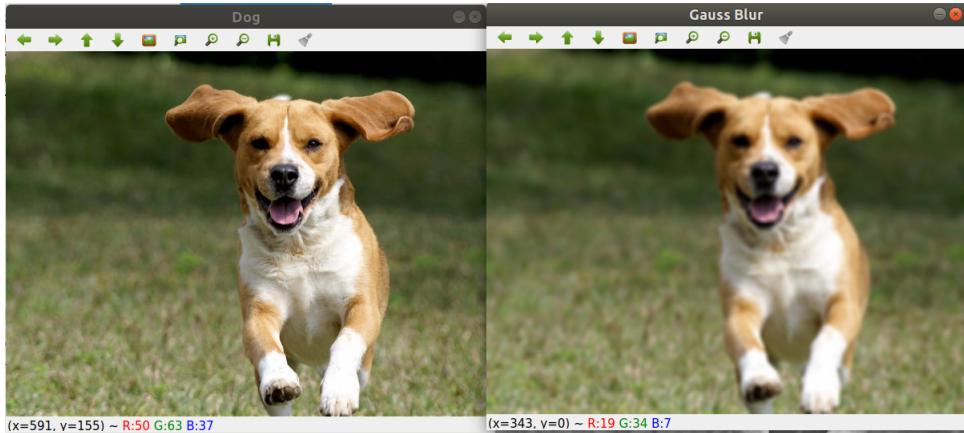
2. Average Blur.

A kernel size window dictates the amount of blurring. Blur is applied to the centre pixel as a result of pixels around it. In averaging the pixel intensity of the middle pixel is the average of intensities of surrounding pixels.



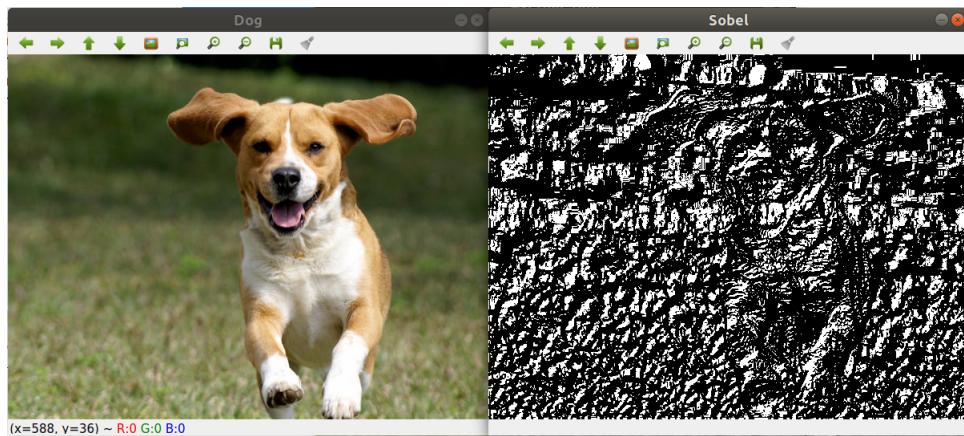
3. Gaussian Blur.

Gaussian blur does the same thing as averaging but every pixel in the kernel window is given a particular weight. The intensity of the middle pixel is the average of products of those weights. It is more natural than average blur.



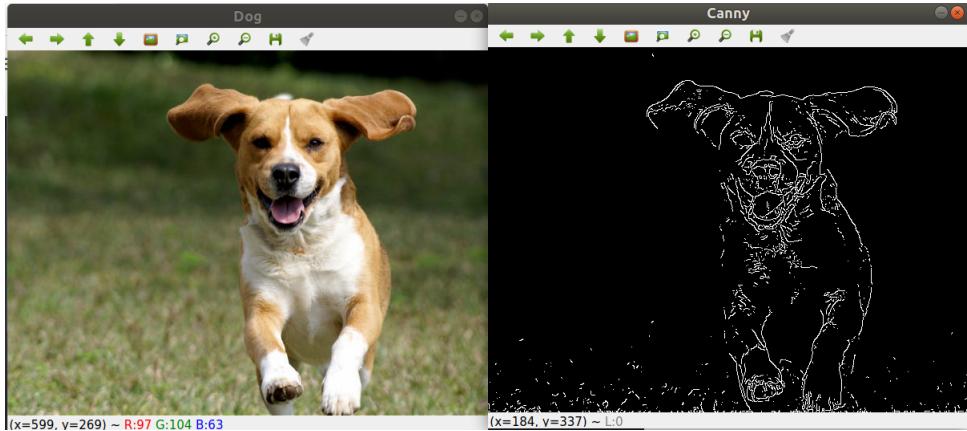
4. Sobel.

Sobel works by calculating the gradient of image intensity at each pixel within the image. It finds the direction of the largest increase from light to dark and the rate of change in that direction.



5. Canny.

The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. It uses gaussian and sobel techniques as some of its stages.



6. Code.

```
1 import cv2 as cv
2
3 img = cv.imread('/home/sourabh/Pictures/dogimagevr.jpeg')
4 cv.imshow('Dog', img)
5
6 gray = cv.cvtColor(img, cv.COLOR_BGR2GRAY)
7 cv.imshow('Gray', gray)
8
9 average = cv.blur(img, (7, 7))
10 cv.imshow('Average Blur', average)
11
12 gauss = cv.GaussianBlur(img, (7, 7), 3)
13 cv.imshow('Gauss Blur', gauss)
14
15 sobelx = cv.Sobel(gray, cv.CV_64F, 1, 0)
16 sobely = cv.Sobel(gray, cv.CV_64F, 0, 1)
17 combine_sobel = cv.bitwise_or(sobelx, sobely)
18 cv.imshow('Sobel', combine_sobel)
19
20 canny = cv.Canny(gray, 130, 130)
21 cv.imshow('Canny', canny)
22
23 cv.waitKey(0)
24
```