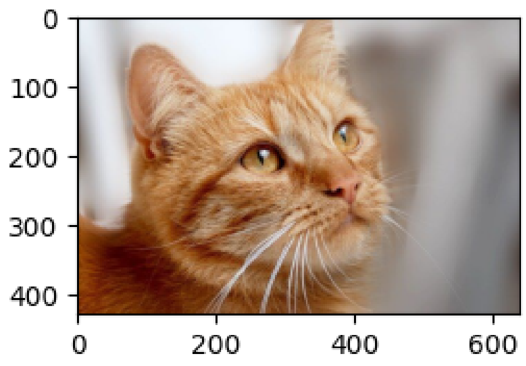
python-opencv

March 26, 2023

[1]:
```python
import cv2
import warnings
import matplotlib.pyplot as plt
import numpy as np

warnings.filterwarnings("ignore")
%matplotlib inline
```

[2]:
```python
plt.figure(figsize=(4, 2))
imagedata = plt.imread("cat.jpg")
plt.imshow(imagedata)
plt.grid(False)
plt.show()
```



[3]:
```python
imagedata.shape[2]
```

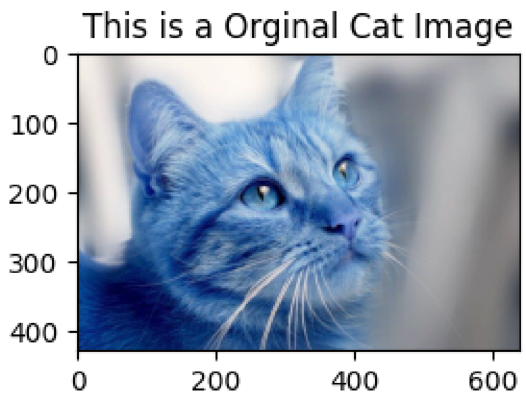
[3]:
```
3
```

[4]:
```python
print("Image Shape: {}".format(imagedata.shape))
print("Image Size is : Image Height: {},  Image Width: {} and Image Channle: {}␣
↪= {}".format(imagedata.shape[0], imagedata.shape[1], imagedata.shape[2],␣
↪imagedata.size))
```

```
Image Shape: (428, 640, 3)
Image Size is : Image Height: 428,  Image Width: 640 and Image Channle: 3 =
821760
```

[5]:
```
def catimageShow(imageTitle, image):
    imageVariable = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
    plt.figure(figsize=(4, 2))
    plt.imshow(imageVariable)
    plt.title(imageTitle)
    plt.show()
```

[6]:
```
catimageShow("This is a Orginal Cat Image", imagedata)
```



[7]:
```
imagedata.shape[:2]
```

[7]:
```
(428, 640)
```

[8]:
```
#mask Lider, Data Fusion
Image_mask = np.zeros(imagedata.shape[:2], dtype="uint8")
```

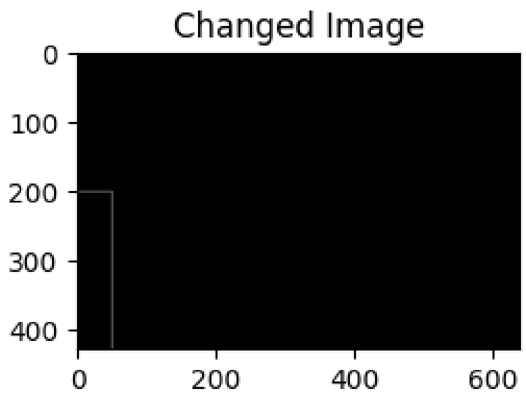
[9]:
```
Image_mask
```

[9]:
```
array([[0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       …,
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0]], dtype=uint8)
```

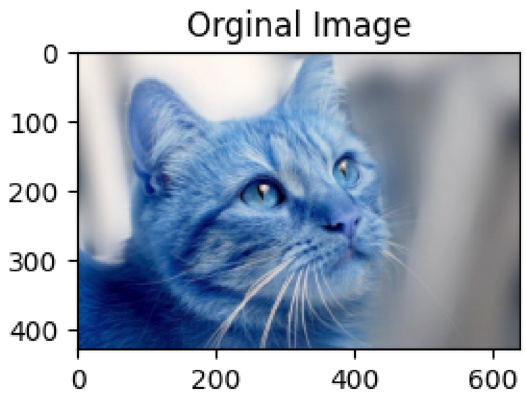
[10]:
```
cv2.rectangle(Image_mask, (0, 450), (50, 200), 255)
```

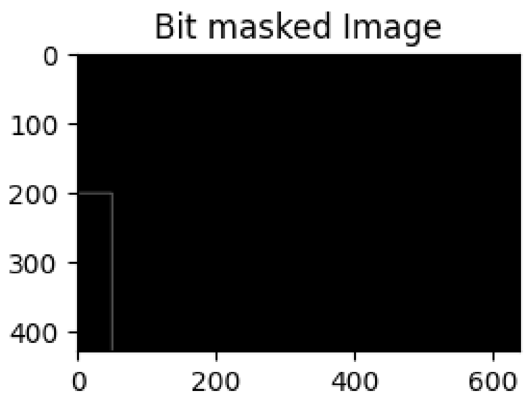
[10]:
```
array([[  0,   0,   0, …,   0,   0,   0],
       [  0,   0,   0, …,   0,   0,   0],
        [  0,    0,    0, ...,    0,    0,    0],
        ...,
        [255,    0,    0, ...,    0,    0,    0],
        [255,    0,    0, ...,    0,    0,    0],
        [255,    0,    0, ...,    0,    0,    0]], dtype=uint8)
```

[11]:
```
catimageShow("Changed Image", Image_mask)
```

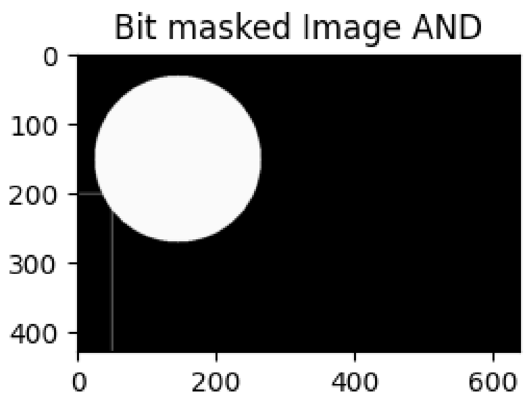


[12]:
```
argmumentImage = {"Image":"cat.jpg",
                  "scharr":0}
imagedata = plt.imread(argmumentImage["Image"])
catimageShow("Orginal Image", imagedata)
bit_mask = cv2.bitwise_and(imagedata, imagedata, mask = Image_mask)
catimageShow("Bit masked Image", Image_mask)
```

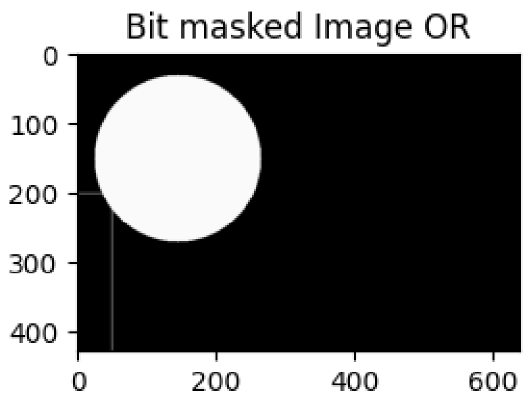




[13]:
```
cv2.circle(Image_mask, (145, 150), 120, 250, -1)
bit_mask = cv2.bitwise_and(imagedata, imagedata, mask = Image_mask)
catimageShow("Bit masked Image AND", Image_mask)
```



[14]:
```
cv2.circle(Image_mask, (145, 150), 120, 250, -1)
bit_mask = cv2.bitwise_or(imagedata, imagedata, mask = Image_mask)
catimageShow("Bit masked Image OR", Image_mask)
```



```
[15]: max(imagedata[0][0])
```

```
[15]: 246
```

```
[16]: # Image Scalling
      # Normalization
      # Standarization
      imagedata/255
```

```
[16]: array([[[0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              …,
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078]],

             [[0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              …,
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078]],

             [[0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              [0.90980392, 0.94509804, 0.96470588],
              …,
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078],
              [0.70196078, 0.70196078, 0.70196078]],
             …,

             [[0.47843137, 0.17647059, 0.01176471],
              [0.47843137, 0.17647059, 0.01176471],
              [0.47843137, 0.17647059, 0.01176471],
              …,
              [0.41960784, 0.38431373, 0.36470588],
              [0.41960784, 0.37647059, 0.36078431],
              [0.41960784, 0.37647059, 0.36078431]],

             [[0.50588235, 0.19607843, 0.03529412],
              [0.50588235, 0.19607843, 0.03529412],
              [0.50196078, 0.19215686, 0.02352941],
              …,
              [0.41960784, 0.38431373, 0.36470588],
              [0.41960784, 0.37647059, 0.36078431],
              [0.41960784, 0.37647059, 0.36078431]],

             [[0.5254902 , 0.21568627, 0.05490196],
              [0.52156863, 0.21176471, 0.05098039],
              [0.51764706, 0.20784314, 0.03921569],
              …,
              [0.41960784, 0.38431373, 0.36470588],
              [0.41960784, 0.37647059, 0.36078431],
              [0.41960784, 0.37647059, 0.36078431]]])
```

[17]:
```
customValueW = 120.0/imagedata.shape[1]
```

[18]:
```
customValueH = 120.0/imagedata.shape[0]
```

[19]:
```
120*120
```

[19]:
```
14400
```

[20]:
```
customValueW
```

[20]:
```
0.1875
```

[21]:
```
imagedata.shape[0]
```

[21]:
```
428
```

[22]:
```
280*0.4
```

[22]:
```
112.0
```

[23]:
```
imageDimention = (120, int(imagedata.shape[0]*customValueW))
```

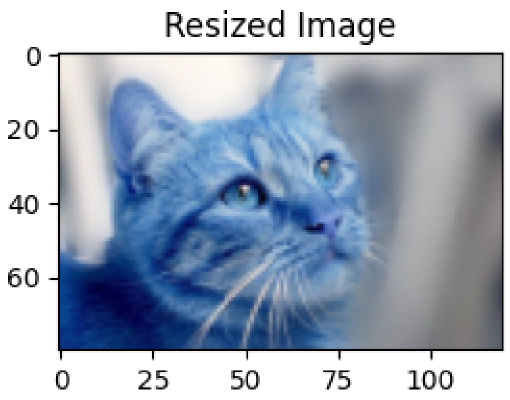
[24]:
```
imagedata.shape
```

[24]:
```
(428, 640, 3)
```

[25]:
```
imageDimention
```

[25]:
```
(120, 80)
```

[26]:
```
newImage = cv2.resize(imagedata, imageDimention, interpolation = cv2.INTER_AREA)
catimageShow("Resized Image", newImage)
```



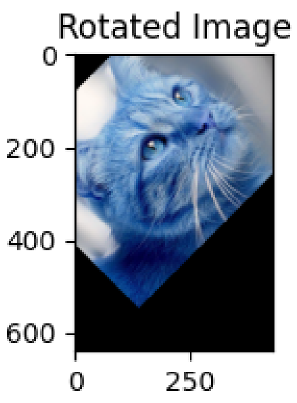
[27]:
```
newImage.shape
```

[27]:
```
(80, 120, 3)
```

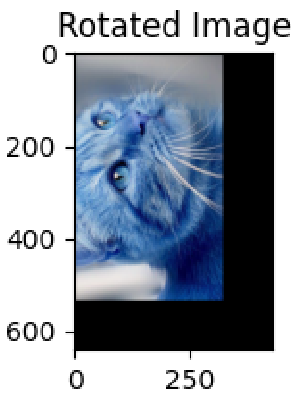
[28]:
```
(imageH, ImageW) = imagedata.shape[:2]
```

[29]:
```
centerX, centerY = (imageH//2, ImageW//2)
```

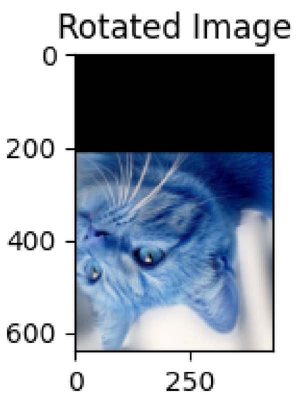
[30]:
```
imageRotate = cv2.getRotationMatrix2D((centerX, centerY), 45, 1.0)
rotateNow = cv2.warpAffine(imagedata, imageRotate, (imageH, ImageW))
catimageShow("Rotated Image", rotateNow)
```



[31]:
```
imageRotate = cv2.getRotationMatrix2D((centerX, centerY), 90, 1.0)
rotateNow = cv2.warpAffine(imagedata, imageRotate, (imageH, ImageW))
catimageShow("Rotated Image", rotateNow)
```



[32]:
```
imageRotate = cv2.getRotationMatrix2D((centerX, centerY), 180, 1.0)
rotateNow = cv2.warpAffine(imagedata, imageRotate, (imageH, ImageW))
catimageShow("Rotated Image", rotateNow)
```



[33]:
```
#Step 01: Convert iMages to Gray
grayimage = cv2.cvtColor(imagedata, cv2.COLOR_RGB2GRAY)
```

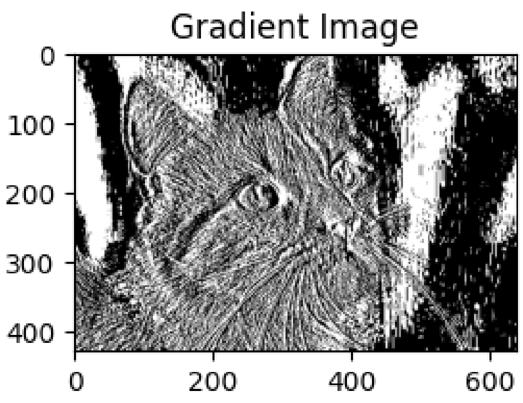
[34]:
```
grayimage.shape
```

[34]:
```
(428, 640)
```

[35]:
```
kernelGen = -1 if argmumentImage["scharr"] > 0 else 3
```

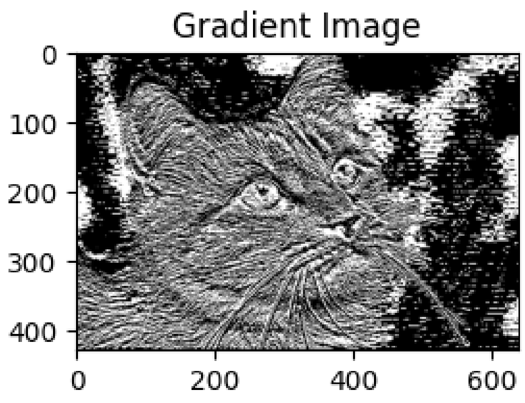
[36]:
```
gradienImageDataX = cv2.Sobel(grayimage, ddepth = cv2.CV_32F, dx = 1, dy = 0,␣
↪ksize = kernelGen)
gradienImageDataY = cv2.Sobel(grayimage, ddepth = cv2.CV_32F, dx = 0, dy = 1,␣
↪ksize = kernelGen)
catimageShow("Gradient Image", gradienImageDataX)
```

```
Clipping input data to the valid range for imshow with RGB data ([0..1] for
floats or [0..255] for integers).
```



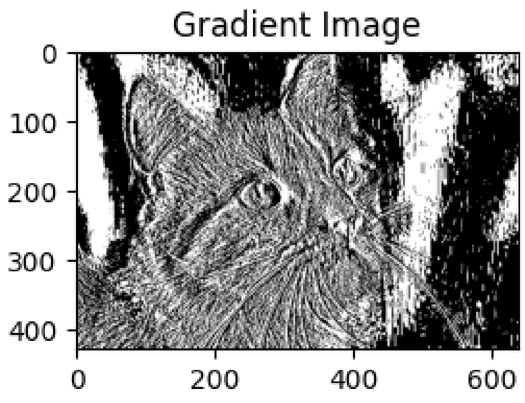
[37]:
```
catimageShow("Gradient Image", gradienImageDataY)
```

```
Clipping input data to the valid range for imshow with RGB data ([0..1] for
floats or [0..255] for integers).
```



[38]:
```
catimageShow("Gradient Image", gradienImageDataX)
```

```
Clipping input data to the valid range for imshow with RGB data ([0..1] for
floats or [0..255] for integers).
```



[39]:
```
gradienImageDataX
```

[39]:
```
array([[ 0.,  0.,  4., …,  4.,  0.,  0.],
       [ 0.,  0.,  3., …,  3.,  0.,  0.],
       [ 0.,  1.,  1., …,  1.,  1.,  0.],
       …,
       [ 0., -1., -8., …,  0., -4.,  0.],
       [ 0., -4., -5., …,  0., -4.,  0.],
        [ 0., -6., -4., …,  0., -4.,  0.]], dtype=float32)
```

```
[40]: gradienImageDataY
```

```
[40]: array([[ 0.,  0.,  0., …,  0.,  0.,  0.],
             [ 0.,  0., -1., …,  1.,  0.,  0.],
             [-2., -1., -1., …,  1.,  1.,  2.],
             …,
             [38., 37., 38., …,  0.,  0.,  0.],
             [42., 40., 39., …,  0.,  0.,  0.],
             [ 0.,  0.,  0., …,  0.,  0.,  0.]], dtype=float32)
```