ATIVIDADE 5 – VISÃO COMPUTACIONAL

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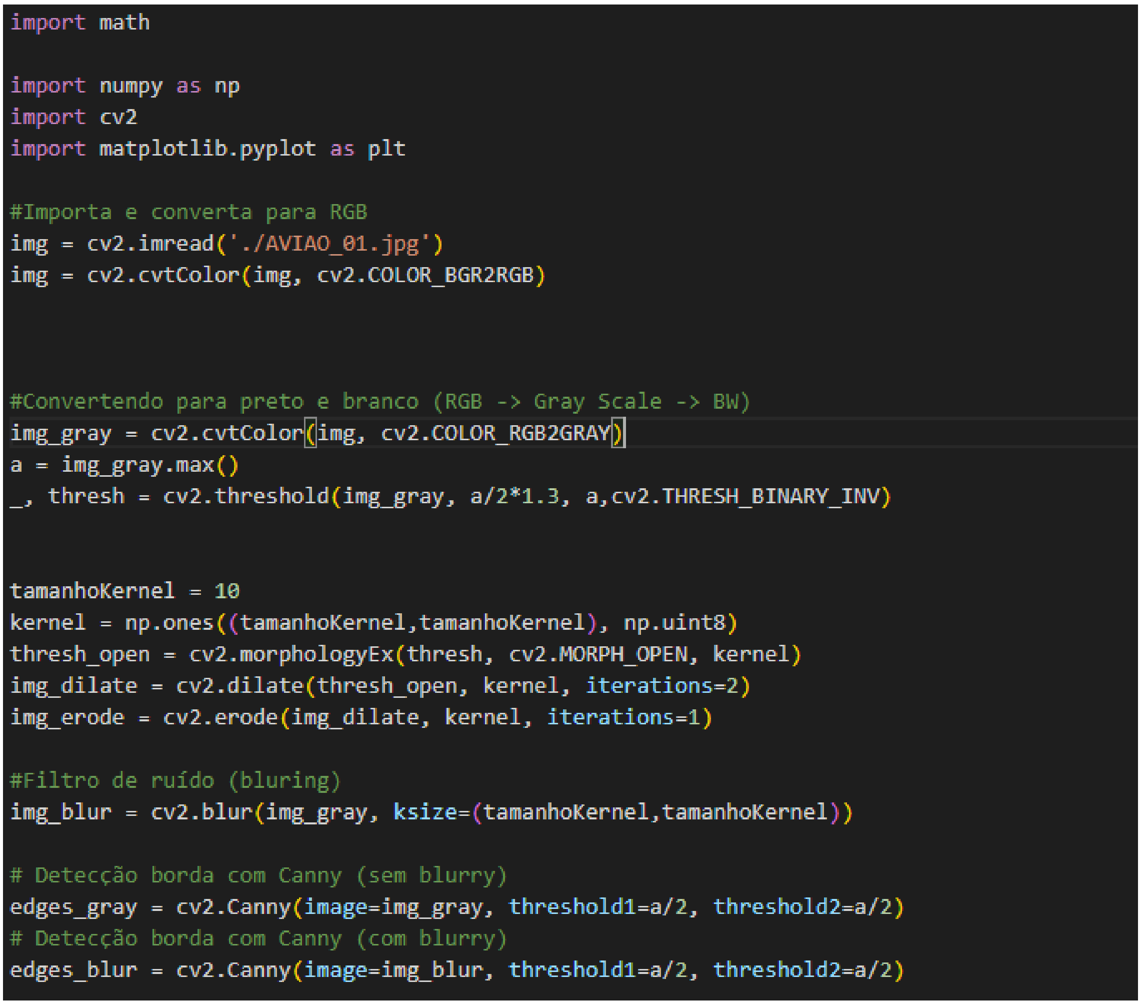
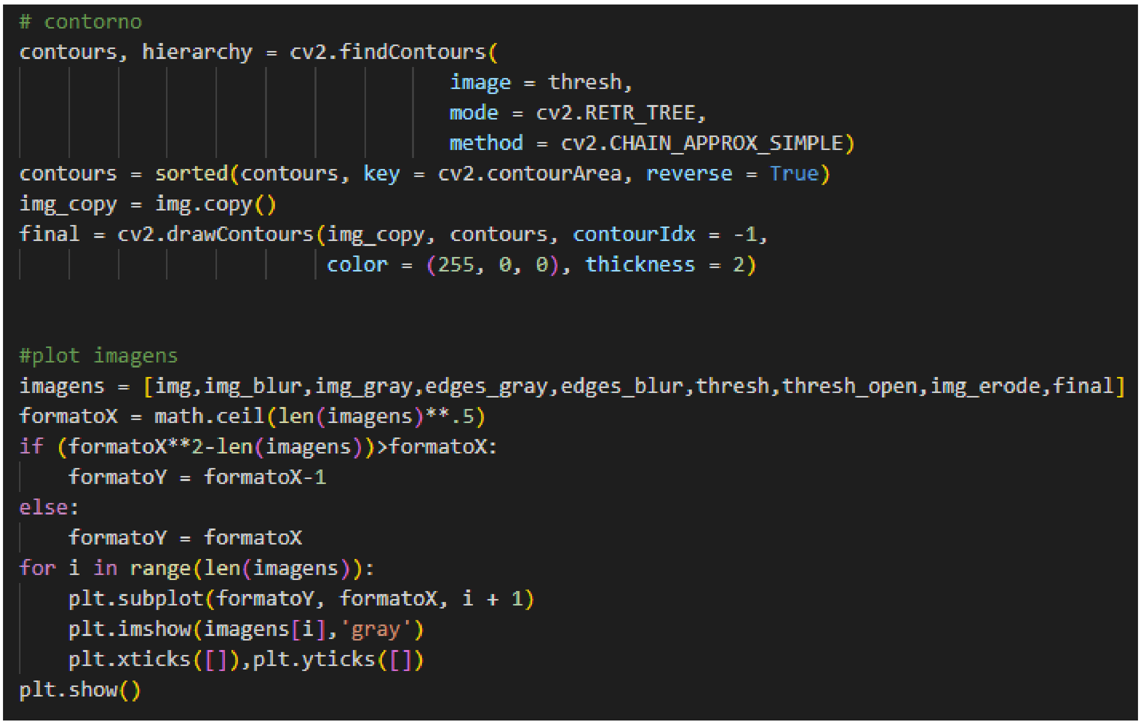
Código visão computacional – Avião

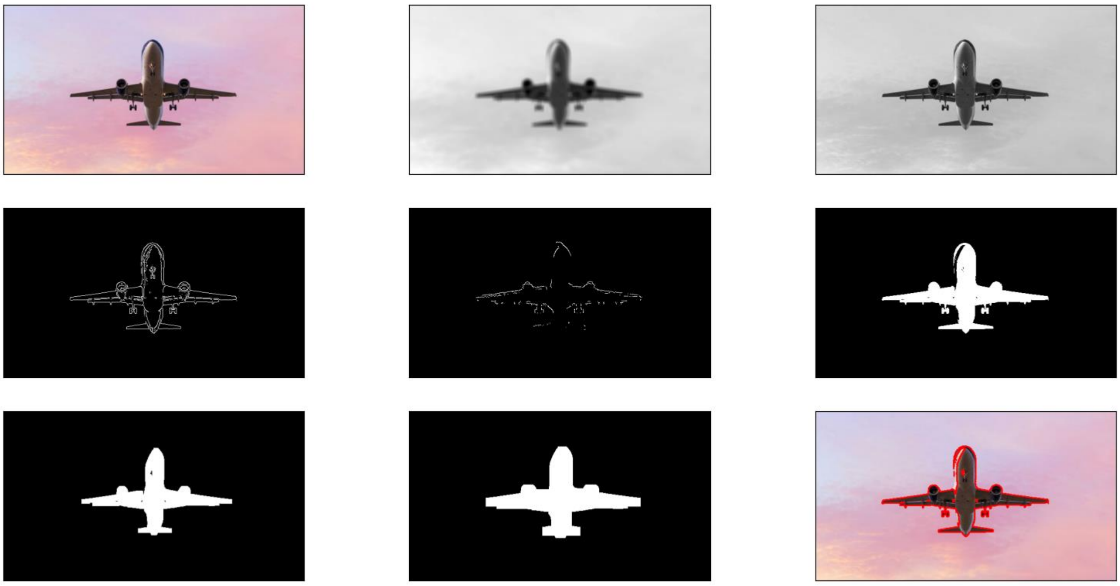


```
import math

import numpy as np
import cv2
import matplotlib.pyplot as plt

#Importa e converta para RGB
img = cv2.imread('./AVIAO_01.jpg')
img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)



#Convertendo para preto e branco (RGB -> Gray Scale -> BW)
img_gray = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)
a = img_gray.max()
_, thresh = cv2.threshold(img_gray, a/2*1.3, a,cv2.THRESH_BINARY_INV)


tamanhoKernel = 10
kernel = np.ones((tamanhoKernel,tamanhoKernel), np.uint8)
thresh_open = cv2.morphologyEx(thresh, cv2.MORPH_OPEN, kernel)
img_dilate = cv2.dilate(thresh_open, kernel, iterations=2)
img_erode = cv2.erode(img_dilate, kernel, iterations=1)

#Filtro de ruído (bluring)
img_blur = cv2.blur(img_gray, ksize=(tamanhoKernel,tamanhoKernel))

# Detecção borda com Canny (sem blurry)
edges_gray = cv2.Canny(image=img_gray, threshold1=a/2, threshold2=a/2)
# Detecção borda com Canny (com blurry)
edges_blur = cv2.Canny(image=img_blur, threshold1=a/2, threshold2=a/2)
```

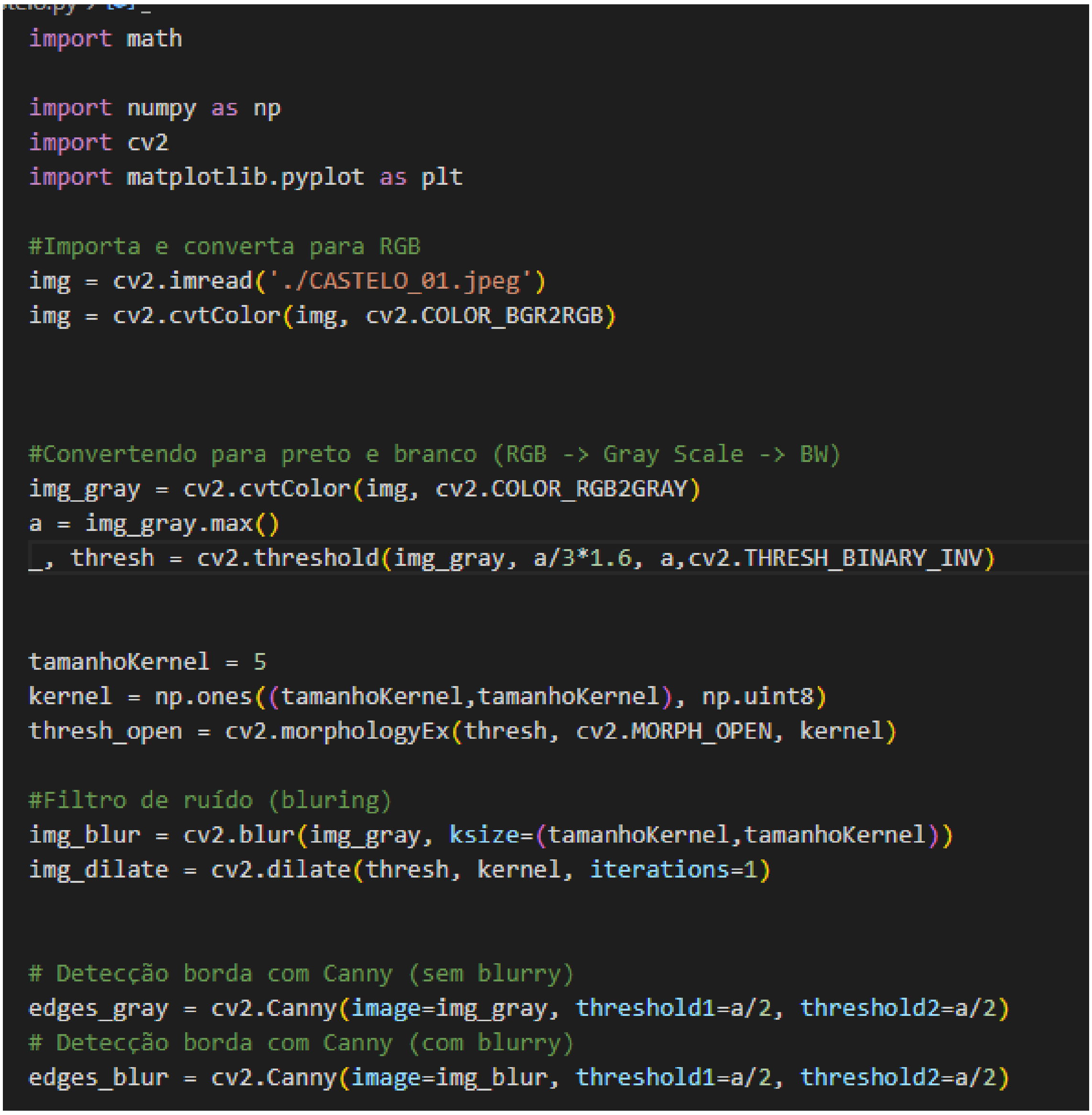


```python
# contorno
contours, hierarchy = cv2.findContours(
                                   image = thresh,
                                   mode = cv2.RETR_TREE,
                                   method = cv2.CHAIN_APPROX_SIMPLE)
contours = sorted(contours, key = cv2.contourArea, reverse = True)
img_copy = img.copy()
final = cv2.drawContours(img_copy, contours, contourIdx = -1,
                         color = (255, 0, 0), thickness = 2)


#plot imagens
imagens = [img,img_blur,img_gray,edges_gray,edges_blur,thresh,thresh_open,img_erode,final]
formatoX = math.ceil(len(imagens)**.5)
if (formatoX**2-len(imagens))>formatoX:
    formatoY = formatoX-1
else:
    formatoY = formatoX
for i in range(len(imagens)):
    plt.subplot(formatoY, formatoX, i + 1)
    plt.imshow(imagens[i],'gray')
    plt.xticks([]),plt.yticks([])
plt.show()
```

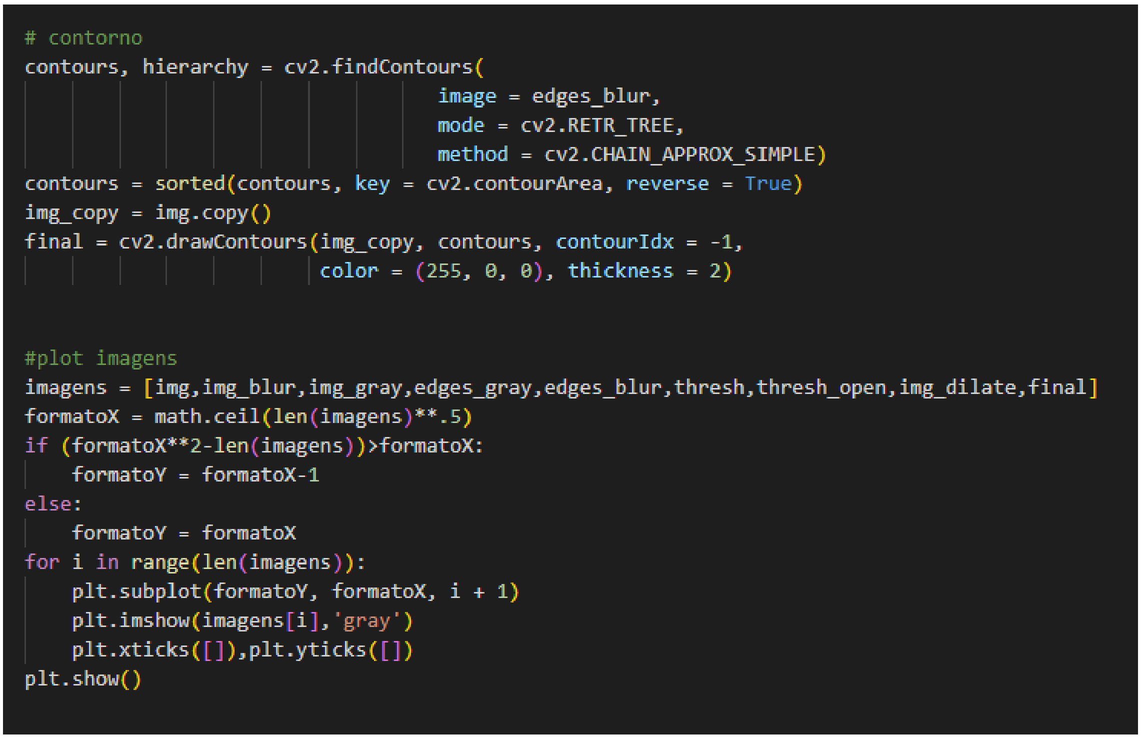
MELHOR IMAGEM OBTIDA:



Código visão computacional – Castelo



```python
import math

import numpy as np
import cv2
import matplotlib.pyplot as plt

#Importa e converta para RGB
img = cv2.imread('./CASTELO_01.jpeg')
img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)



#Convertendo para preto e branco (RGB -> Gray Scale -> BW)
img_gray = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)
a = img_gray.max()
_, thresh = cv2.threshold(img_gray, a/3*1.6, a,cv2.THRESH_BINARY_INV)


tamanhoKernel = 5
kernel = np.ones((tamanhoKernel,tamanhoKernel), np.uint8)
thresh_open = cv2.morphologyEx(thresh, cv2.MORPH_OPEN, kernel)

#Filtro de ruído (bluring)
img_blur = cv2.blur(img_gray, ksize=(tamanhoKernel,tamanhoKernel))
img_dilate = cv2.dilate(thresh, kernel, iterations=1)


# Detecção borda com Canny (sem blurry)
edges_gray = cv2.Canny(image=img_gray, threshold1=a/2, threshold2=a/2)
# Detecção borda com Canny (com blurry)
edges_blur = cv2.Canny(image=img_blur, threshold1=a/2, threshold2=a/2)
```



```
# contorno
contours, hierarchy = cv2.findContours(
                                   image = edges_blur,
                                   mode = cv2.RETR_TREE,
                                   method = cv2.CHAIN_APPROX_SIMPLE)
contours = sorted(contours, key = cv2.contourArea, reverse = True)
img_copy = img.copy()
final = cv2.drawContours(img_copy, contours, contourIdx = -1,
                         color = (255, 0, 0), thickness = 2)


#plot imagens
imagens = [img,img_blur,img_gray,edges_gray,edges_blur,thresh,thresh_open,img_dilate,final]
formatoX = math.ceil(len(imagens)**.5)
if (formatoX**2-len(imagens))>formatoX:
    formatoY = formatoX-1
else:
    formatoY = formatoX
for i in range(len(imagens)):
    plt.subplot(formatoY, formatoX, i + 1)
    plt.imshow(imagens[i],'gray')
    plt.xticks([]),plt.yticks([])
plt.show()
```

MELHOR IMAGEM OBTIDA: