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In [1]:  
import cv2 as cv  
import numpy as np  
import matplotlib.pyplot as plt  
import os  
%matplotlib inline
```

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In [2]:  
def load(path):  
    img=cv.imread(path)  
    img=cv.cvtColor(img,cv.COLOR_BGR2RGB)  
    return img
```

```
In [15]:  
def display(img1,img2):  
    fig=plt.figure(figsize=(12,18))  
    ax=fig.add_subplot(221)  
    ax.imshow(img1)  
    ax=fig.add_subplot(222)  
    ax.imshow(img2)  
    plt.show()
```

```
In [16]:  
#loading file paths  
p=[]  
dir=r"/Users/mehradhq/Downloads/drive-download-20220511T112708Z-001"  
for i in os.listdir(dir):  
    p.append(i)  
#print (p)
```

```
In [17]:  
for i in p:  
  
    #getting the path of the folder of the image  
    path=os.path.join(dir, i)  
    #getting the image array in RGB as defined in the load function  
    img=load(path)  
  
    #creating two copies of the image  
    img_copy1=img.copy()  
    img_copy2=img.copy()  
  
    #grayscaling image  
    img_gray = cv.cvtColor(img, cv.COLOR_RGB2GRAY)  
  
    #getting the hsv version of the image  
    img_hsv=cv.cvtColor(img, cv.COLOR_RGB2HSV)  
  
    #lower mask (0-10)  
    lower_red = np.array([0,50,50])  
    upper_red = np.array([10,255,255])  
    mask0 = cv.inRange(img_hsv, lower_red, upper_red)  
  
    #upper mask (170-180)  
    lower_red = np.array([170,50,50])  
    upper_red = np.array([180,255,255])  
    mask1 = cv.inRange(img_hsv, lower_red, upper_red)  
  
    #join my masks  
    mask = mask0+mask1  
  
    # set my output img to zero everywhere except my mask, set to 255 wherever my mask exists.
```

```

masked_img = img.copy()
masked_img[np.where(mask==0)] = [0,0,0]
masked_img[np.where(mask!=0)] = [255,0,0]
blended=cv.addWeighted(masked_img,0.9,img,0.3,0)

#define rows
rows=img.shape[0]

#hough transform on img_gray
circles = cv.HoughCircles(img_gray, cv.HOUGH_GRADIENT, 1, rows, param1=60, param2=30, minRadius=60)
if circles is not None:
    circles = np.uint16(np.around(circles))
    circles.sort()
    for i in circles[0, :]:
        center = (i[0], i[1])
        # circle center
        cv.circle(img_copy1, center, 1, (0, 0, 250), 3)
        # circle outline
        radius = i[2]
        cv.circle(img_copy1, center, radius, (0, 0, 250), 3)
masked_img_gray=cv.cvtColor(masked_img, cv.COLOR_RGB2GRAY)
#hough transform on masked_img
circles = cv.HoughCircles(masked_img_gray, cv.HOUGH_GRADIENT, 1, rows, param1=60, param2=30, minR
if circles is not None:
    circles = np.uint16(np.around(circles))
    for i in circles[0, :]:
        center = (i[0], i[1])
        # circle center
        cv.circle(img_copy2, center, 1, (0, 0, 250), 3)
        # circle outline
        radius = i[2]
        cv.circle(img_copy2, center, radius, (0, 0, 250), 3)

display(img_copy1,img_copy2)

```















