

In [1]:

```
%matplotlib inline

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

In [2]:

```
def resize_image(image, scale):
    image_height, image_width = image.shape
    new_height = int(image_height * scale)
    new_width = int(image_width * scale)

    return cv.resize(image, (new_width, new_height), cv.INTER_AREA)

def find_pattern(image, template):
    template_height, template_width = template.shape

    result = cv.matchTemplate(grayscale_image, template, cv.TM_CCOEFF_NORMED)

    min_val, max_val, min_loc, max_loc = cv.minMaxLoc(result)

    top_left = max_loc

    bottom_right = (top_left[0] + template_width, top_left[1] + template_height)

    return top_left, bottom_right
```

In [3]:

```
filenames = ("messi-1.jpg",
             "messi-2.jpg",
             "messi-3.jpg",
             "messi-4.jpg",
             "messi-5.jpg",
             "messi-6.jpg")

template_names = ("messi-1-template.jpg",
                  "messi-2-template.jpg",
                  "messi-3-template.jpg",
                  "messi-4-template.jpg",
                  "messi-5-template.jpg",
                  "messi-6-template.jpg")

for template_name in template_names:
    print("===== Using template {0}".format(template_name))

    template = cv.imread(template_name, cv.IMREAD_GRAYSCALE)

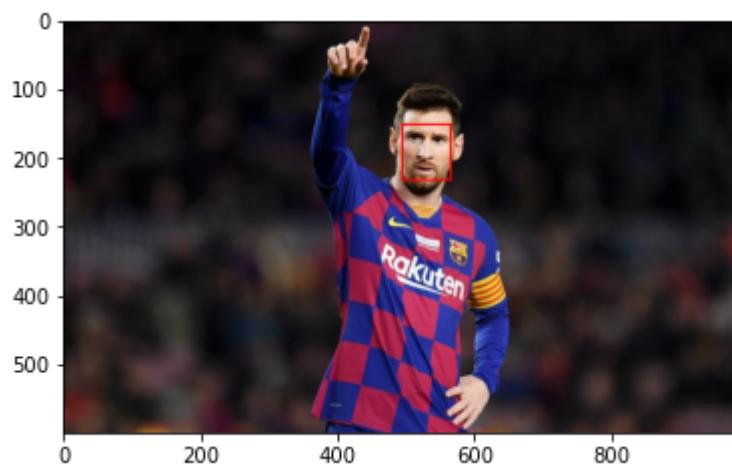
    for filename in filenames:
        print("processing image {0}...".format(filename))

        image = cv.imread(filename)
        rgb_image = cv.cvtColor(image, cv.COLOR_BGR2RGB)
        grayscale_image = cv.cvtColor(image, cv.COLOR_BGR2GRAY)
        top_left, bottom_right = find_pattern(grayscale_image, template)

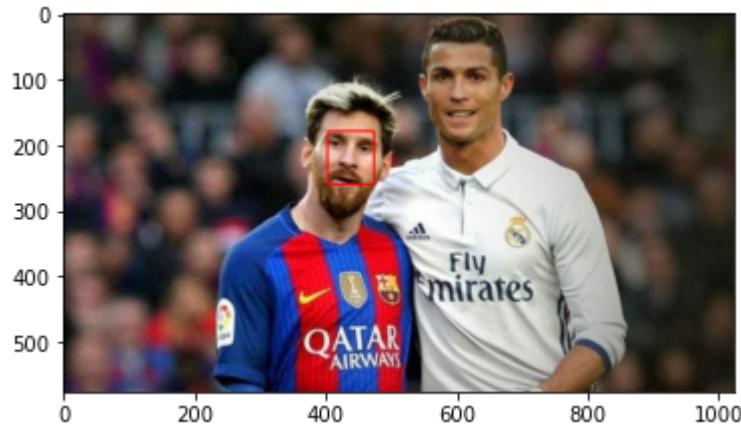
        cv.rectangle(rgb_image, top_left, bottom_right, 255, 2)

        plt.figure(filename)
        plt.imshow(rgb_image)
        plt.show()
```

```
===== Using template messi-1-template.jpg
processing image messi-1.jpg...
```



processing image messi-2.jpg...



processing image messi-3.jpg...



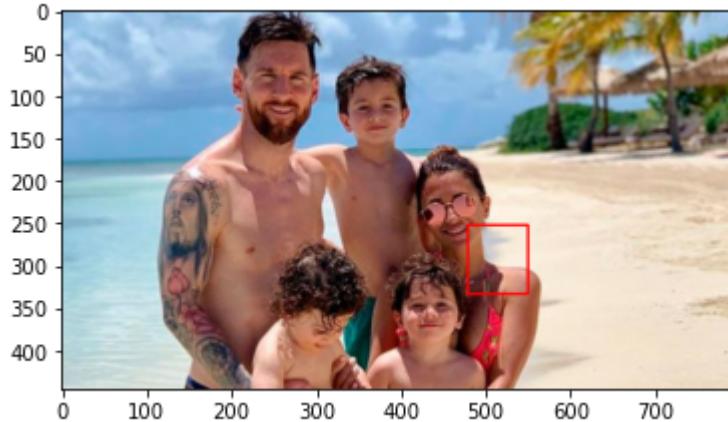
processing image messi-4.jpg...



processing image messi-5.jpg...



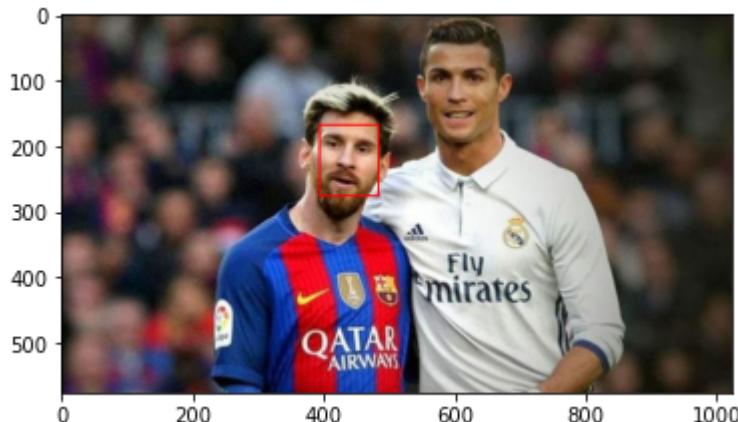
processing image messi-6.jpg...



===== Using template messi-2-template.jpg  
processing image messi-1.jpg...



processing image messi-2.jpg...



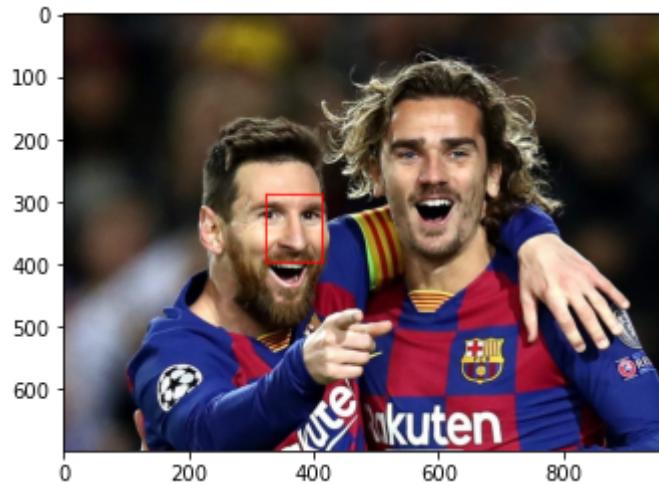
processing image messi-3.jpg...



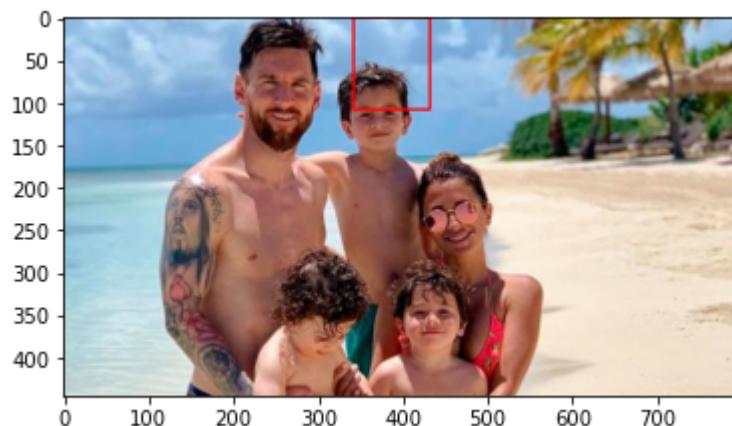
processing image messi-4.jpg...



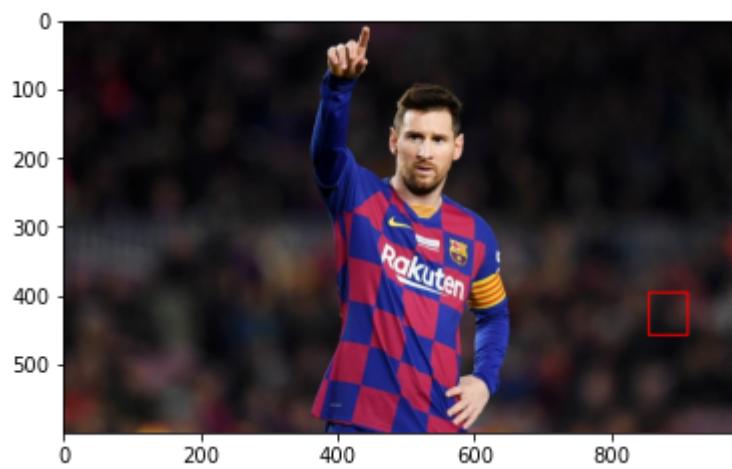
processing image messi-5.jpg...



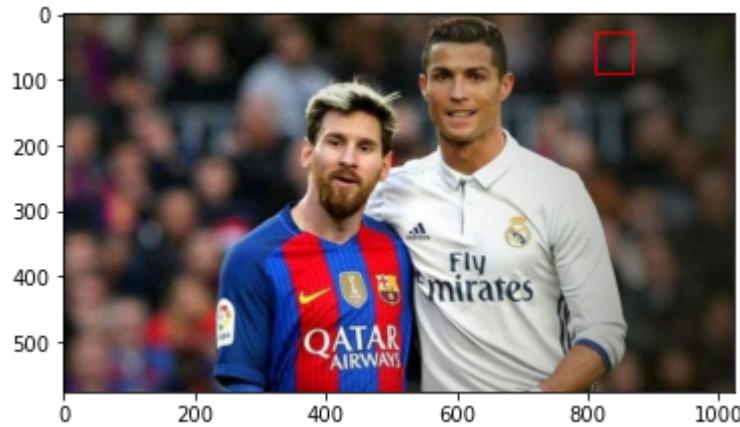
processing image messi-6.jpg...



===== Using template messi-3-template.jpg  
processing image messi-1.jpg...



processing image messi-2.jpg...



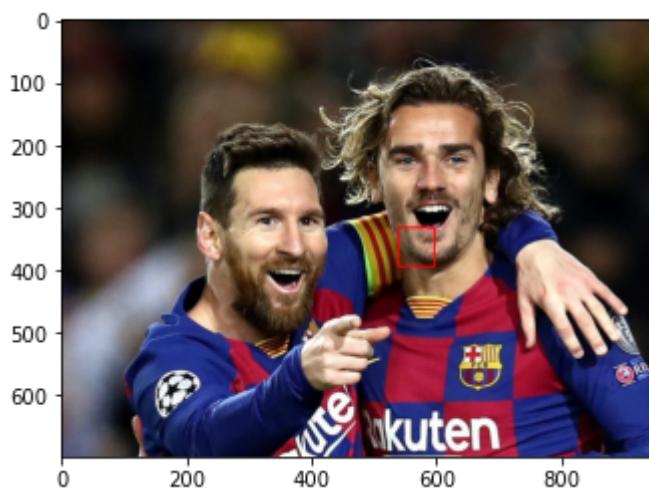
processing image messi-3.jpg...



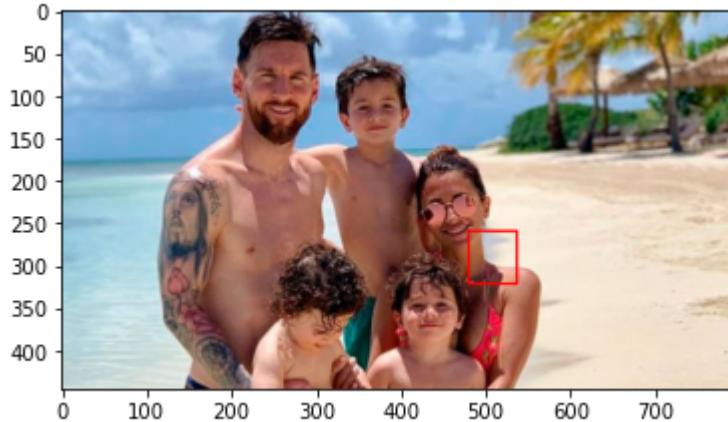
processing image messi-4.jpg...



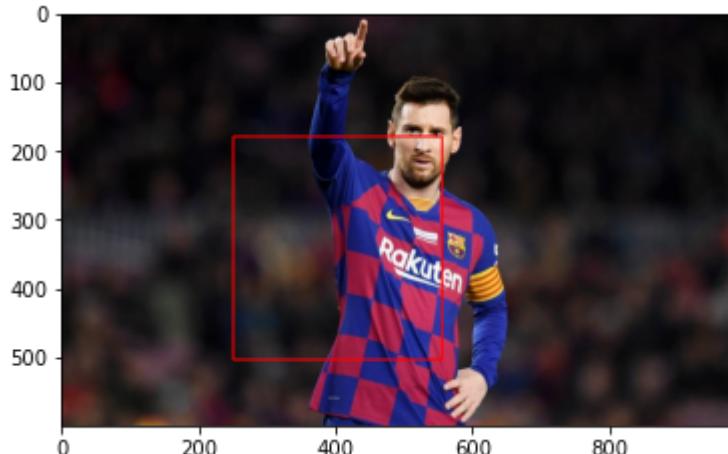
processing image messi-5.jpg...



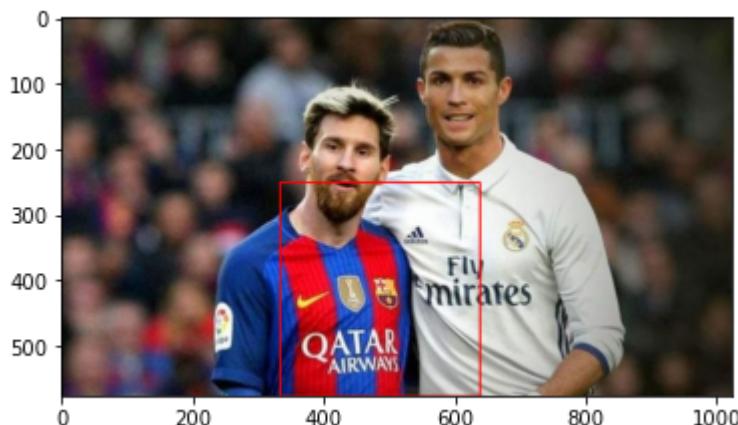
processing image messi-6.jpg...



===== Using template messi-4-template.jpg  
processing image messi-1.jpg...



processing image messi-2.jpg...



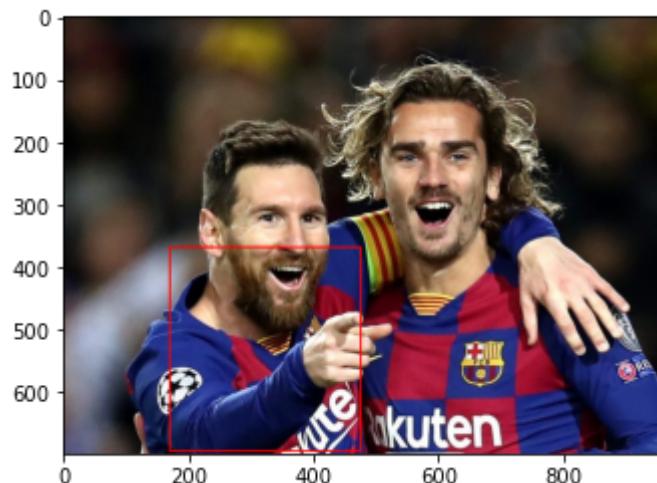
processing image messi-3.jpg...



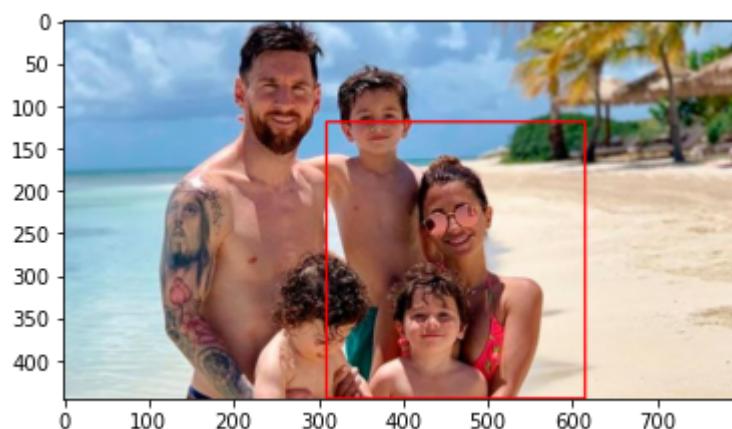
processing image messi-4.jpg...



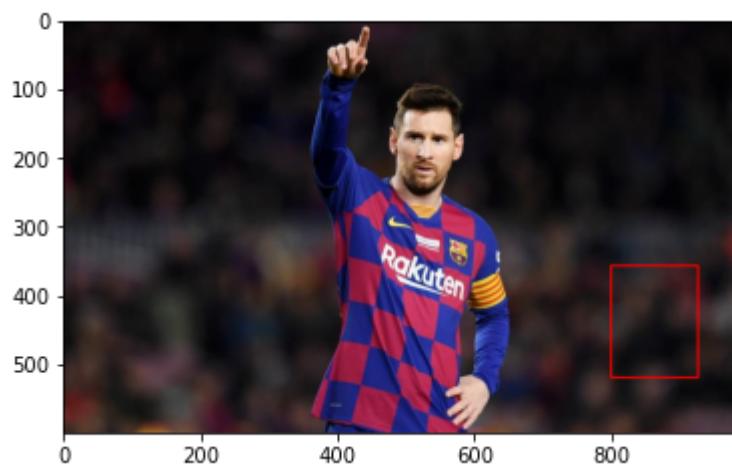
processing image messi-5.jpg...



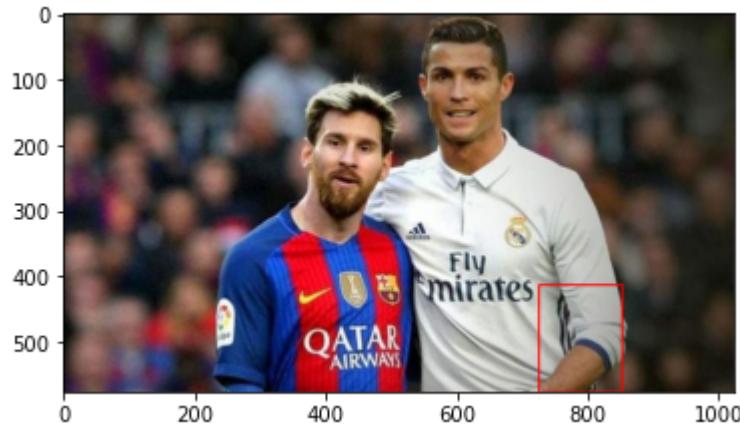
processing image messi-6.jpg...



===== Using template messi-5-template.jpg  
processing image messi-1.jpg...



processing image messi-2.jpg...



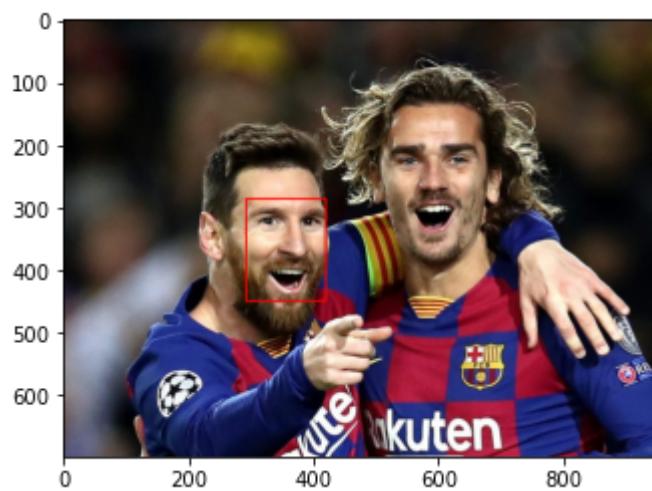
processing image messi-3.jpg...



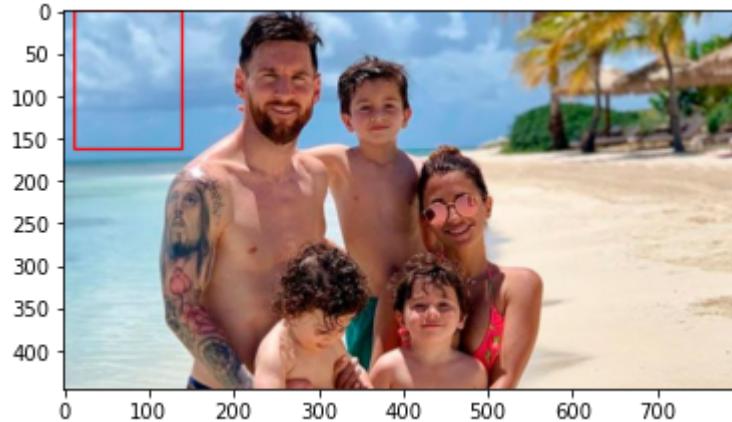
processing image messi-4.jpg...



processing image messi-5.jpg...



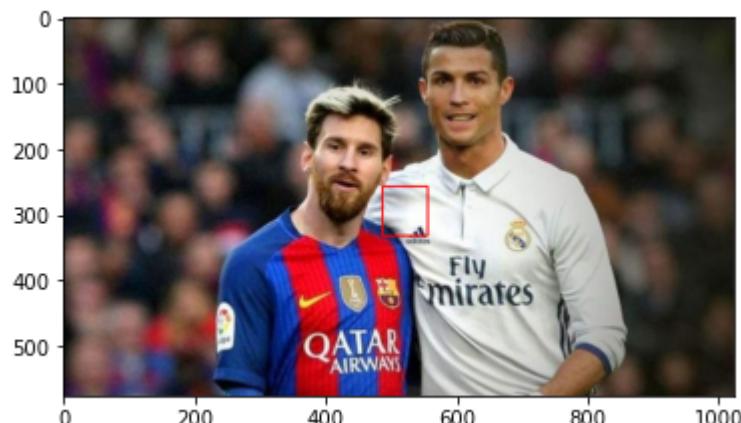
processing image messi-6.jpg...



===== Using template messi-6-template.jpg  
processing image messi-1.jpg...



processing image messi-2.jpg...



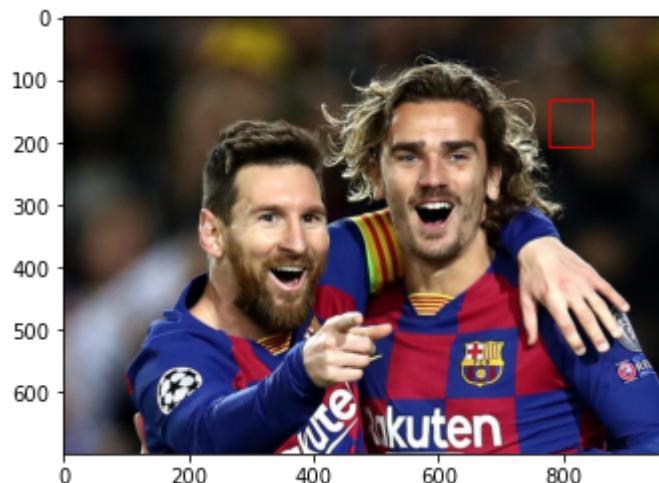
processing image messi-3.jpg...



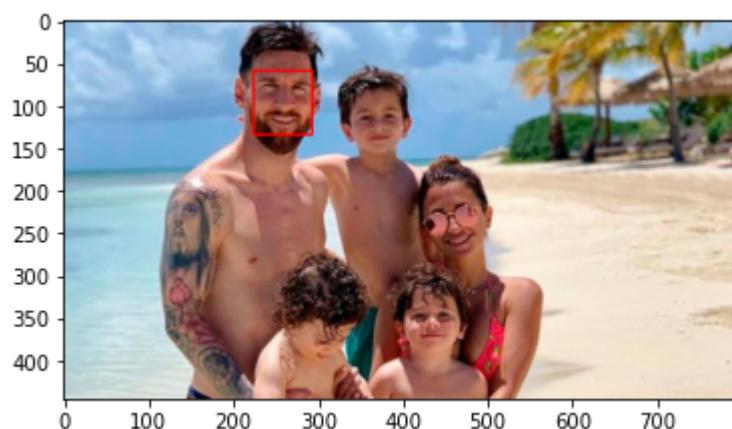
processing image messi-4.jpg...



processing image messi-5.jpg...



processing image messi-6.jpg...



In [4]:

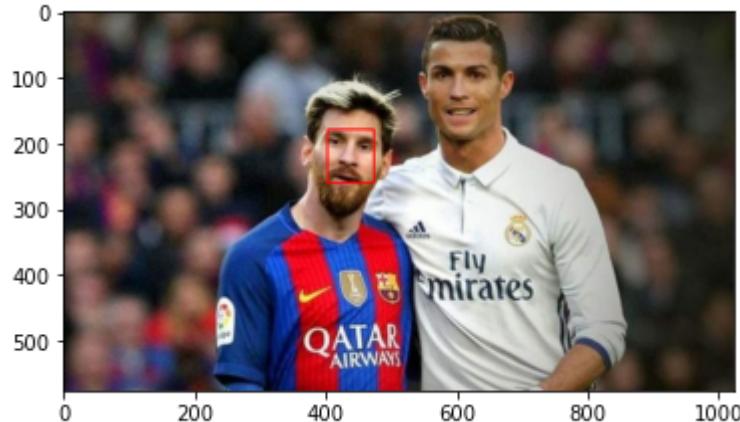
```
filenames = ("messi-1.jpg",
             "messi-2.jpg",
             "messi-3.jpg",
             "messi-4-resized.jpg",
             "messi-5-resized.jpg",
```

```
"messi-6-resized.jpg")  
  
template = cv.imread("messi-1-template.jpg", cv.IMREAD_GRAYSCALE)  
  
for filename in filenames:  
    print("processing image {0}...".format(filename))  
  
    image = cv.imread(filename)  
    rgb_image = cv.cvtColor(image, cv.COLOR_BGR2RGB)  
    grayscale_image = cv.cvtColor(image, cv.COLOR_BGR2GRAY)  
    top_left, bottom_right = find_pattern(grayscale_image, template)  
  
    cv.rectangle(rgb_image, top_left, bottom_right, 255, 2)  
  
    plt.figure(filename)  
    plt.imshow(rgb_image)  
    plt.show()
```

processing image messi-1.jpg...



processing image messi-2.jpg...



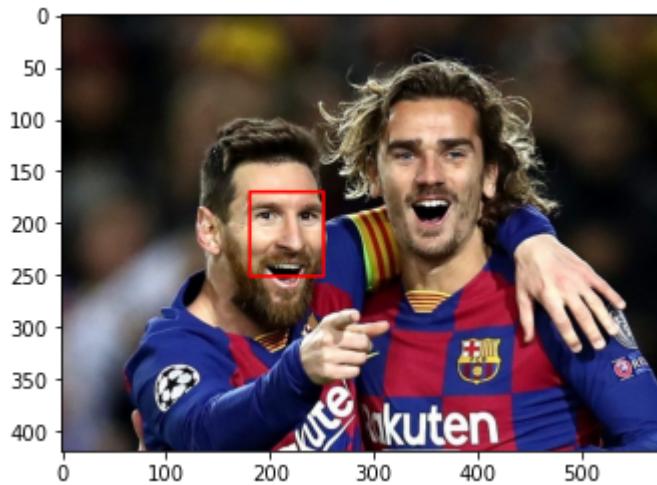
processing image messi-3.jpg...



processing image messi-4-resized.jpg...



processing image messi-5-resized.jpg...



processing image messi-6-resized.jpg...

