

# Color Detect

Josef Rodriguez Mallma

# Tools

Which tools did you use of the following:

- Cam Logitech
- Open CV library
- Laptop Mac Book
- Python Programming language
- IDE – Spyder
- Rubik Cube

# Motivation

- I want to detect 3 different colors using Open cv library and HSV color Space for learning Artificial Intelligence and computer Vision.
- For continue learn I need to solve this challenge detect 3 colors using Open CV python library and HSV.

# Research Question(s)

Is possible to detect 3 different colors using Opencv and HSV space color?

# Process

Firts of all I need to import Opencv and Numpy, then use my webcam for get frames and set dimensions of my Windows.

```
2 # -*- coding: utf-8 -*-
3 """
4 Created on Fri May  1 12:10:55 2020
5
6 @author: josef
7 """
8
9 import cv2
10 import numpy as np
11
12 capture = cv2.VideoCapture(0)
13 capture.set(cv2.CAP_PROP_FRAME_WIDTH, 480)
14 capture.set(cv2.CAP_PROP_FRAME_HEIGHT, 640)
15
```

# Process

Now I start a Loop where we get the frames and we do the detection.  
In this part I use HSV ranges, transform RGB color to HSV.

```
15  
16 while True:  
17  
18     _, frame = capture.read()  
19     #convert to hsv  
20     hsv_frame = cv2.cvtColor(frame, cv2.COLOR_BGR2HSV)  
21
```

# Process

For detect color I need to define HSV ranges for colors and create the mask for show only object for colors red green and blue.

```
--  
22     # Red color  
23     low_red = np.array([161, 155, 84])  
24     high_red = np.array([179, 255, 255])  
25     red_mask = cv2.inRange(hsv_frame, low_red, high_red)  
26     red = cv2.bitwise_and(frame, frame, mask=red_mask)  
27  
28     # Blue color  
29     low_blue = np.array([94, 80, 2])  
30     high_blue = np.array([126, 255, 255])  
31     blue_mask = cv2.inRange(hsv_frame, low_blue, high_blue)  
32     blue = cv2.bitwise_and(frame, frame, mask=blue_mask)  
33  
34     # Green color  
35     low_green = np.array([25, 52, 72])  
36     high_green = np.array([102, 255, 255])  
37     green_mask = cv2.inRange(hsv_frame, low_green, high_green)  
38     green = cv2.bitwise_and(frame, frame, mask=green_mask)
```

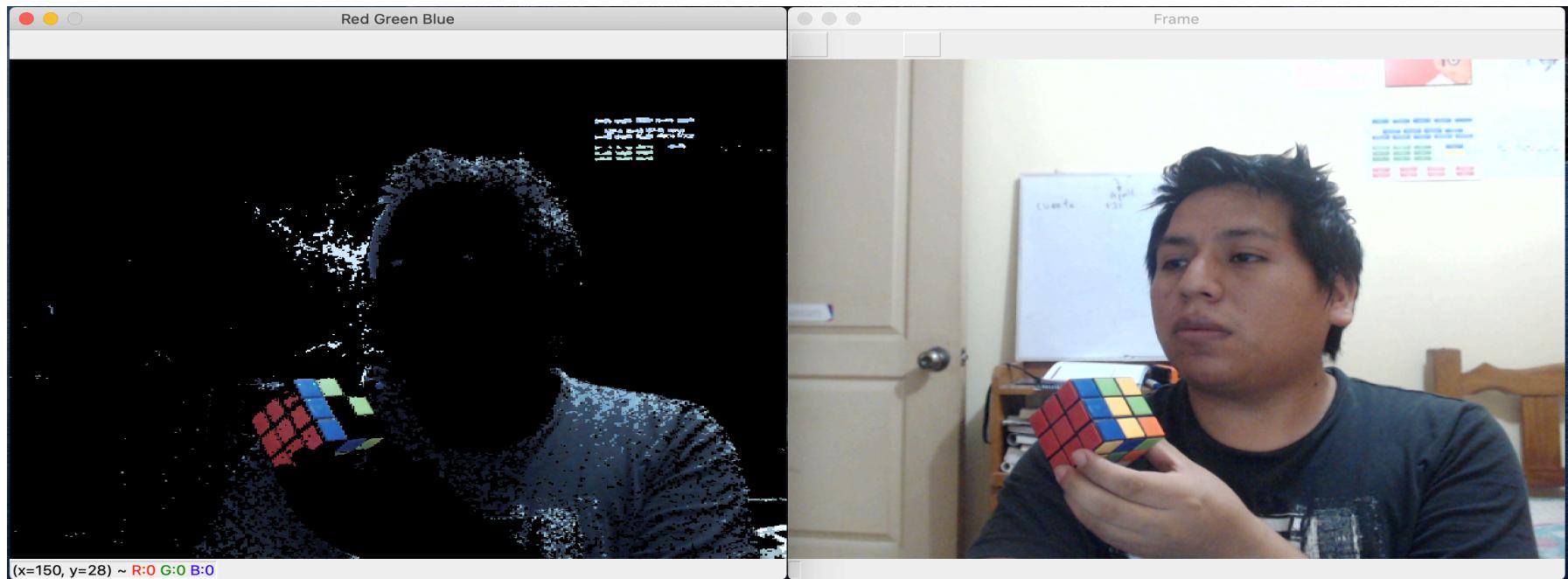
# Process

Then I add the colors for detect and show results.

```
39  
40     Unio_2_colors = cv2.add(red, green)  
41     all_colors = cv2.add(Unio_2_colors, blue)  
42  
43     cv2.imshow("Frame", frame)  
44     cv2.imshow("Red Green Blue", all_colors)  
45  
46  
47
```

# Process

I can detect 3 colors: red , Green and blue in the same time.



# Process

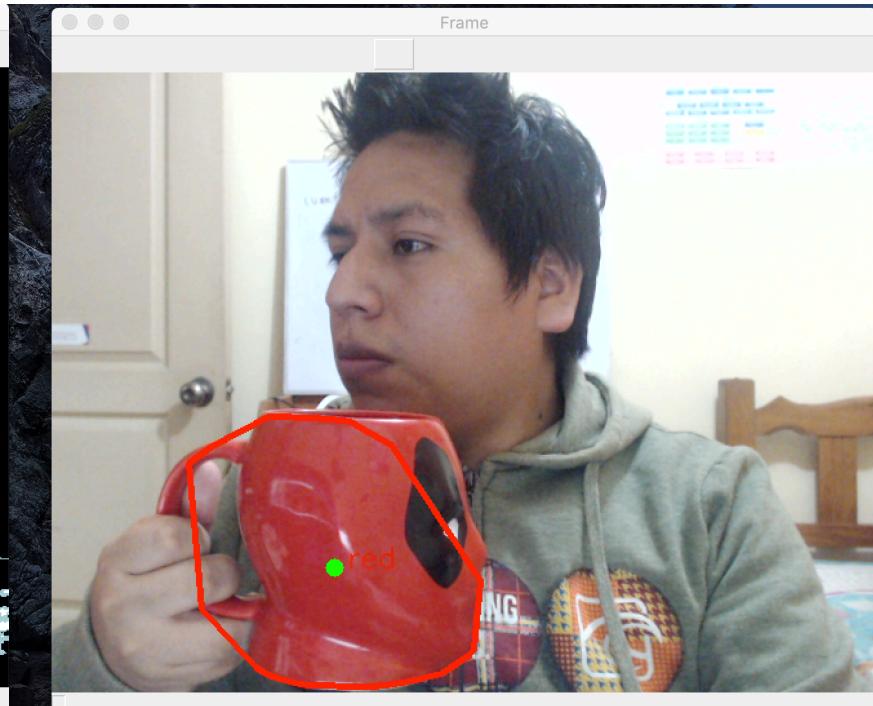
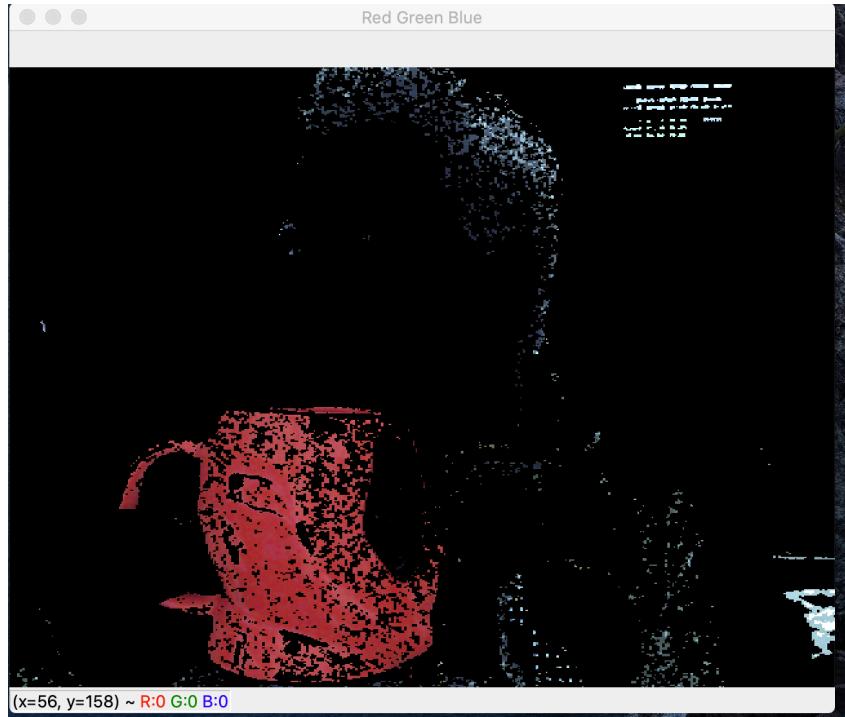
Draw border of colors, using a function and show results

```
16
17 def drawBorder(mask,color):
18
19     contornos, hierarchy = cv2.findContours(mask, cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)
20
21     for c in contornos:
22         area = cv2.contourArea(c)
23         if area > 3000:
24             M = cv2.moments(c)
25             if (M["m00"]==0): M["m00"]=1
26             x = int(M["m10"] / M["m00"])
27             y = int(M['m01'] / M['m00'])
28             newContorn = cv2.convexHull(c)
29
30             cv2.circle(frame,(x,y),7,(0,255,0),-1)
31
32             font = cv2.FONT_HERSHEY_SIMPLEX
33
34             if color == (0,0,255):
35                 cv2.putText(frame,'red',(x+10,y), font , 0.75,(0,0,255),1, cv2.LINE_AA)
36             if color == (255,0,0):
37                 cv2.putText(frame,'blue',(x+10,y), font , 0.75,(255,0,0),1, cv2.LINE_AA)
38             if color == (50,205,50):
39                 cv2.putText(frame,'green',(x+10,y), font , 0.75,(50,205,50),1, cv2.LINE_AA)
40
41             cv2.drawContours(frame, [newContorn], 0, color, 3)
42
43
44 while True:
```

```
72
73     drawBorder(red_2,(0,0,255))
74     drawBorder(blue_2,(255,0,0))
75     drawBorder(green_2,(50,205,50))
76
77     cv2.imshow("Frame", frame)
78     cv2.imshow("Red Green Blue", all_colors)
79
80
```

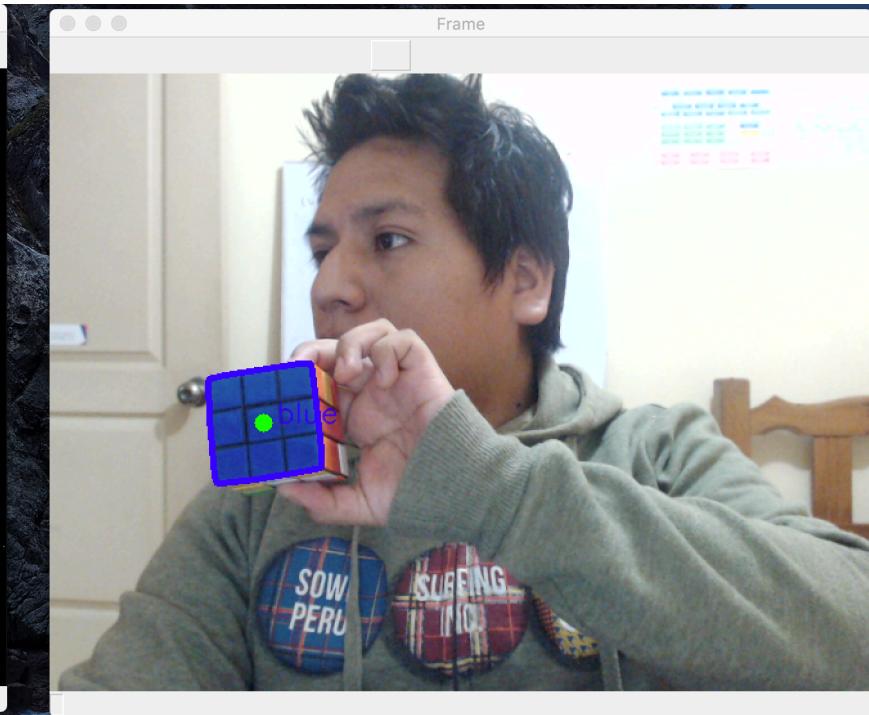
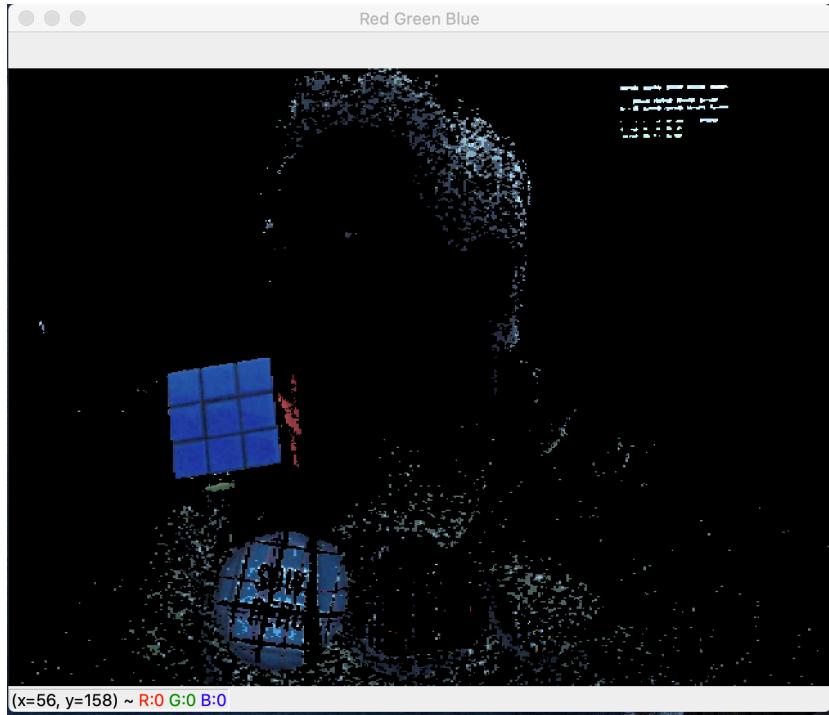
# Process

## Red Color



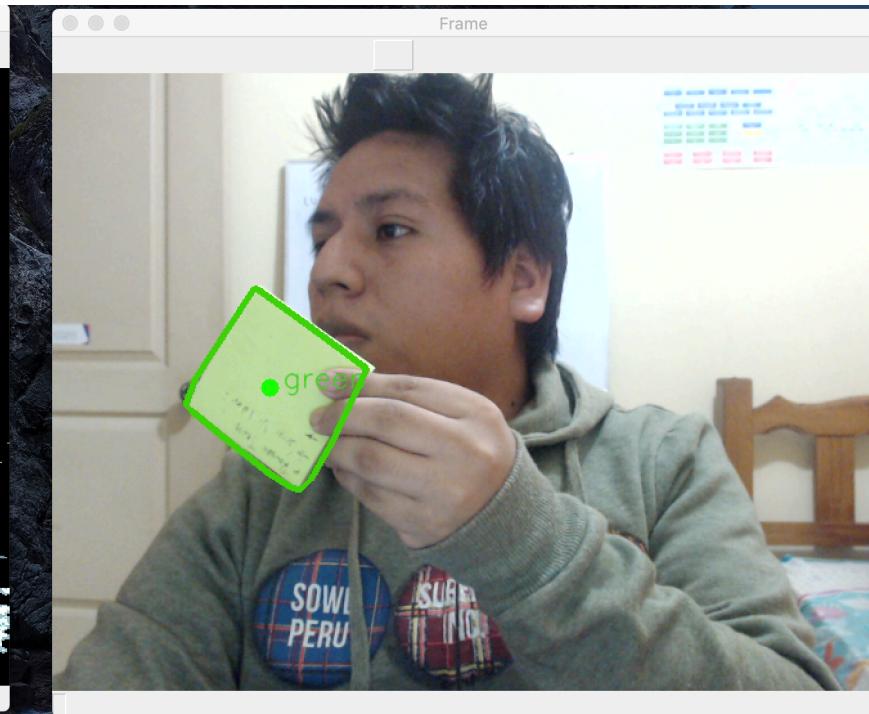
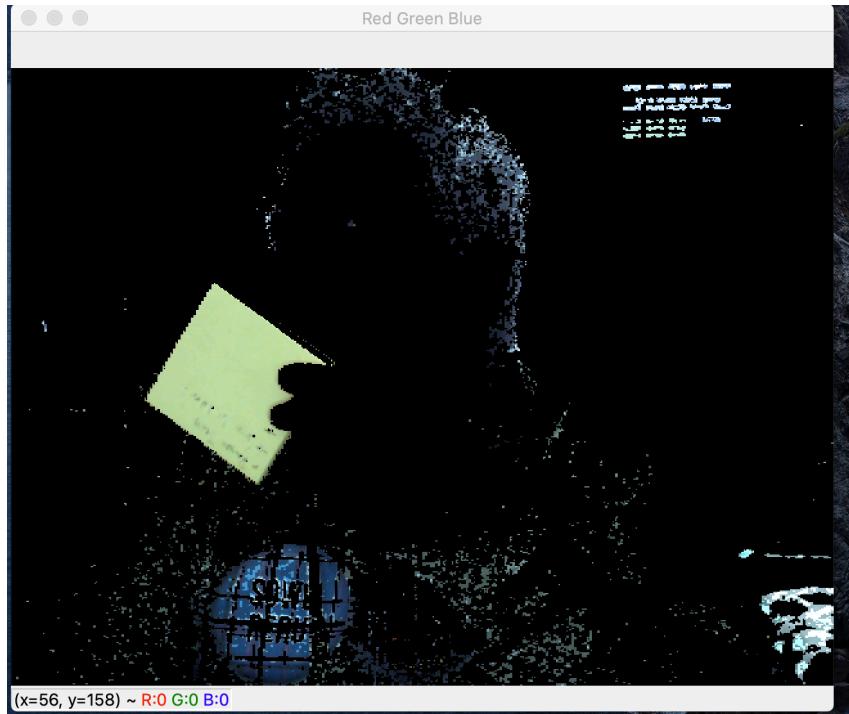
# Process

## Blue Color



# Process

## Green Color



# Process

For stop loop while I use 'ESC'.

```
46  
47  
48     key = cv2.waitKey(1)  
49     if key == 27:  
50         break
```

# Findings

Open CV is a great library for computer vision but in this case when i use my computer camera the red color was difficult to recognize, for solve this problem I change for better camera ‘Logitech HD 1080p’, so in my opinion for create good Artificial Intelligence we need good software and good hardware.

# References

- <https://docs.opencv.org/2.4/index.html>