```
1  # taking a picture to test the camera
2
3  import cv2
4  import numpy as np
5  import RPi.GPIO as GPIO
6
7  # initalize variables
8  code_running=True
9
10 # quit button
11 GPIO.setmode(GPIO.BCM)
12 GPIO.setup(17, GPIO.IN, pull_up_down=GPIO.PUD_UP)
13
14 def GPIO17_call_back(channel):
15     global code_running
16     code_running=False
17
18 cap = cv2.VideoCapture(0) #video capture source camera
19 n=255
20
21 while(code_running):
22
23     # capture current frame
24     ret,frame = cap.read()
25
26     # display captured frame
27     cv2.imshow('img1',frame)
28
29     # convert RBG to HSV
30     hsv=cv2.cvtColor(frame,cv2.COLOR_BGR2HSV)
31
32     # red: [0-20&340-360,60-100,50-100]
33     light_red1=np.array([255,85,0])
34     dark_red1=np.array([128,51,51])
35     light_red2=np.array([255,0,4])
36     dark_red2=np.array([128,51,76])
37
38     # white: [any,0-10,95-100]
39     light_white=np.array([242,242,242])
40     dark_white=np.array([255,230,230])
41
42     # darks:[any,any,0-60] & [230-360,50-100,60-100]
43     light_dark1=np.array([153,0,3])
44     dark_dark1=np.array([0,0,0])
45     light_dark2=np.array([255,0,4])
```

```
46      dark_dark2=np.array([77,89,153])
47
48      # lights: [any,0-50,60-100]
49      light_light=np.array([153,153,153])
50      dark_light=np.array([255,128,130])
51
52      # colors: [0-230,50-100,60-100]
53      light_color=np.array([0,42,255])
54      dark_color=np.array([153,77,77])
55
56      # find red
57      mask_red1=cv2.inRange(hsv,light_red1,dark_red1)
58      mask_red2=cv2.inRange(hsv,light_red2,dark_red2)
59      mask_white=cv2.inRange(hsv,light_white,dark_white)
60      mask_dark1=cv2.inRange(hsv,light_dark1,dark_dark1)
61      mask_dark2=cv2.inRange(hsv,light_dark2,dark_dark2)
62      mask_light=cv2.inRange(hsv,light_light,dark_light)
63      mask_color=cv2.inRange(hsv,light_color,dark_color)
64
65      # output
66      red1=cv2.bitwise_and(frame,frame,mask=mask_red1)
67      red2=cv2.bitwise_and(frame,frame,mask=mask_red2)
68      white=cv2.bitwise_and(frame,frame,mask=mask_white)
69      dark1=cv2.bitwise_and(frame,frame,mask=mask_dark1)
70      dark2=cv2.bitwise_and(frame,frame,mask=mask_dark2)
71      light=cv2.bitwise_and(frame,frame,mask=mask_light)
72      color=cv2.bitwise_and(frame,frame,mask=mask_color)
73      cv2.imshow("red1",red1)
74      cv2.imshow("red2",red2)
75      cv2.imshow("white",white)
76      cv2.imshow("dark1",dark1)
77      cv2.imshow("dark2",dark2)
78      cv2.imshow("light",light)
79      cv2.imshow("color",color)
80
81
82      # release video and close windows
83      cv2.waitKey(0)
84      cap.release()
85      cv2.destroyAllWindows()
86
87
```