

```

1  import cv2
2  import numpy as np
3
4  def avoidObs(frame, px, w, h):
5      ### Zero the percent of frame makeup ###
6      percent_makeup = 0
7
8
9      ### Computer vision boundaries ###
10     # Looking for red and blue objects (obstacles) within this region of BGR values #
11     bluebound = ([80, 40, 10], [150, 80, 30])
12     redbound = ([0, 0, 50], [60, 80, 150])
13     searchbound = ([],[])
14
15     ### Print pixel BGR value ###
16     print(px)
17
18     ### Determine if the object is red, blue, or neither ###
19
20     ### Check the B value ###
21     if px[0] > bluebound[0][0] and px[0] < bluebound[1][0]:
22
23         ### Check the G value ###
24         if px[1] > bluebound[0][1] and px[1] < bluebound[1][1]:
25
26             ### Check the R value ###
27             if px[2] > bluebound[0][2] and px[2] < bluebound[1][2]:
28                 searchbound = bluebound
29                 print('Found something blue!')
30             else:
31                 searchbound = ([0,0,0],[0,0,0])
32         else:
33             searchbound = ([0,0,0],[0,0,0])
34
35     ### Check the B value ###
36     elif px[0] > redbound[0][0] and px[0] < redbound[1][0]:
37
38         ### Check the G value ###
39         if px[1] > redbound[0][1] and px[1] < redbound[1][1]:
40
41             ### Check the R value ###
42             if px[2] > redbound[0][2] and px[2] < redbound[1][2]:
43                 searchbound = redbound
44                 print('Found something red!')
45             else:
46                 searchbound = ([0,0,0],[0,0,0])
47         else:
48             searchbound = ([0,0,0],[0,0,0])
49     else:
50         searchbound = ([0,0,0],[0,0,0])
51
52
53     ### Set the boundaries to the color boundaries from above ###
54     boundaries = [
55         searchbound
56     ]
57
58     ### For each of the bounds, iterate ###
59     for (lower, upper) in boundaries:
60
61         ### Create NumPy arrays from the boundaries ###
62         lower = np.array(lower, dtype = "uint8")
63         upper = np.array(upper, dtype = "uint8")
64
65         ### Mask the colors within the boundaries ###
66         mask = cv2.inRange(frame, lower, upper)
67

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68
69     ### Bitwise_and the frame using the mask ###
70     output = cv2.bitwise_and(frame, frame, mask = mask)
71
72
73     ### Threshold the masked image, make the blue/red -> white, everything else black ###
74     _, thresh = cv2.threshold(mask, 0, 255, 0)
75
76     ### Find the contours (blobs) of the threshold image ###
77     _, contours, _ = cv2.findContours(thresh, cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_NONE)
78
79
80     ### If there are contours: ###
81     if len(contours) != 0:
82
83         ### Find the biggest contour ###
84         c = max(contours, key=cv2.contourArea)
85
86         ### Find the x,y of the center, the width/height of the contour
87         x,y,w,h = cv2.boundingRect(c)
88
89         ### If the contour is too small, disregard it ###
90         if w < 50 or h < 50:
91             w = 0
92             h = 0
93
94     ### If the width/height exist: ###
95     if h and w:
96
97         ### Calculate the percent makeup of the frame ###
98         percent_makeup = (h*w)/(240*320)*100
99
100     ### Return the value ###
101     return percent_makeup
102

```