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1  import wiringpi as wp
2  from collections import deque
3  import imutils
4  import cv2
5  import numpy as np
6  import cv2.cv as cv
7  import time
8  import sys
9
10
11  wp.wiringPiSetupGpio()
12
13
14  #function definitions:
15
16  def Motor(x,y,pwm):
17      wp.pinMode(x,1)
18      wp.pinMode(y,1)
19      wp.pinMode(pwm,1)
20      wp.softPwmCreate(pwm,0,200)
21      return x,y,pwm
22
23  def forward(wheel,speed):
24      (x,y,pwm)=wheel
25      if wheel==right_wheel:
26          wp.digitalWrite(x,0)
27          wp.digitalWrite(y,1)
28      else:
29          wp.digitalWrite(x,1)
30          wp.digitalWrite(y,0)
31      wp.softPwmWrite(pwm,speed)
32
33  def backward(wheel,speed):
34      (x,y,pwm)=wheel
35      if wheel==left_wheel:
36          wp.digitalWrite(x,0)
37          wp.digitalWrite(y,1)
38      else:
39          wp.digitalWrite(x,1)
40          wp.digitalWrite(y,0)
41      wp.softPwmWrite(pwm,speed)
42
43  def stop(motor):
44      (x,y,pwm)=motor
45      wp.digitalWrite(x,0)
46      wp.digitalWrite(y,0)
47
48  def move_dist(dist):
49      time_move=1200*dist/circum_wheel
50      forward(left_wheel,37)
51      forward(right_wheel,52)
52      wp.delay(int(round(time_move)))
53      stop(left_wheel)
54      stop(right_wheel)
55
56
57
58
59  def rotate(speed,dir='counter_clock'):
60      if dir=='counter_clock':
61          forward(right_wheel,speed)
62          backward(left_wheel,speed)
63      else:
64          backward(right_wheel,speed)
65          forward(left_wheel,speed)
66
67
68
69  def left_turn(speed):
70      rotate(speed,'counter_clock')
71
72  def right_turn(speed):
73      rotate(speed,'clock')
74
75  def straight():
76      forward(left_wheel,37)
77      forward(right_wheel,52)
78
79  def stop_bot():
80      stop(left_wheel)
81      stop(right_wheel)
82

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73 def Go_to_Location(place):
74     camera = cv2.VideoCapture(0)
75     try:
76         Lower=place[0]
77         Upper=place[1]
78         check_loc=True
79         caught=False
80         while check_loc:
81             if not caught:
82                 rotate(set_speed)
83                 (grabbed, frame) = camera.read()
84                 frame = imutils.resize(frame, width=200,height=200)
85                 hsv = cv2.cvtColor(frame, cv2.COLOR_BGR2HSV)
86                 mask = cv2.inRange(hsv,Lower,Upper)
87                 mask = cv2.erode(mask, None, iterations=2)
88                 mask= cv2.dilate(mask, None, iterations=2)
89                 cnts =cv2.findContours(mask.copy(), cv2.RETR_EXTERNAL,
90                                     cv2.CHAIN_APPROX_SIMPLE)[-2]
91                 center = None
92                 if len(cnts)>0:
93                     c = max(cnts, key=cv2.contourArea)
94                     ((x,y),radius) = cv2.minEnclosingCircle(c)
95                     M = cv2.moments(c)
96                     center = (int(M["m10"]/M["m00"]),
97                             int(M["m01"]/M["m00"]))
98                     if center[0]<90:
99                         print 'turn right'
100                         caught=True
101                         right_turn(set_speed)
102                     elif center[0]>110:
103                         print 'turn left'
104                         caught=True
105                         left_turn(set_speed)
106                     else :
107                         caught=True
108                         print 'straight \t', radius
109                         straight()
110                         if 47<radius:
111                             check_loc=False
112
113                 stop_bot()
114                 move_dist(8)
115                 print 'Moved Front successfully'
116     except KeyboardInterrupt:
117         print 'stopped'
118         stop_bot()
119         sys.exit()
120
121 def Servo(pin):
122     wp.softPwmCreate(pin,0,100)
123     return pin
124
125 def Sweep(servo,dir,delay,angle):
126     pin=servo
127     if dir=='down' or dir=='close':
128         for i in range(0,int(angle+1),1):
129             wp.softPwmWrite(pin,i)
130             wp.delay(delay)
131     else:
132         for i in range(int(angle),-1,-1):
133             wp.softPwmWrite(pin,i)
134             wp.delay(delay)
135
136 def Collect_ball():
137     try:
138         Sweep(main_arm,'down',200,14)
139         wp.delay(200)
140         Sweep(collector_arm,'close',200,13)
141         wp.delay(200)
142         Sweep(main_arm,'up',200,14)
143     except :
144         wp.softPwmWrite(main_arm,0)

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143         wp.softPwmWrite(collector_arm,0)
144
145     def Shoot_ball():
146         try:
147             Sweep(main_arm,'down',200,8)
148             wp.delay(200)
149             Sweep(collector_arm,'open',200,12)
150             wp.delay(2000)
151             Sweep(main_arm,'up',200,8)
152             wp.delay(200)
153
154
155             Sweep(collector_arm,'close',200,12)
156
157         except :
158             wp.softPwmWrite(main_arm,0)
159             wp.softPwmWrite(collector_arm,0)
160
161
162     right_wheel=Motor(23,24,25)
163     left_wheel=Motor(17,27,22)
164     main_arm=Servo(12)
165     collector_arm=Servo(26)
166
167     circum_wheel=17
168     dist_between_wheels=17.9
169     set_speed=25
170
171     orange_Lower = (0,114,215)
172     orange_Upper = (34,255,255)
173     pink_Lower = (0,114,215)
174     pink_Upper = (34,255,255)
175
176     ball=(orange_Lower,orange_Upper)
177     goal=(pink_Lower,pink_Upper)
178
179     Go_to_Location(ball)
180     Collect_ball()
181     Go_to_Location(goal)
182     Shoot_ball()
183
184
```