PANTECH SOLUTIONS®
Technology Beyond the Dreams

AI Master Class series – Day 6

Object Tracking based on Colour

Day-6 Agenda.

01.

Object Tracking

Object Tracking Based on Colour

02.

HSV Color format & New Syntax

Overview on Hue Saturation Value & Basic syntax

03.

Object Tracking

Object tracking based on colour

Installing Libraries

pyautogui: pip install pyautogui

```
Installing collected packages: pymsgbox, PyTweening, pyscreeze, pyrect, pygetwindow, pyperclip, mouseinfo, pyautogui
Successfully installed PyTweening-1.0.3 mouseinfo-0.1.3 pyautogui-0.9.52 pygetwindow-0.0.9 pymsgbox-1.0.8 pyperclip-1.8.
0 pyrect-0.1.4 pyscreeze-0.1.26
```

Object Tracking.

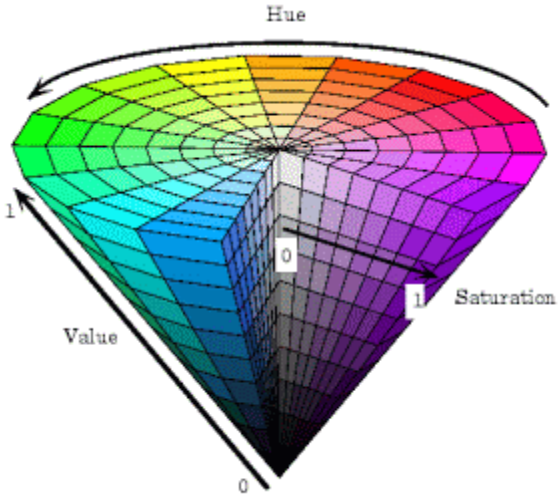
- Object detection and tracking are the task that is important and challenging such as video surveillance and vehicle navigation.

- Image processing is a method of extracting some useful information by converting image into digital inform by performing some operations on it.

HSV Value.

- HSL and HSV are alternative representations of the RGB color model, designed in the 1970s by computer graphics researchers to more closely align with the way human vision perceives color-making attributes

- HSV Color Space. The HSV color space (hue, saturation, value) is often used by people who are selecting colors (e.g., of paints or inks) from a color wheel or palette, because it corresponds better to how people experience color than the RGB color space does.

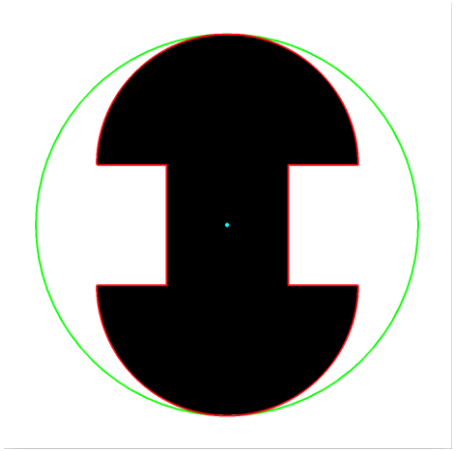


BGR to HSV.

```
#dst = cv2.cvtColor(src, cv2.COLOR_BGR2HSV)

hsv = cv2.cvtColor(blurred, cv2.COLOR_BGR2HSV)
```

Minimum Enclosing Circle.

```
#((x, y), radius) = cv2.minEnclosingCircle(countourArea)

((x, y), radius) = cv2.minEnclosingCircle(c)
```



Moments to find center of the Area.

Image moments help you to calculate some features like center of mass of the object, area of the object etc.

#var = cv2.moments(contourArea)

M = cv2.moments(c)

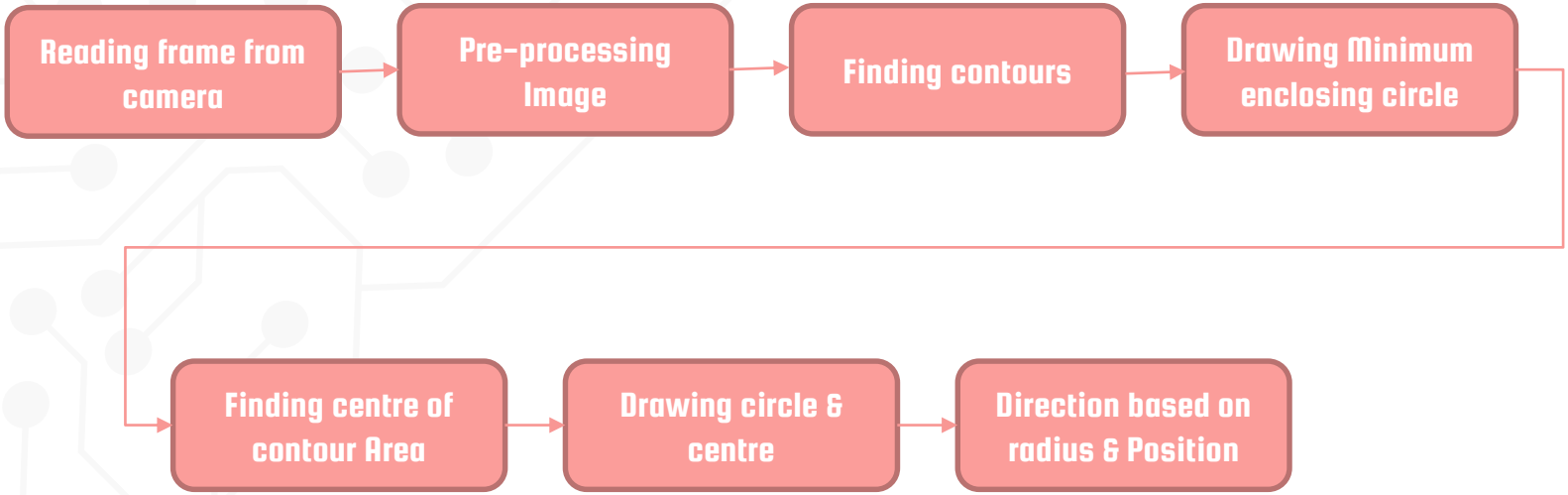
center = (int(M["m10"] / M["m00"]), int(M["m01"] / M["m00"]))

$$C_x = \frac{M_{10}}{M_{00}} \text{ and } C_y = \frac{M_{01}}{M_{00}}.$$

Drawing Circle .

```
# cv2.circle(src, (x,y), int(radius),colour,thickness)

cv2.circle(frame, (int(x), int(y)), int(radius),  (0, 255, 255), 2)


#cv2.circle(frame, center, 5, (0, 0, 255), -1)

cv2.circle(frame, center, 5, (0, 0, 255), -1)
```

Block Diagram – Workflow of Color Object Tracking.



Practical session

Tuning Color

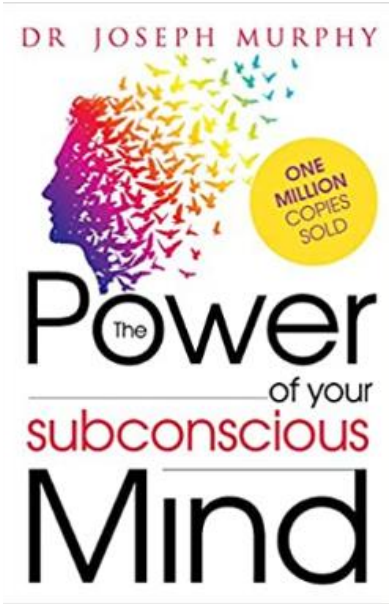
Object Tracking based on color

```
import imutils
import cv2

redLower = (157, 93, 203)
redUpper = (179, 255, 255)

camera=cv2.VideoCapture(1)
while True:
    (grabbed, frame) = camera.read()
    frame = imutils.resize(frame, width=600)
    blurred = cv2.GaussianBlur(frame, (11, 11), 0)
    hsv = cv2.cvtColor(blurred, cv2.COLOR_BGR2HSV)
    mask = cv2.inRange(hsv, redLower, redUpper)
    mask = cv2.erode(mask, None, iterations=2)
    mask = cv2.dilate(mask, None, iterations=2)
    cnts = cv2.findContours(mask.copy(),
        cv2.RETR_EXTERNAL,cv2.CHAIN_APPROX_SIMPLE)[-2] center = None
```

```
if len(cnts) > 0:
        c = max(cnts, key=cv2.contourArea)
        ((x, y), radius) = cv2.minEnclosingCircle(c)
        M = cv2.moments(c)
        center = (int(M["m10"] / M["m00"]), int(M["m01"] / M["m00"]))
        if radius > 10:
            cv2.circle(frame, (int(x), int(y)), int(radius),
                (0, 255, 255), 2)
            cv2.circle(frame, center, 5, (0, 0, 255), -1)
            print(center,radius)
            if radius > 250:
                print("stop")
            else:
                if(center[0]<150):
                    print("Left")
                elif(center[0]>450):
                    print("Right")
                elif(radius<250):
                    print("Front")
                else:
                    print("Stop")
 cv2.imshow("Frame", frame)
    key = cv2.waitKey(1) & 0xFF
    if key == ord("q"):
        break

camera.release()
cv2.destroyAllWindows()
```

Today's Short Bytes – Success Mindset – Task

- How your Mind Works
- Power of subconscious Mind
- Your Right to be Rich



Thanks!

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Tomorrow session

Face recognition using OpenCV