“COMPUTER VISION”

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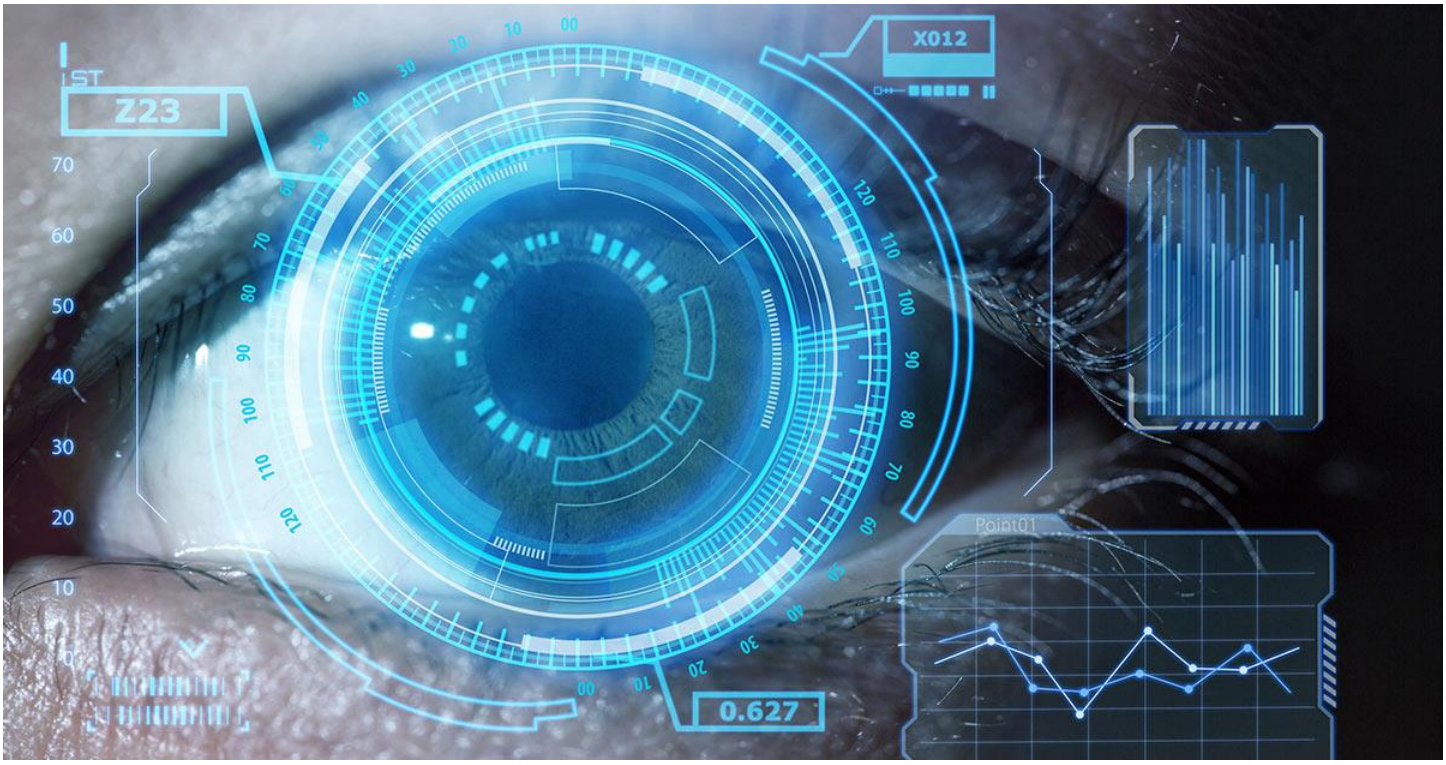

SESSION NO.“5”

- OPENCV LIBRARY
  1. Splitting & Merging colores
  2. Color spaces
  3. HSV

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1. Splitting & Merging colors

```python
import numpy as np
import cv2

image = cv2.imread("images/boat.jpg")

###? Splitting ###
b, g, r = cv2.split(image)
cv2.imshow("Red Channel", r)
cv2.imshow("Green Channel", g)
cv2.imshow("Blue Channel", b)
cv2.waitKey(0)

##? Merging ###
zero = np.zeros(image.shape[:2], dtype=np.uint8)
cv2.imshow("Red", cv2.merge([zero, zero, r]))
cv2.imshow("Green", cv2.merge([zero, g, zero]))
cv2.imshow("Blue", cv2.merge([b, zero, zero]))
cv2.waitKey(0)

merged = cv2.merge([b, g, r])
cv2.imshow("Merged", merged)
cv2.waitKey(0)
```

2. Color spaces

```python
import numpy as np
import cv2

image = cv2.imread("images/khwarizmy.jpg")

###? Color Spaces ###
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
cv2.imshow("Gray", gray)

hsv = cv2.cvtColor(image, cv2.COLOR_BGR2HSV)
cv2.imshow("HSV", hsv)

lab = cv2.cvtColor(image, cv2.COLOR_BGR2Lab)
cv2.imshow("L*a*b", lab)

cv2.imshow("ORG", image)

cv2.waitKey(0)
```

3. HSV

```python
import cv2
import numpy as np

image = cv2.imread("images/balloons.jpg")  # BGR

#? RGB #
image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)  # RGB
channels = cv2.split(image_rgb)

#! READ THIS #
# https://stackoverflow.com/questions/50963283/python-opencv-imshow-doesnt-need-convert-from-bgr-to-rgb

cv2.imshow('Image', image)

# for c, label in zip(channels, list('RGB')):
#     print(label)
#     cv2.imshow(label, c)

lower_rgb = np.array([145, 45, 0])
upper_rgb = np.array([255, 255, 167])

mask = cv2.inRange(image_rgb, lower_rgb, upper_rgb)
masked_rgb = cv2.bitwise_and(image, image, mask=mask)
cv2.imshow('Mased RGB', masked_rgb)
cv2.waitKey(0)

#?#########################
#?          HSV          #
#?#########################
image_hsv = cv2.cvtColor(image, cv2.COLOR_BGR2HSV)  # HSV

#! READ THIS #
# https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_colorspaces/py_colorspaces.html#how-to-find-hsv-values-to-track


def hsv_from(rgb_value):
    rgb = np.uint8([[list(rgb_value)]])
    hsv = cv2.cvtColor(rgb, cv2.COLOR_RGB2HSV)
    return hsv[0][0][0]


lower_hsv = np.array([hsv_from(lower_rgb), 50, 50])
upper_hsv = np.array([hsv_from(upper_rgb), 255, 255])
```

```
mask = cv2.inRange(image_hsv, lower_hsv, upper_hsv)
masked_hsv = cv2.bitwise_and(image, image, mask=mask)
cv2.imshow('Mased HSV', masked_hsv)
cv2.waitKey(0)
```

WITH MY BEST WISHES

ENG/AHMED MUBARAK 😉