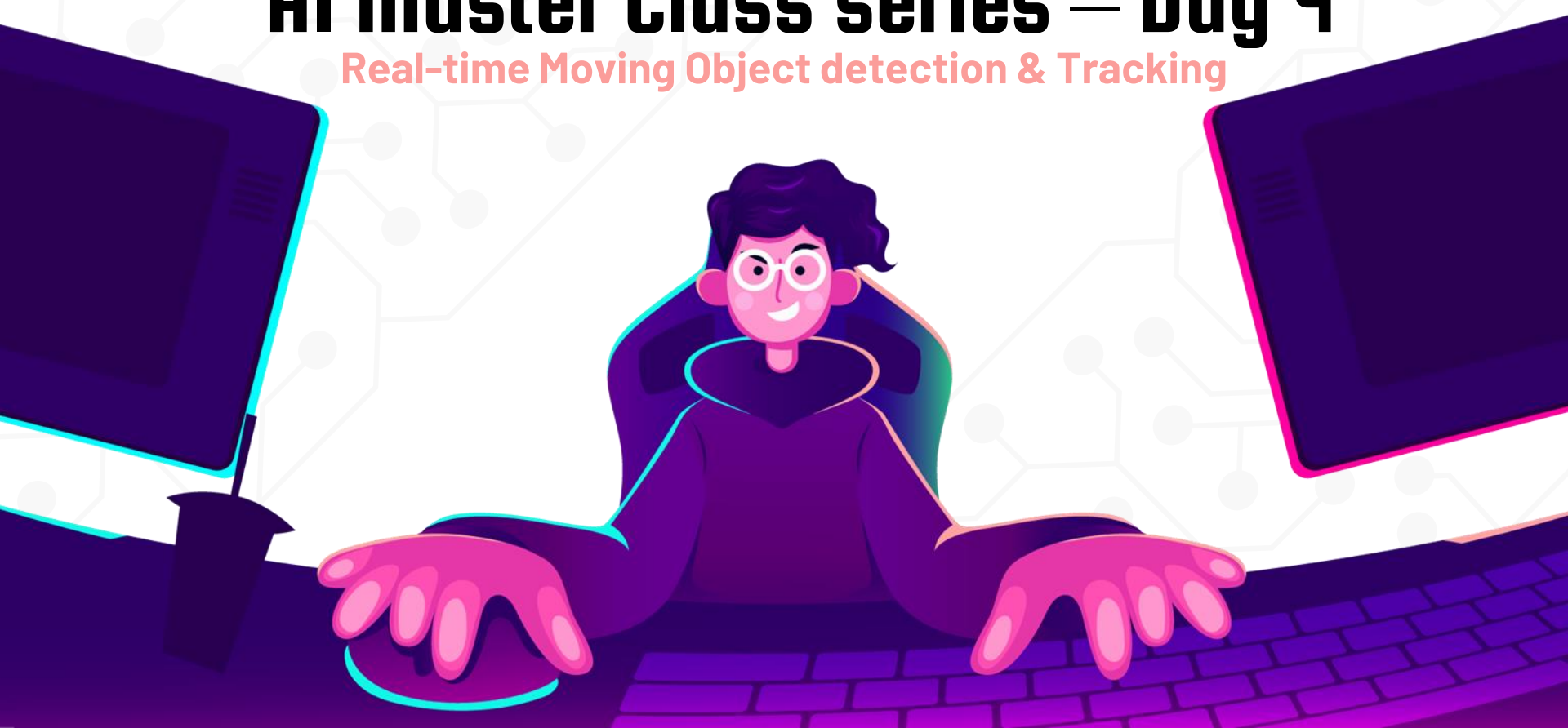
PANTECH SOLUTIONS®
Technology Beyond the Dreams

AI Master Class series – Day 4

Real-time Moving Object detection & Tracking



Practical session

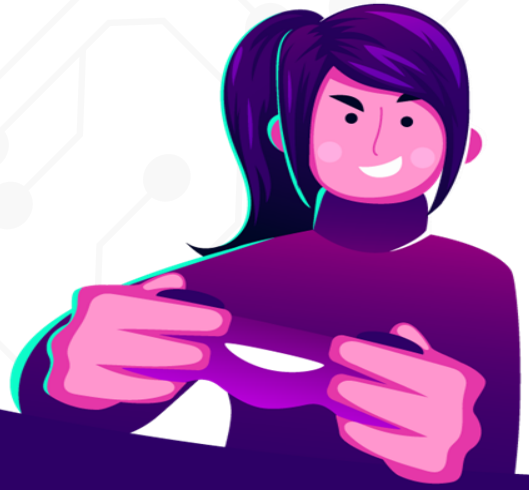


Image Resize.

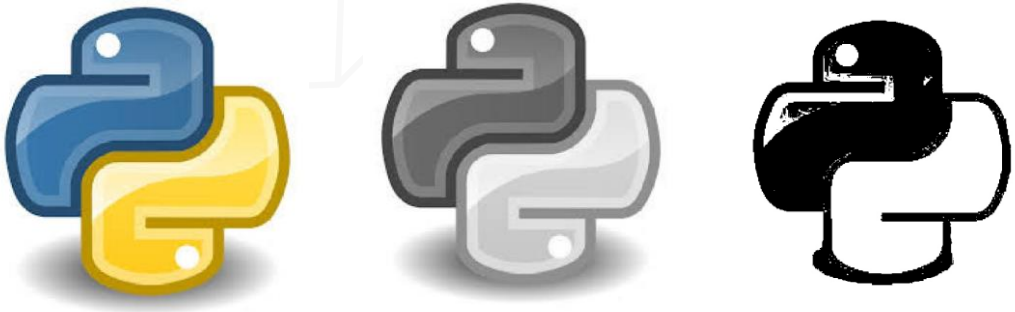
```
import cv2
import imutils
img = cv2.imread('sample2.jpg')
resizedImg = imutils.resize(img, width=500)
cv2.imwrite('resizedImage.jpg', resizedImg)
```

Gaussian Blur – Smoothening.

```
import cv2
img = cv2.imread('sample2.jpg')
grayImg = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
#dst = cv2.GaussianBlur(src, (kernel),borderType)
gaussianImg = cv2.GaussianBlur(grayImg, (21, 21), 0)
cv2.imwrite("GaussianBlur.jpg", gaussianImg)
```

threshold.

```
#dst = cv2.threshold(src, threshold, maxValueForThreshold,binary,type)[1]
import cv2
img=cv2.imread("sample.jpg")
grayImg = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
gaussBlur = cv2.GaussianBlur(grayImg,(21,21),0)
thresholdImg = cv2.threshold(grayImg,150,255,cv2.THRESH_BINARY)[1]
cv2.imwrite("threshold.jpg",thresholdImg)
```



Drawing Rectangle.

#cv2.rectangle(src,startpoint,endpoint,color,thickness)

```
cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
```

Putting Text in Image.

#cv2.putText(src, text, position,font,fontSize,color,thickness)

```
cv2.putText(img, text, (10, 20), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 255), 2)
```

findContours.

```
#dst =cv2.findContours(srcImageCopy, contourRetrievalMode,
            contourApproximationMethod)

cnts = cv2.findContours(threshImg.copy(), cv2.RETR_EXTERNAL,
            cv2.CHAIN_APPROX_SIMPLE)
```

Reading frame from camera – video streaming.

```
import cv2
vs = cv2.VideoCapture(0)
while True:
        _,img = vs.read()
        cv2.imshow("VideoStream", img)
        key = cv2.waitKey(1) & 0xFF
        if key == ord("q"):
                break
vs.release()
cv2.destroyAllWindows()
```

Moving Object Detection.

- Moving object detection is a technique used in computer vision and image processing. Multiple consecutive frames from a video are compared by various methods to determine if any moving object is detected.

Moving Object detection.

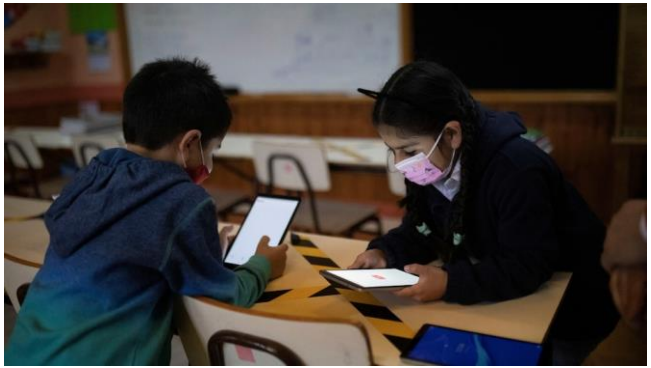
```
import imutils
import time
import cv2

vs = cv2.VideoCapture(0)
firstFrame = None
area=500
```

```
while True:
        _,img = vs.read()
        text = "Normal"
        img = imutils.resize(img, width=500)
        grayImg = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
        grayImg = cv2.GaussianBlur(grayImg, (21, 21), 0)
        if firstFrame is None:
                firstFrame = grayImg
                continue
        imgDiff = cv2.absdiff(firstFrame, grayImg)
        threshImg = cv2.threshold(imgDiff, 25, 255, cv2.THRESH_BINARY)[1]
        threshImg = cv2.dilate(threshImg, None, iterations=2)
        cnts = cv2.findContours(threshImg.copy(), cv2.RETR_EXTERNAL,
                cv2.CHAIN_APPROX_SIMPLE)
        cnts = imutils.grab_contours(cnts)
        for c in cnts:
                if cv2.contourArea(c) < area:
                        continue
                (x, y, w, h) = cv2.boundingRect(c)
                cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
                text = "Moving Object detected"
                print(text)
        cv2.putText(img, text, (10, 20),
                cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 255), 2)
        cv2.imshow("VideoStream", img)
        cv2.imshow("Thresh", threshImg)
        cv2.imshow("Image Difference", imgDiff)
        key = cv2.waitKey(1) & 0xFF
        if key == ord("q"):
                break
vs.release()
cv2.destroyAllWindows()
```

Today's Short Bytes – Tech News

Elon Musk's Starlink Satellites Beam Internet Into Remote Chilean Fishing Hamlet

It is one of two places in Chile to be chosen for a pilot project run by Musk to receive free Internet for a year.



Thanks!

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Tomorrow session

Real-Time Face Detection & Tracking