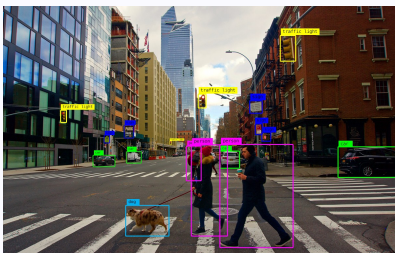


Computer Vision

Definition



It deals with how computers can gain high-level understanding from digital images or videos.



Vision

Installation



1 Installing using pip

Opencv

pip install opencv-python

Additional library for opencv

pip install opencv-contrib-python

2 Installing from the scratch

Libraries



Open CV

OpenCV is a library of programming functions mainly aimed at real-time computer vision.



PIL

It adds support for opening, manipulating, and saving many different image file formats.



Scikit-image

It includes algorithms for segmentation, geometric transformations, color space manipulation, analysis, filtering, morphology, feature detection, and more.



Mahotas

Mahotas is a includes many algorithms implemented in C++ for speed while operating in numpy arrays and with a very clean Python interface.



Scientific Python

SciPy contains modules for optimization, linear algebra, integration, interpolation, special functions, FFT, signal and image processing



Numerical Python

NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

Installing Libraries



1 Matplotlib pip install matplotlib

2 Imutils pip install imutils

3 Scipy pip install scipy

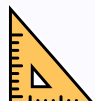
4 Wheel pip install wheel

Applications



- 1 Object recognition
- 2 Face recognition
- 3 Autonomous vehicle
- 4 Disease detection
- 5 Emotion recognition
- 6 Agriculture
- 7 Satellite image analysis
- 8 Mobile & camera
- 9 OCR
- 10 Steganography & Cryptography

Examples



1 Read, Show & Write an Image.

```
import numpy as np
import cv2
img = cv2.imread('sample2.jpg') cv2.
imshow('show',img)
cv2.imwrite('photo.jpg',img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

2 Converting Color Image to Grayscale Image.

```
import cv2
image = cv2.imread('sample1.png')
greyImage = cv2.cvtColor(image, cv2.
COLOR_BGR2GRAY)
cv2.imwrite('gray_image.png', greyImage)
cv2.imshow('Color_image',image)
cv2.imshow('Grey_image', greyImage)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

3 Image Properties

```
Import cv2
img = cv2.imread('sample2.jpg')
print (img.shape) #(342, 548, 3)
print (img.size) #562248
print (img.dtype) #uint8
```