Image Processing with OpenCV

Introduction:

The ability to see and perceive the world comes naturally to us humans. It's second nature for us to gather information from our surroundings through the gift of vision and perception.
But,When it comes to machines, this learning process becomes complicated. The process of parsing through an image and detecting objects involves multiple and complex steps, including feature extraction (edges detection, shapes, etc), feature classification, etc.

In simple words,Computer Vision is a field of deep learning that enables machines to see, identify and process images like humans.Computer vision is one of the hottest fields in the industry right now.Features like unlocking our phones using face recognition, our smartphone cameras, self-driving cars – computer vision is everywhere.We will restrict ourselves to the Opencv Library for now.It is used for all sorts of image and video analysis, like facial recognition and detection, license plate reading, photo editing, advanced robotic vision, optical character recognition, and a whole lot more.We will be using Python as the programming language as it has other libraries like numpy,matplotlib,sciPy to which makes our task easier.

INSTALLATION:

For windows:-

Refer to the link from opencv-python - OpenCV Windows

For ubuntu :-

Run the following commands:

For python:

sudo apt install python3.7

link:python installaton

For pip:

sudo apt install python3-pip(python3)

sudo apt install python-pip(python2)

pip3--version(to check version of pip)

pip --version(to check version of pip)

Links : pip installation

For numpy:

sudo apt install python-numpy

Or sudo apt install python3-pip

Or pip install numpy

link:numpy installation

For matplotlib:
sudo apt-get build-dep python-matplotlib
Or pip install matplotlib

For opencv:
pip install opencv-python
Link : opencv installation
For more help:video_tutorial

For pycharm:
Download link(download community version) -pycharm
For opencv installation on pycharm - video_tutorial
Numpy tutorial -Numpy
Matplotlib tutorial-Matplotlib

Note: *Kindly search your queries if you have any, on google. You'll easily find them.*

OpenCV Documentation :

Basics of Image Processing:

- Starting with Images
- Dealing with Videos
- Basic Drawing functions
- Basic operation with images
- Arithmetic Operation on images
- Image Thresholding
- Smoothing Images
- Morphological Transformations
- Image Gradients
- Canny Edge Detection
- Feature Detection

More resources :-

1. OpenCV Python Tutorial For Beginners

ASSIGNMENT I

From the knowledge gained based on the above tutorials, develop a filter for the images attached in the link below to increase brightness and contrast and remove noise from the pictures.

IMAGES

For feature detection, use these videos for practice.

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