PANTECH SOLUTIONS®
Technology Beyond the Dreams

AI Master Class series – Day 3

Introductions to Computer Vision & its Libraries

Day-3 Agenda.

01.

Introduction to Computer Vision

CV & Image processing vs CV

02.

Application of Computer Vision

Evolution & applications

03.

Libraries of Computer vision

Available libraries and Installing OpenCV

04.

Computer Vision examples

Basic OpenCV functions

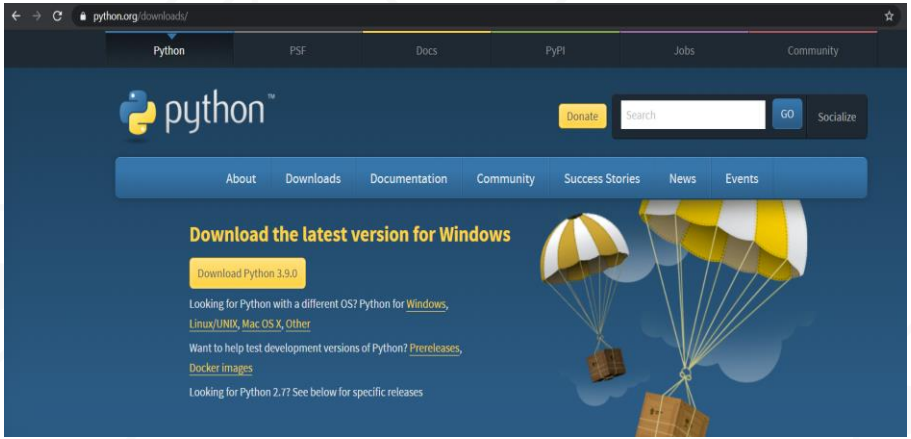
05.

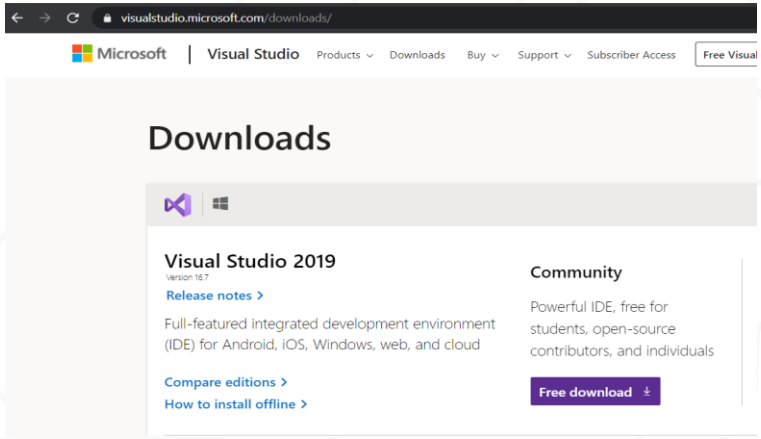
Q & A Session

Practical session

Installing Python IDLE

PYTHON.ORG | MICROSOFT VISUAL STUDIO





Setting Python in Environment Varaibles to access from Command window

Installing Python Libraries

Basic Python Programming

print(‘Hello world’)

Install Library – pip install libraryName

UnInstall Library – pip uninstall libraryName

Install Library Specific Version –

pip install libraryName==versionNumber

Add two number.

```
a = 5.4
b = 4.6
sum = float(a) + float(b)
print(sum)
```

User Input.

```
a = input(“Enter number1: “)
b = input(“Enter number2:  “)
sum = int(a) + int(b)
print(“The sum of {0} and {1} is {2}”.format(a, b, sum))
```

If & Elif.

```
a = 33
b = 33
if a > b:
        print(“a is greater than b")
elif a == b:
        print("a and b are same")
else:
        print("b is greater than a")
```

AND | OR.

```
a = 200
b = 33
c = 500
if a > b and c > a:
        print("Both conditions are True")
#if a > b or c > a:
#       print(“only one is True")
```

While.

```
i = 1
while i < 20:
        print(i)
        i += 1
```

FOR.

```
for x in range(10):
        print(x)

for x in range(1, 10):
        print(x)

for x in range(1, 10, 2):
        print(x)
```

Fuction.

```
def funName():
        print("Hello from a function")

funName()
```

File Handling.

```
a = open('pantech.txt', 'r')

print(a.read())

a.close()
```

What is Computer Vision?.

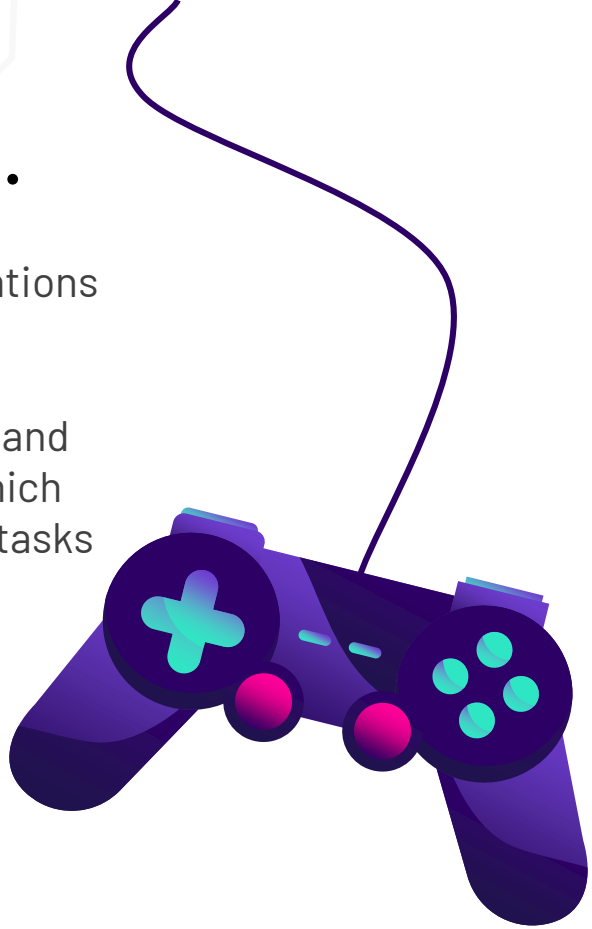
- Early experiments in computer vision took place in the 1950s, using some of the first neural networks to detect the edges of an object and to sort simple objects into categories like circles and squares.

- Computer vision is an interdisciplinary scientific field that deals with how computers can gain high-level understanding from digital images or videos.

Image Processsing vs Computer vision.

Image processing, an image is "processed", transformations are applied to an input image to get output image.

Computer vision, an image or a video is taken as input, and the goal is to understand the image and its contents which uses image processing algorithms to solve some of its tasks like human brain



Evolution.

- Image Segmentation
- Edge Detection
- Watermarking
- Steganography
- Cryptography
- Moving object Detection
- Object recognition
- Autonomous Vehicle
- Satellite image analysis
- Medical image analysis
- OCR

Applications.

- Object recognition
- Face recognition
- Autonomous vehicle
- Disease detection
- Emotion recognition
- Agriculture
- Satellite image analysis
- Robot vision
- Search engines
- Mobile & camera
- Pattern recognition

Practical session

Installing OpenCV

OpenCV: **pip install opencv-python**

or

Installing it from the source

Installing OpenCV

OpenCV: **pip install opencv-python**

or

Installing it from the source

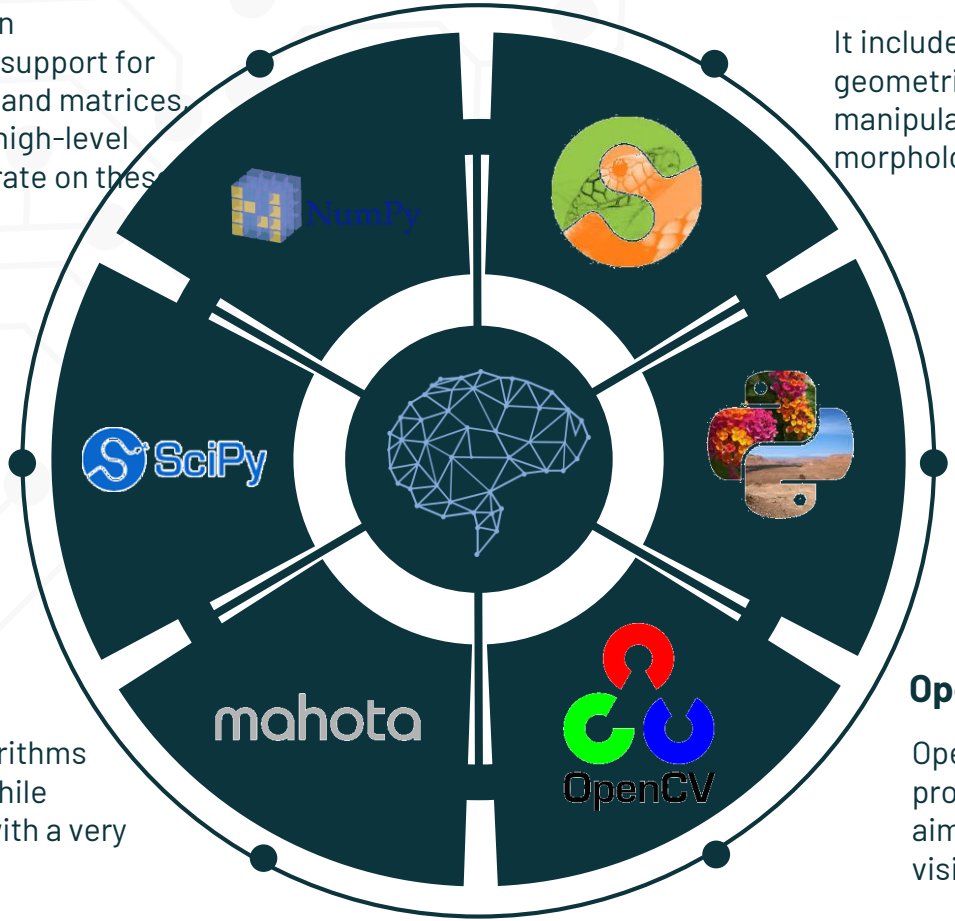
Libraries.

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.

Scikit-image

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



Scientific Python

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

PIL

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

Mahotas

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

Open CV

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

Installing Libraries

Wheel: pip install wheel
Matplotlib: pip install matplotlib
Imutils: pip install imutils
Scipy: pip install scipy

Successfully Installed OpenCVand other libraries in Python 3.7

```
  Consider adding this directory to PATH or, if you prefer to s
Successfully installed numpy-1.19.2 opencv-python-4.4.0.44
WARNING: You are using pip version 20.1.1; however, version 20.
```

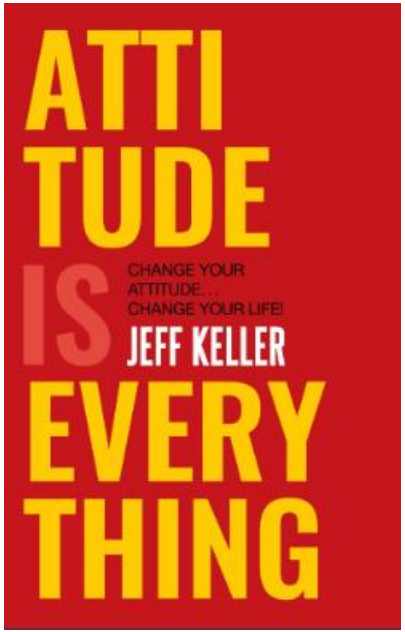
```
Installing collected packages: scipy
Successfully installed scipy-1.5.2
WARNING: You are using pip version 20.1.1; however, version 20.2.3 is available.
You should consider upgrading via the 'c:\program files (x86)\microsoft visual stuc
ip install --upgrade pip' command.

C:\Program Files (x86)\Microsoft Visual Studio\Shared\Python37_64\Scripts>
```

```
Installing collected packages: certifi, six, cycler, python-dateutil, kiwisolver, pillow, pyparsing, matplotlib
Successfully installed certifi-2020.6.20 cycler-0.10.0 kiwisolver-1.2.0 matplotlib-3.3.2 pillow-7.2.0 pyparsing-2.4.7 py
thon-dateutil-2.8.1 six-1.15.0
```

Today's Short Bytes – Book Suggestion

- Success Begins in the Mind
- You are a Human Magnet
- Heaven Helps Those who Act
- Associate with Positive People
- Stop Complaining
- Confronts your Fears & Grow



Thanks!

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link in Description

Product & Project:
www.pantechsolutions.net

Course:
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Tomorrow session

Moving Object Detection and Tracking using OpenCV