EIE4512 - Digital Image Processing

Totorial-Python

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Agenda

Python Tutorial:20 minutes

Matlab Tutorial:20 minutes

Matlab & Python Practice:20 minutes

- Packages Requirement
  - anaconda environment
  - skimage - can be installed by pip install scikit-image
  - matplotlib - can be installed by pip install matplotlib
  - opencv - can be installed by pip install opencv-python

Python Getting Start

- Brief Introduction
  - Python is an interpreted, high-level, general-purpose programming language.
  - IDE&Editor: Pycharm, Subline, Atom
- Package Manager
  - conda

    tsinghua mirror

    `https://mirrors.tuna.tsinghua.edu.cn/help/anaconda`
  - pip
- Import Package

```
import PIL
import scipy

import PIL, scipy
from PIL import ImageFilter, Image

import numpy as np
```

- Control Flow

```
a = 1
if a == 1:
    print('helloworld')
elif a == 2:
    print('hellopython')
else:
    print('helloscipy')
```

- Loop

```
for i in range(1000):
    print('index:', i)

st = ['a','b','c','d']
for s in st:
    print(s)
i = 0
while i<5:
    print('hello')
    i+=1
```

- Function

```
def add_one(a):
    return a+1

add_one(1)

l2 = map(add_one, [1,2,3,4])
print(l2)
l2 = map(lambda x:x+1, [1,2,3,4])
print(l2)
l2 = filter(lambda x:x%2==0, [1,2,3,4,5,6])
print(l2)
```

Basic Image I/O

- Read,Save,Show image

```
from scipy.misc import imread,imresize,imsave
import numpy as np
import scipy
import matplotlib.pyplot as plt


def read(path):
    img = imread(path)
    return img

def save(path, img):
    img = imsave(path, img)

def show(img):
    plt.figure()
    plt.imshow(img)
    plt.show()
```

Practice

- Numpy basic operations
- Using array indexing on image
- Gray, binary image conversion
- Resizing the image & interpolation
- Trying interpolation by yourself instead of using library