

Computer vision in the new era of Artificial Intelligence and Deep Learning

Visión por computador en la nueva era de la Inteligencia Artificial y el Deep Learning

Rubén Usamentiaga*, Alberto Fernández°

- * University of Oviedo
- ° TSK

Gijón (Spain) 5 – 16 April 2021



Pillow



Notebook: pil_introduction_python.ipynb



<u>computer-vision-and-deep-learning-course/pil_introduction_python.ipynb</u> <u>at main · albertofernandezvillan/computer-vision-and-deep-learning-course (github.com)</u>



pil introduction python.ipynb - Colaboratory (google.com)



Pillow introduction

- Pillow is the friendly PIL fork by Alex Clark and Contributors. PIL is the Python Imaging Library by Fredrik Lundh and Contributors. As of 2019, Pillow development is supported by Tidelift.
- Use the following import convention

import PIL

To load an image use Image.open() Note that PIL uses **RGB** mode

```
from PIL import Image

img = Image.open("/content/face_test.png")
print(img)
print("Format: '{}', size: '{}', mode: '{}'".format(img.format, img.size, img.mode))
```

```
<PIL.PngImagePlugin.PngImageFile image mode=RGB
size=482x504 at 0x7F3A5722DC50> Format: 'PNG', size:
'(482, 504)', mode: 'RGB'
```

To convert images between different pixel representations use img.convert().

```
from PIL import Image

# This converts RGB image to grayscale
img = Image.open("/content/face_test.png")
img_l = img.convert("L")
```

```
from PIL import Image, ImageOps
# For this purpose, we can also use ImageOps module
img 2 = ImageOps.grayscale(img)
```





To save an image on disk: img.save()
You can specify a different extension from its original, and
the saved image will be converted to the specified format.

```
from PIL import Image

# Load image:
img = Image.open("/content/face_test.png")

# Save it on disk:
img.save("face_test.jpg", quality=95)
```

Convert PIL Image to OpenCV format

```
import cv2
from PIL import Image
import numpy as np

img = Image.open("/content/face_test.png")

img_bgr = cv2.cvtColor(np.asarray(img), cv2.COLOR_RGB2BGR)
```

Convert OpenCV format to PIL Image

```
from PIL import Image

pil_image = Image.fromarray(img_rgb)
```

Pillow modules

<u>Reference — Pillow (PIL Fork) 3.0.0 documentation</u>

Image Module ImageChops

ImageDraw Module ImageEnhance Module

ImageFont Module ImageMorph Module

ImagePalette Module ImageStat Module

ImageCms Module ImageOps Module

ImageColor Module ExifTags Module

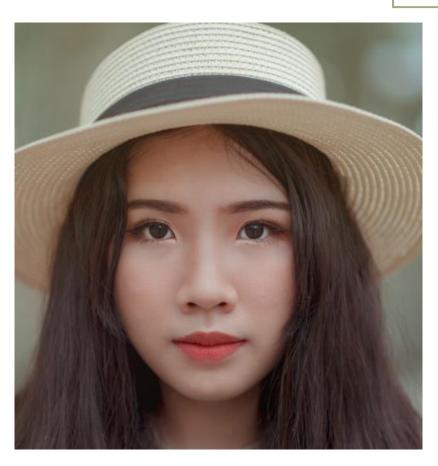
ImageFile Module
ImageFilter Module

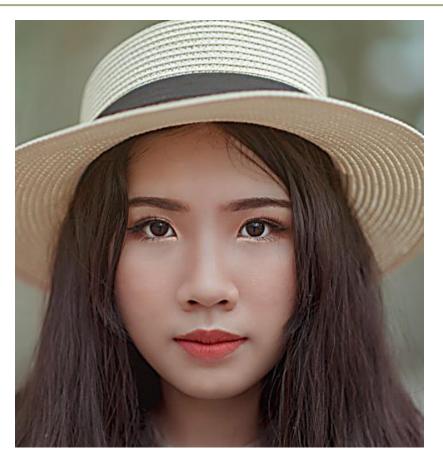
Pillow modules

Reference — Pillow (PIL Fork) 3.0.0 documentation

ImageFilter Module

img.filter(ImageFilter.UnsharpMask)





Pillow



Recommended lectures

- PIL Modules:
 - https://pillow.readthedocs.io/en/3.0.x/reference/index.html