PYTHON FOR COMPUTATIONAL PROBLEM SOLVING

Introduction to Python Imaging Library (PIL)

UE25CS151A

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Introduction to PIL (Pillow)

What is PIL/Pillow?

- Pillow = modern version of Python Imaging Library (PIL)
- Used for:
  - Opening images
    Editing images
    Saving images (multiple formats)

Introduction to PIL (Pillow)

Why use Pillow?

- Easy to use
  Supports many formats (JPEG, PNG, BMP, GIF, TIFF, …)
  Great for resizing, cropping, rotating, filtering images

Install Pillow

pip install pillow

Importing & Loading an Image

Load an Image

```
from PIL import Image
img = Image.open("PES LOGO.jpg")
img.show()
```

Output:

Supported Formats

JPEG, PNG, BMP, GIF, TIFF, and more.

Basic Image Information

```
print(img.format)   # e.g., JPEG
print(img.size)     # (width, height)
print(img.mode)     # RGB, RGBA, L etc.
```

Meaning

- **format:** file type
  size: pixel dimensions
  mode: color channels

Resizing Images

Resizing Images

```
resized_img = img.resize((200, 200))
resized_img.show()
```

Note - *resize() returns a new image and may distort aspect ratio.*

To maintain aspect ratio:

```
img.thumbnail((200, 200))
img.show()
```

Converting Image Modes

Converting Image Modes

```
gray_img = img.convert("L")
gray_img.show()
```

Common Modes:

- **1** → Black & white (1-bit)
  L → Grayscale (8-bit)
  RGB → Color (3 channels)
  RGBA → Color + Transparency
  CMYK → Printing format

Saving, Rotating and Cropping Images

Saving Images

```
gray_img.save("output_image.png")
```

Rotating : rotate(degrees)

```
rotated_img = img.rotate(45)

rotated_img.show()
```

Cropping : Image.crop(left, upper, right, lower) pixel coordinates

```
cropped_img = img.crop((50, 50, 200, 200))

cropped_img.show()
```

THANK YOU

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