pillow

July 27, 2025

0.0.1 The basics of `pillow`

create new image by import

[229]:
```
from IPython.display import display
from PIL import Image

img = Image.open("fruits.png")
img # img.show() / show the picture
```

[229]:

alternative way to import an image

[230]:
```
with Image.open("fruits.png") as img:
    display(img) # img.show()
```

create a new image from scratch

[231]:
```
new_img = Image.new(mode="RGBA",size=(300, 200))
new_img
```

[231]:

saving the picture

[232]:
```
# img.save("test.png")
```

image information

[233]:
```
img.size
```

[233]: (300, 200)

[234]:
```
img.filename
```

[234]: 'fruits.png'

[235]:
```
img.format
```

[235]: 'PNG'

[236]:
```
img.format_description
```

[236]: 'Portable network graphics'

0.0.2 Basic manipulation

Rotate

[237]:
```
img_rotate = img.rotate(60)
img_rotate
```

[237]:

[238]:
```
img_rotate = img.rotate(60,expand=True,fillcolor= (0, 128, 0))
img_rotate
```

[238]:

[239]:
```
from PIL import ImageColor

ImageColor.getcolor("Green","RGB")
```

[239]: (0, 128, 0)

[240]:
```
img_rotate = img.rotate(60,expand=True,
    fillcolor= ImageColor.getcolor("Green","RGB")) # (0, 128, 0)
img_rotate
```

[240]:

Crop Crop((`left_X` , `top_Y` , `right_X` , `bottom_Y`))

[241]:
```
img_crop = img.crop((0,0,300,100))
img_crop
```

[241]:

[242]:
```
img_crop = img.crop((200,80,260,150))
img_crop
```

[242]:

flipping the image / transpose the image

[243]:
```
img_flip_horizontal = img.transpose(Image.Transpose.FLIP_LEFT_RIGHT)
display(img) # original pitcure
img_flip_horizontal
```

[243]:

[244]:
```
img_flip_vertical = img.transpose(Image.Transpose.FLIP_TOP_BOTTOM)
display(img) # original picture
img_flip_vertical
```

[244]:

[ ]:
```
img_flip_rotate_90 = img.transpose(Image.Transpose.ROTATE_90)
display(img_flip_rotate_90)

img_flip_rotate_180 = img.transpose(Image.Transpose.ROTATE_180)
display(img_flip_rotate_180)
```

```
img_flip_rotate_270 = img.transpose(Image.Transpose.ROTATE_270)
display(img_flip_rotate_270)
```

[246]:
```
img_flip_transpose = img.transpose(Image.Transpose.TRANSPOSE)
display(img_flip_transpose)

img_flip_transverse = img.transpose(Image.Transpose.TRANSVERSE)
display(img_flip_transverse)
```

Resize

[247]:
```
width = img.size[0] # 480
height = img.size[1] # 320

img_resize = img.resize((width*2 , height*2))
img_resize
```

[247]:

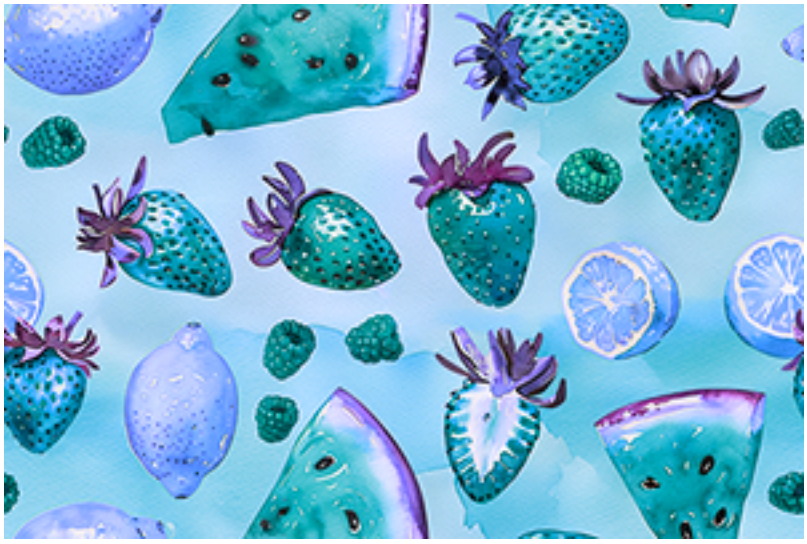
0.0.3 Filters and Enhancements

Enhancement Color

[248]:
```
from PIL import ImageEnhance

img_color = ImageEnhance.Color(img)

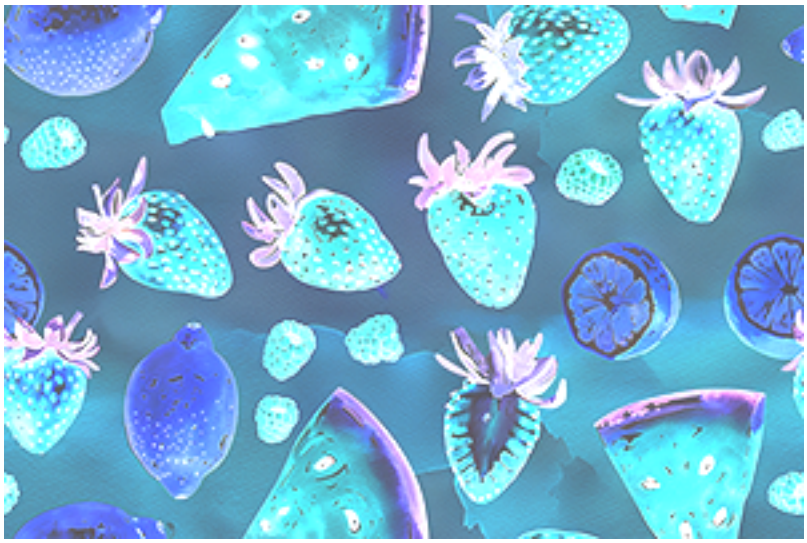
display(img_color.enhance(-1))
display(img_color.enhance(0))
display(img_color.enhance(0.5))
display(img_color.enhance(1))
display(img_color.enhance(3))
```



Contrast

[249]:
```
img_contrast = ImageEnhance.Contrast(img)

display(img_contrast.enhance(-1))
display(img_contrast.enhance(0))
display(img_contrast.enhance(0.5))
display(img_contrast.enhance(2))
display(img_contrast.enhance(10))
```



Brightness

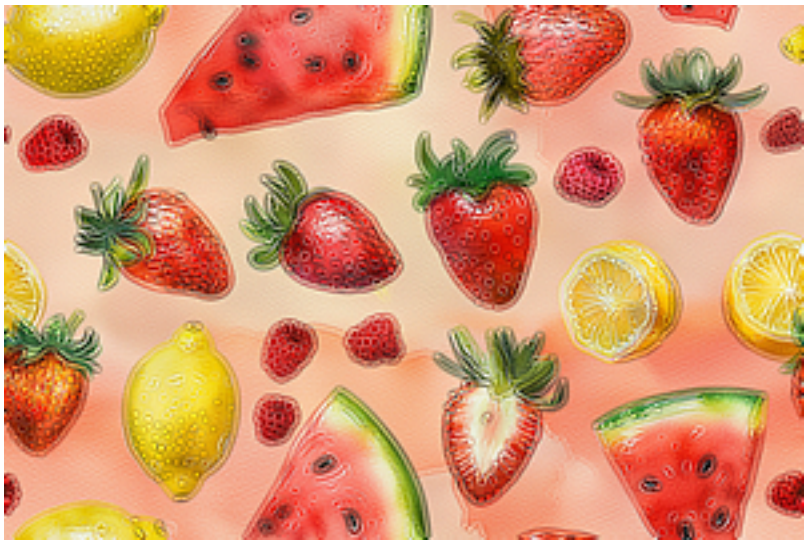
[250]:
```
img_brightness = ImageEnhance.Brightness(img)

display(img_brightness.enhance(0))
display(img_brightness.enhance(1))
display(img_brightness.enhance(2))
```

Sharpness

[251]:
```
img_sharpness = ImageEnhance.Sharpness(img)

display(img_sharpness.enhance(-2))
display(img_sharpness.enhance(1))
display(img_sharpness.enhance(5))
display(img_sharpness.enhance(9))
```



Filter BoxBlur

[252]:
```
from PIL import ImageFilter

img_boxblur = img.filter(ImageFilter.BoxBlur(12))
img_boxblur
```

[252]:

GaussianBlur

[253]:
```
img_gaussblur = img.filter(ImageFilter.GaussianBlur(3))
img_gaussblur
```

[253]:

UnsharpMask

[254]:
```
img_unsharp = img.filter(ImageFilter.UnsharpMask(8))
img_unsharp
```

[254]:

Blur

[255]:
```
img_blur = img.filter(ImageFilter.BLUR)
img_blur
```

[255]:

Contour

[256]:
```
img_contour = img.filter(ImageFilter.CONTOUR)
img_contour
```

[256]:

DETAIL

[257]:
```
img_detail = img.filter(ImageFilter.DETAIL)
display(img) # original picture
img_detail
```

[257]:

Edge Enchance

[258]:
```
img_edge_enchance = img.filter(ImageFilter.EDGE_ENHANCE)
img_edge_enchance
```

[258]:

Edge Enchance More

[259]:
```
img_edge_enchance_more = img.filter(ImageFilter.EDGE_ENHANCE_MORE)
img_edge_enchance_more
```

[259]:

Find Edge

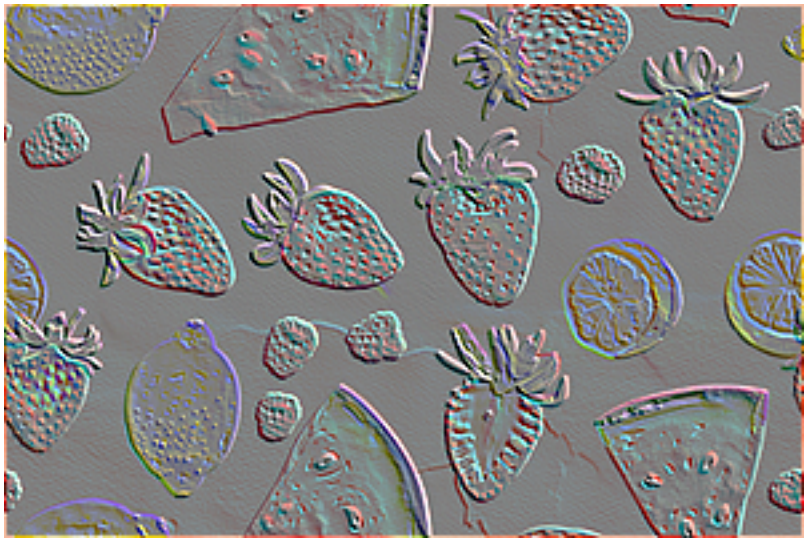
[260]:
```
img_find_edge = img.filter(ImageFilter.FIND_EDGES)
img_find_edge
```

[260]:

Emboss

[261]:
```
img_emboss = img.filter(ImageFilter.EMBOSS)
img_emboss
```

[261]:



Sharpen

[262]:
```
img_sharpen = img.filter(ImageFilter.SHARPEN)
img_sharpen
```

[262]:

Smooth

[263]:
```
img_smooth = img.filter(ImageFilter.SMOOTH)
img_smooth
```

[263]:

Smooth More

[264]:
```
img_smooth_more = img.filter(ImageFilter.SMOOTH_MORE)
img_smooth_more
```

[264]:

Min Filter

[265]:
```
img_min_filter = img.filter(ImageFilter.MinFilter(5))
img_min_filter
```

[265]:

Median Filter

[266]:
```
img_median_filter = img.filter(ImageFilter.MedianFilter(5))
img_median_filter
```

[266]:

Max Filter

[267]:
```
img_max_filter = img.filter(ImageFilter.MaxFilter(5))
img_max_filter
```

[267]:

Mode Filter

[268]:
```
img_mode_filter = img.filter(ImageFilter.ModeFilter(5))
img_mode_filter
```

[268]:

0.0.4 Colors in Pillow

Analysing picture information

[269]:
```
display(img.crop((0,0,1,1)).resize((30,30)))

img.getpixel((0,0))
# ( R , G , B )
```


[269]:
```
(245, 194, 166)
```

[270]:
```
img.getcolors(maxcolors= img.size[0]*img.size[1])

# showing every colors and number of used it
# ( number_of_use, ( R , G , B ))
```

[270]:
```
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xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:photoshop="http://ns.adobe.com/photoshop/1.0/"
xmlns:xmpMM="http://ns.adobe.com/xap/1.0/mm/"
xmlns:stEvt="http://ns.adobe.com/xap/1.0/sType/ResourceEvent#"
xmp:CreatorTool="Adobe Photoshop 26.8 (Windows)"
xmp:CreateDate="2025-07-24T11:53:08+03:30"
xmp:ModifyDate="2025-07-25T09:19:21+03:30"
xmp:MetadataDate="2025-07-25T09:19:21+03:30" dc:format="image/png"
photoshop:ColorMode="3"
xmpMM:InstanceID="xmp.iid:f0f5ae2e-565e-964d-baee-d2480d24f523"
xmpMM:DocumentID="xmp.did:eac1155c-5760-5b4c-864e-4987de78e248"
xmpMM:OriginalDocumentID="xmp.did:eac1155c-5760-5b4c-864e-4987de78e248">
<xmpMM:History> <rdf:Seq> <rdf:li stEvt:action="created"
stEvt:instanceID="xmp.iid:eac1155c-5760-5b4c-864e-4987de78e248"
stEvt:when="2025-07-24T11:53:08+03:30" stEvt:softwareAgent="Adobe Photoshop 26.8
(Windows)"/> <rdf:li stEvt:action="saved"
stEvt:instanceID="xmp.iid:be8255f3-87b7-7e47-8ffe-9224bc1851ae"
stEvt:when="2025-07-24T13:12:18+03:30" stEvt:softwareAgent="Adobe Photoshop 26.8
(Windows)" stEvt:changed="/"/> <rdf:li stEvt:action="saved"
stEvt:instanceID="xmp.iid:f0f5ae2e-565e-964d-baee-d2480d24f523"
stEvt:when="2025-07-25T09:19:21+03:30" stEvt:softwareAgent="Adobe Photoshop 26.8
(Windows)" stEvt:changed="/"/> </rdf:Seq> </xmpMM:History> </rdf:Description>
</rdf:RDF> </x:xmpmeta> <?xpacket end="r"?>'}

channels

[274]:
```
img.getchannel("R")
```

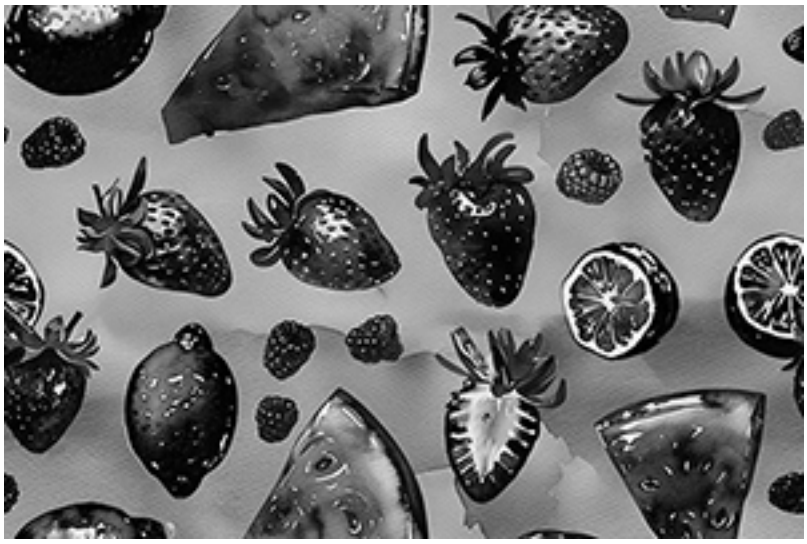
[274]:

[275]:
```
img.getchannel("G")
```

[275]:

[276]:
```
img.getchannel("B")
```

[276]:



numpy section

[277]:
```
import numpy as np
display(np.array(img).shape) # ( img.size[1] , img.size[0] , RGB )
np.array(img) # [[ R ] , [ G ] , [ B ]]
```

```
(200, 300, 3)
```

[277]:
```
array([[[245, 194, 166],
        [247, 182, 152],
        [247, 202, 191],
        …,
        [246, 193, 167],
        [245, 190, 162],
        [245, 187, 158]],

       [[244, 190, 162],
        [253, 195, 179],
        [231, 199, 175],
        …,
        [245, 191, 163],
        [246, 193, 168],
        [247, 188, 157]],

       [[248, 189, 162],
        [250, 202, 200],
        [217, 190, 115],
        …,
        [246, 193, 166],
        [244, 191, 166],
        [246, 199, 172]],

       …,

       [[246, 186, 155],
        [247, 182, 150],
        [247, 185, 153],
        …,
        [244, 188, 161],
        [244, 181, 151],
        [246, 187, 159]],

       [[247, 189, 161],
        [250, 196, 169],
        [247, 176, 145],
        …,
        [245, 189, 161],
        [247, 194, 166],
        [246, 190, 163]],

       [[245, 186, 158],
        [247, 184, 156],
        [250, 183, 167],
```

```
        …,
        [246, 190, 160],
        [246, 189, 163],
        [245, 192, 167]]], shape=(200, 300, 3), dtype=uint8)
```

[278]:
```
np.array(img.getchannel('R'))
```

[278]:
```
array([[245, 247, 247, …, 246, 245, 245],
       [244, 253, 231, …, 245, 246, 247],
       [248, 250, 217, …, 246, 244, 246],
       …,
       [246, 247, 247, …, 244, 244, 246],
       [247, 250, 247, …, 245, 247, 246],
       [245, 247, 250, …, 246, 246, 245]], shape=(200, 300), dtype=uint8)
```

Color converstions

[279]:
```
img_grayscale_1bit = img.convert('1')
img_grayscale_1bit
```

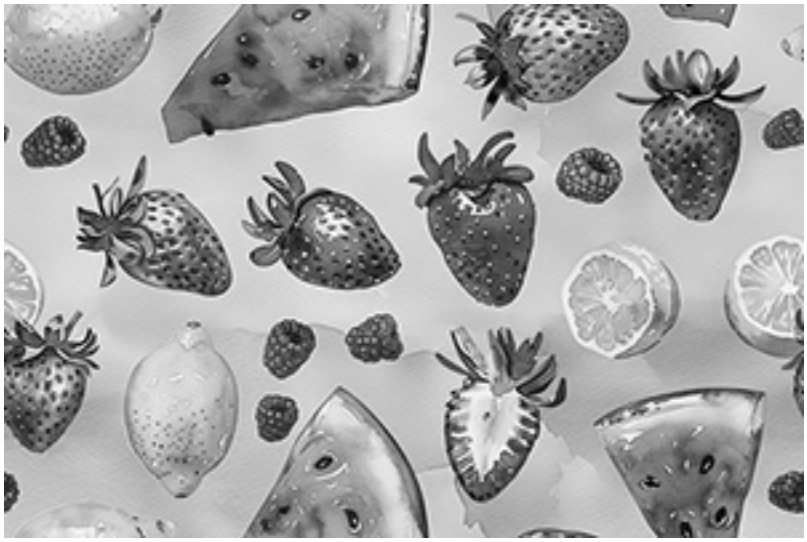
[279]:

[280]:
```
np.array(img_grayscale_1bit,dtype=int)
```

[280]:
```
array([[1, 1, 1, …, 1, 1, 1],
       [1, 1, 0, …, 1, 1, 0],
       [1, 1, 1, …, 1, 1, 1],
       …,
       [1, 1, 1, …, 1, 1, 1],
       [1, 0, 1, …, 1, 0, 1],
       [1, 1, 1, …, 1, 1, 1]], shape=(200, 300))
```

[281]:
```
img_grayscale_l = img.convert('L')
img_grayscale_l
```

[281]:



[282]:
```
# np.array(img) == img.getbands()
```

[283]:
```
img_palette = img.convert('P')
img_palette
```

[283]:

[284]:
```
np.array(img_palette.getpalette())
```

```
[284]: array([  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
                0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
                0,   0,   0,   0,   0,   0,   0,  51,   0,   0, 102,   0,   0,
              153,   0,   0, 204,   0,   0, 255,   0,   0,   0,  51,   0,  51,
               51,   0, 102,  51,   0, 153,  51,   0, 204,  51,   0, 255,  51,
                0,   0, 102,   0,  51, 102,   0, 102, 102,   0, 153, 102,   0,
              204, 102,   0, 255, 102,   0,   0, 153,   0,  51, 153,   0, 102,
              153,   0, 153, 153,   0, 204, 153,   0, 255, 153,   0,   0, 204,
                0,  51, 204,   0, 102, 204,   0, 153, 204,   0, 204, 204,   0,
              255, 204,   0,   0, 255,   0,  51, 255,   0, 102, 255,   0, 153,
              255,   0, 204, 255,   0, 255, 255,   0,   0,   0,  51,  51,   0,
               51, 102,   0,  51, 153,   0,  51, 204,   0,  51, 255,   0,  51,
                0,  51,  51,  51,  51,  51, 102,  51,  51, 153,  51,  51, 204,
               51,  51, 255,  51,  51,   0, 102,  51,  51, 102,  51, 102, 102,
               51, 153, 102,  51, 204, 102,  51, 255, 102,  51,   0, 153,  51,
               51, 153,  51, 102, 153,  51, 153, 153,  51, 204, 153,  51, 255,
              153,  51,   0, 204,  51,  51, 204,  51, 102, 204,  51, 153, 204,
               51, 204, 204,  51, 255, 204,  51,   0, 255,  51,  51, 255,  51,
              102, 255,  51, 153, 255,  51, 204, 255,  51, 255, 255,  51,   0,
                0, 102,  51,   0, 102, 102,   0, 102, 153,   0, 102, 204,   0,
              102, 255,   0, 102,   0,  51, 102,  51,  51, 102, 102,  51, 102,
              153,  51, 102, 204,  51, 102, 255,  51, 102,   0, 102, 102,  51,
              102, 102, 102, 102, 102, 153, 102, 102, 204, 102, 102, 255, 102,
              102,   0, 153, 102,  51, 153, 102, 102, 153, 102, 153, 153, 102,
              204, 153, 102, 255, 153, 102,   0, 204, 102,  51, 204, 102, 102,
              204, 102, 153, 204, 102, 204, 204, 102, 255, 204, 102,   0, 255,
              102,  51, 255, 102, 102, 255, 102, 153, 255, 102, 204, 255, 102,
              255, 255, 102,   0,   0, 153,  51,   0, 153, 102,   0, 153, 153,
                0, 153, 204,   0, 153, 255,   0, 153,   0,  51, 153,  51,  51,
              153, 102,  51, 153, 153,  51, 153, 204,  51, 153, 255,  51, 153,
                0, 102, 153,  51, 102, 153, 102, 102, 153, 153, 102, 153, 204,
              102, 153, 255, 102, 153,   0, 153, 153,  51, 153, 153, 102, 153,
              153, 153, 153, 153, 204, 153, 153, 255, 153, 153,   0, 204, 153,
               51, 204, 153, 102, 204, 153, 153, 204, 153, 204, 204, 153, 255,
              204, 153,   0, 255, 153,  51, 255, 153, 102, 255, 153, 153, 255,
              153, 204, 255, 153, 255, 255, 153,   0,   0, 204,  51,   0, 204,
              102,   0, 204, 153,   0, 204, 204,   0, 204, 255,   0, 204,   0,
               51, 204,  51,  51, 204, 102,  51, 204, 153,  51, 204, 204,  51,
              204, 255,  51, 204,   0, 102, 204,  51, 102, 204, 102, 102, 204,
              153, 102, 204, 204, 102, 204, 255, 102, 204,   0, 153, 204,  51,
              153, 204, 102, 153, 204, 153, 153, 204, 204, 153, 204, 255, 153,
              204,   0, 204, 204,  51, 204, 204, 102, 204, 204, 153, 204, 204,
              204, 204, 204, 255, 204, 204,   0, 255, 204,  51, 255, 204, 102,
              255, 204, 153, 255, 204, 204, 255, 204, 255, 255, 204,   0,   0,
              255,  51,   0, 255, 102,   0, 255, 153,   0, 255, 204,   0, 255,
              255,   0, 255,   0,  51, 255,  51,  51, 255, 102,  51, 255, 153,
               51, 255, 204,  51, 255, 255,  51, 255,   0, 102, 255,  51, 102,
```

```
255, 102, 102, 255, 153, 102, 255, 204, 102, 255, 255, 102, 255,
  0, 153, 255,  51, 153, 255, 102, 153, 255, 153, 153, 255, 204,
153, 255, 255, 153, 255,   0, 204, 255,  51, 204, 255, 102, 204,
255, 153, 204, 255, 204, 204, 255, 255, 204, 255,   0, 255, 255,
 51, 255, 255, 102, 255, 255, 153, 255, 255, 204, 255, 255, 255,
255, 255])
```

[285]:
```
img_palette_6 = img.convert('P',palette= Image.Palette.ADAPTIVE,colors=6)
img_palette_6
```

[285]:

[286]:
```
new_palette = [ x // 2 for x in img_palette_6.getpalette()]
img_palette_6.putpalette(new_palette)
img_palette_6
```

[286]:

[287]:
```
Image.MODES
```

[287]:
```
['1',
 'CMYK',
 'F',
 'HSV',
 'I',
 'I;16',
 'I;16B',
 'I;16L',
 'I;16N',
 'L',
 'LA',
 'La',
 'LAB',
 'P',
 'PA',
 'RGB',
 'RGBA',
 'RGBa',
 'RGBX',
 'YCbCr']
```

put pixel

[288]:
```
img_putpixel = img.crop((0,0,40,40))

for num in range(1,18):
    img_putpixel.putpixel((20,20 + num ),(255,0,0))
    img_putpixel.putpixel((21,20 + num ),(255,0,0))
    img_putpixel.putpixel((22,20 + num ),(255,0,0))

img_putpixel.putpixel((21,26),(0,0,255))

img_putpixel.resize((200,200))
```

[288]:

[289]:
```
new_img = img.copy()

for x in range(new_img.size[0]):
    for y in range(new_img.size[1]):
        if new_img.getpixel((x,y))[0] > 240:
            new_img.putpixel((x,y),(0,0,255))
new_img
```

[289]:

0.0.5 ImageOps works kinda like a filter but it can do more color change

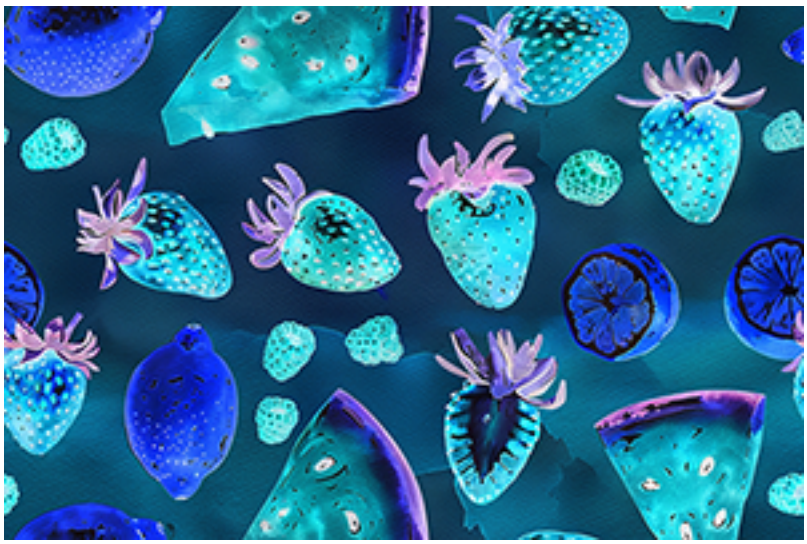
[290]:
```
from PIL import ImageOps

ImageOps.autocontrast(img,cutoff= 4)
```

[290]:

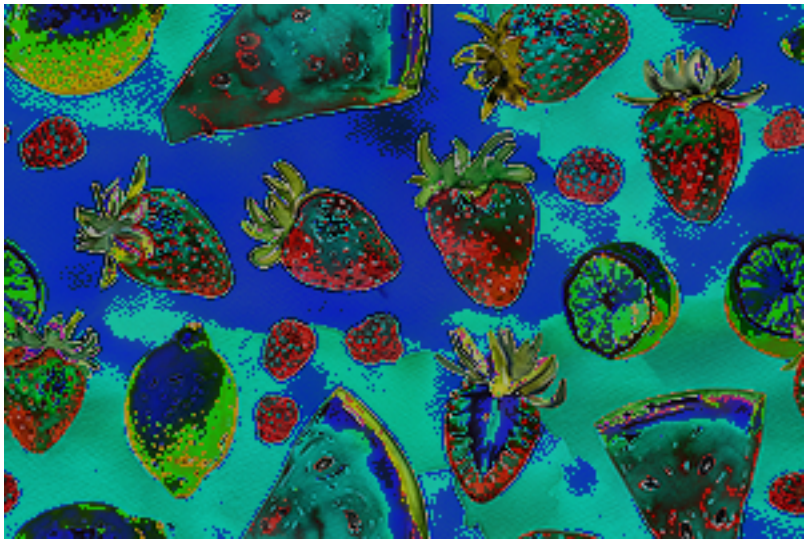
[291]:
```
ImageOps.invert(img)
```

[291]:



[292]:
```
ImageOps.solarize(img,threshold=190)
```

[292]:



[293]:
```
ImageOps.posterize(img,bits=2)
```

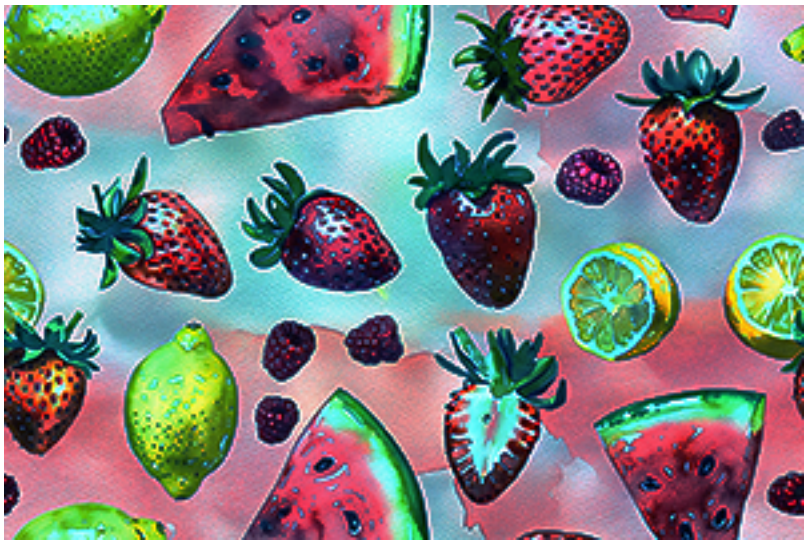
[293]:

[294]:
```
ImageOps.grayscale(img)
```

[294]:

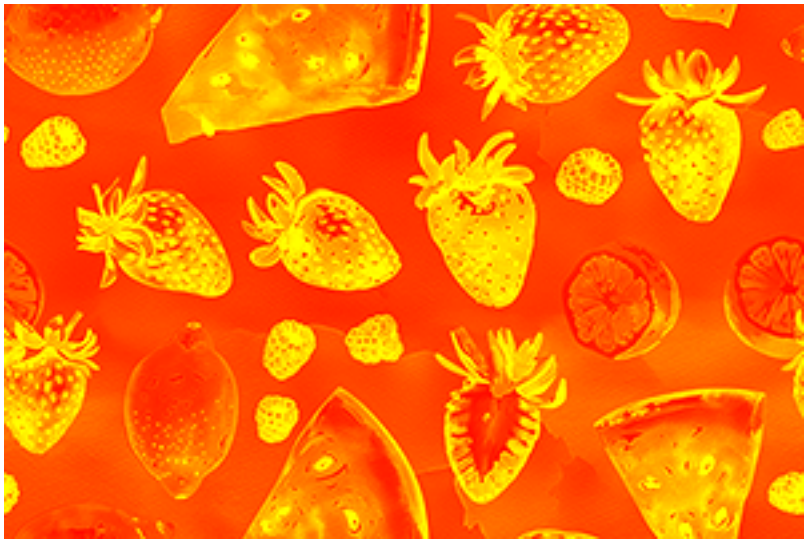
[295]:
```
ImageOps.equalize(img)
```

[295]:



[296]:
```
ImageOps.colorize(img.convert('L'),black="yellow",white='red',blackpoint=50)
```

[296]:



dimension changes

[297]:
```
ImageOps.mirror(img) # img.transpose(Image.Transpose.FLIP_LEFT_RIGHT)
```

[297]:

[298]:
```
ImageOps.flip(img) # img.transpose(Image.Transpose.FLIP_TOP_BOTTOM)
```

[298]:

[299]:
```
ImageOps.scale(img,factor= 0.4)
# img.resize((int(img.size[0]*0.4),int(img.size[1]*0.4)))
```

[299]:

[300]:
```
ImageOps.contain(img,size=(200,200))
```

[300]:

Adding and removing

[301]:
```
ImageOps.expand(img,border=(25,6),fill='green')
```

[301]:

[302]:
```
ImageOps.pad(img ,size=(400,200),color="red")
```

[302]:

[303]:
```
ImageOps.fit(img,size=(100,200))
```

[303]:

[304]:
```
ImageOps.crop(img,border=60)
```

[304]:

diformer

[305]:
```
class Diformer:
    def getmesh(self,img : Image):
        width , height = img.size
        soures_shape = (0,0                #
                        ,0,height          #
                        ,width,height      #
                        ,width,0)          #

        target_rect = (0,0,width //2,height)
        return [(target_rect,soures_shape)]

ImageOps.deform(img,Diformer())
```

[305]:

[306]:
```
class Diformer:
    def getmesh(self,img : Image):
        width , height = img.size
        soures_shape = (0,0                     #
                        ,0,height               #
                        ,width - 200,height     #
                        ,width,0)               #

        target_rect = (0,0,width //2,height)
        return [(target_rect,soures_shape)]

ImageOps.deform(img,Diformer())
```

[306]:

[307]:
```
class Diformer:
    def getmesh(self,img : Image):
        width , height = img.size
        # (0,0)
        # (w,h)
        left = (0,0, width//2 ,height),(0,0,0,height,width//2,height,width//2,0)
        right = (width//2 ,0,width,height),(width//2,0,width//
 ↪2,height,0,height,0,0)

        return [left,right]

ImageOps.deform(img,Diformer())
```

[307]:

[308]:
```
class Diformer:
    def getmesh(self,img : Image):
        width , height = img.size
        # (0,0)
        # (w,h)
        left = (0,0, width//2 ,height),(0,0,0,height,width//2,height,width//2,0)
        right = (width//2 ,0,width,height),(width//2,height,width//
 ↪2,0,width,0,width,height)

        return [left,right]

ImageOps.deform(img,Diformer())
```

[308]:

[309]:
```
class Diformer:
    def transform(self, x , y):
        import math
        y = y + 30*math.sin(x/40)
        return x , y

    def transform_rectangle(self,x0,y0,x1,y1):
        return ( *self.transform(x0,y0),
                 *self.transform(x0,y1),
                 *self.transform(x1,y1),
                 *self.transform(x1,y0),)

    def getmesh(self,img : Image):
        width , height = img.size
        gridspace = 20
        target_grid = []
        for x in range(0,width,gridspace):
            for y in range(0,height,gridspace):
                target_grid.append((x,y,x+gridspace,y+gridspace))
        source_grid = [ self.transform_rectangle(*rect) for rect in target_grid]

        return [ t for t in zip(target_grid,source_grid)]

ImageOps.deform(img,Diformer())
```

[309]:

0.0.6 Drawing shapes

[310]:
```
from PIL import ImageDraw

new_img = img.copy()

draw = ImageDraw.Draw(new_img)
draw.rectangle((30,30,100,180),width=3)

new_img
```

[310]:

[311]:
```
draw.rectangle((30,30,100,180),width=3 , outline='yellow',fill='green')

new_img
```

[311]:

[312]:
```
draw.ellipse((33,33,97,176),width=0 ,fill='purple')

new_img
```

[312]:

[313]:
```
draw.
↪polygon(((120,40),(176,20),(200,56),(176,70)),width=4,fill='blue',outline="white")
```

```
new_img
```

[313]:

[314]:
```
draw.line(((170,180),(289,160),(250,40)),fill="black",width=5,joint='curve')

new_img
```

[314]:

[315]:
```
draw.arc((170,100,220,150),start=20,end=200,width=5,fill='yellow')

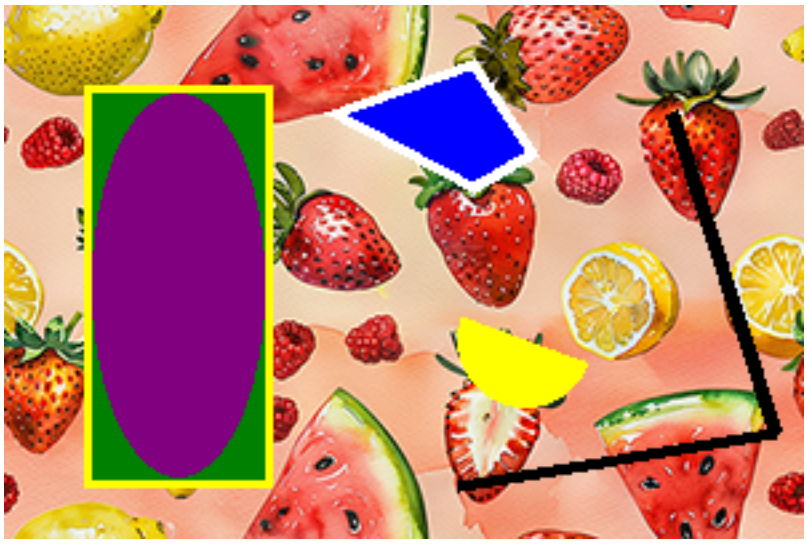
new_img
```

[315]:

[316]:
```
draw.chord((170,100,220,150),start=20,end=200,width=5,fill='yellow')

new_img
```

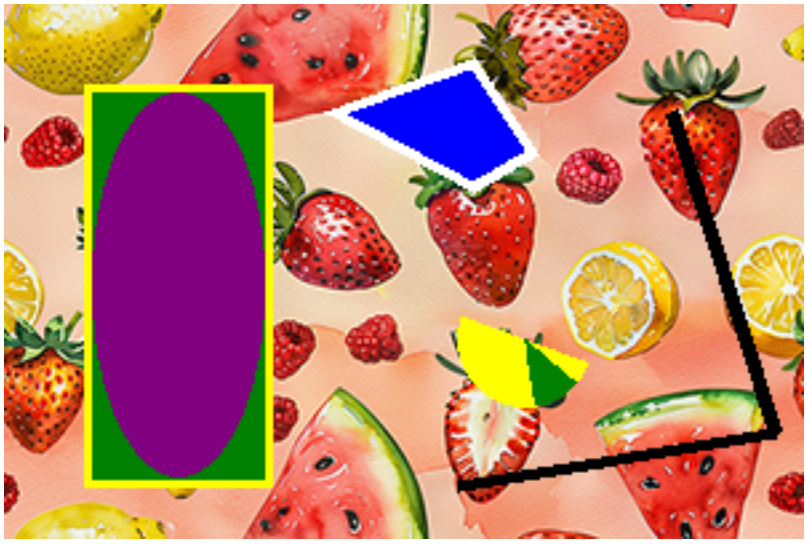
[316]:



[317]:
```
draw.pieslice((170,100,220,150),start=40,end=80,width=5,fill='green')

new_img
```

[317]:



[318]:
```
from PIL import ImageFont

font = ImageFont.truetype(font='arial',size=20)
draw.text((40,50),'fruits',font=font,fill='red')

new_img
```

[318]:

0.0.7 Combining images

merging images with Image.mehods( )

[319]:
```
picture = Image.open('picture.jpg')
picture
```

[319]:

[320]:
```
# both images need same size and mode
Image.blend(img,picture,0.6)
```

[320]:

[321]:
```
Image.composite(img,picture,mask= Image.new('L',img.size,100))
```

[321]:

image paste

[322]:
```
python = Image.open("python.png")
python
```

[322]:

[323]:
```
new_img = img.copy()

new_img.paste(python,(100,50),mask=python)
new_img
```

[323]:

channel operations

[324]:
```
from PIL import ImageChops

ImageChops.overlay(img,picture)
```

[324]:

[325]:
```
ImageChops.darker(img,picture)
```

[325]:

[326]:
```
ImageChops.lighter(img,picture)
```

[326]:

[327]:
```
ImageChops.soft_light(img,picture)
```

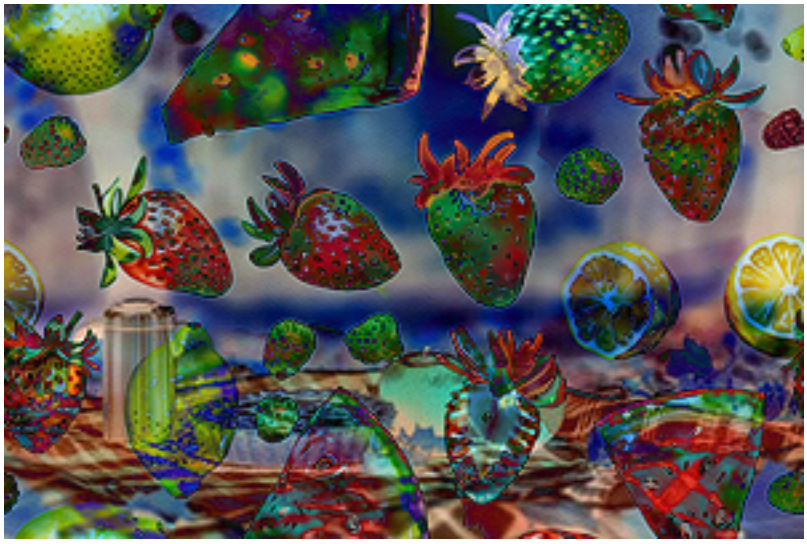
[327]:

[328]:
```
ImageChops.hard_light(img,picture)
```

[328]:

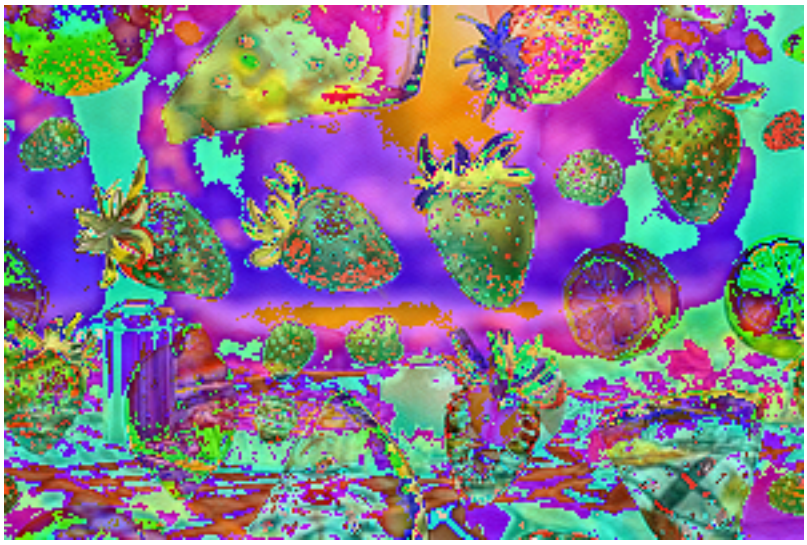
[329]:
```
ImageChops.difference(img,picture)
```

[329]:



[330]:
```
ImageChops.add_modulo(img,picture)
```

[330]:



[331]:
```
ImageChops.screen(img,picture)
```

[331]:

[332]:
```
ImageChops.multiply(img,picture)
```

[332]:

more complex channel operations

[333]:
```
ImageChops.add(img,picture,scale=3,offset=100)
```

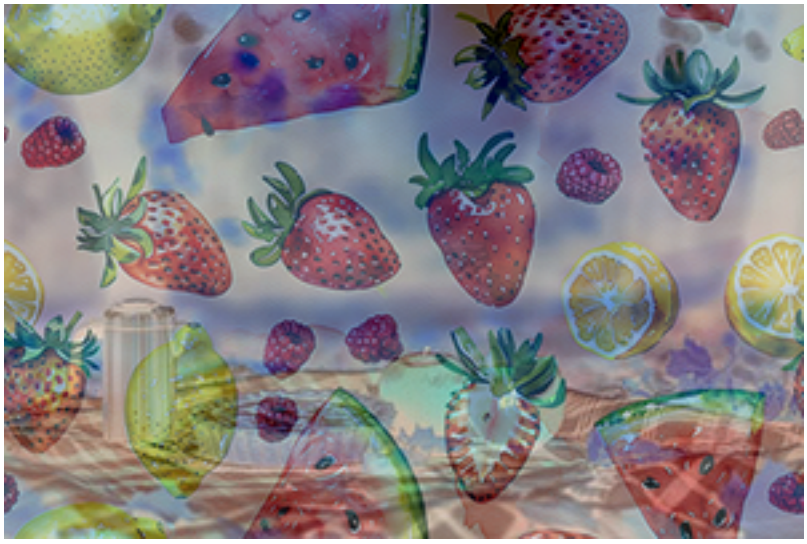
[333]:

[334]:
```
ImageChops.add(img,picture,scale=2,offset=20)
```

[334]:

[335]:
```
ImageChops.subtract(img,picture,scale=2,offset=100)
```

[335]:



logical

[336]:
```
ImageChops.logical_and(img.convert('1'),picture.convert('1'))
```

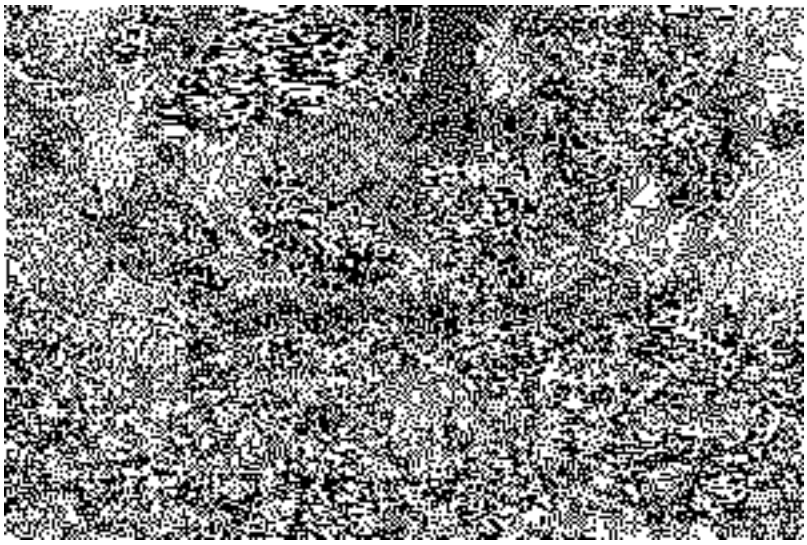
[336]:

[337]:
```
ImageChops.logical_or(img.convert('1'),picture.convert('1'))
```

[337]:

[338]:
```
ImageChops.logical_xor(img.convert('1'),picture.convert('1'))
```

[338]:



masking

[339]:
```
mask = Image.open("mask.png")
Image.open("mask.png").convert('L')
```

[339]:

[340]:
```
img_masked_alpha = Image.alpha_composite(img.convert("RGBA"),mask)
img_masked_alpha
```

[340]:

[341]:
```
img_masked = Image.composite(img,picture,mask=mask)
img_masked
```

[341]:

[342]:
```
img_masked = Image.composite(img,picture,mask=mask.convert('L'))
img_masked
```

[342]: