

**Reamostrando imagens**

• Link do post https://www.instagram.com/p/CkyjEIypYae/ :

*# Bibliotecas*

import numpy as np

import tifffile as tif

import matplotlib.pyplot as plt

from skimage.transform import rescale

from spectral import imshow

*# Função para redimensionar imagens*

**def** resample(source, target, scale):

scaled = rescale(source, (scale,scale))

**if** target.shape[0] < scaled.shape[0]:

scaled = scaled[:target.shape[0],:]

**else**:

target = target[:scaled.shape[0],:]

**if** target.shape[1] < scaled.shape[1]:

scaled = scaled[:,:target.shape[1]]

**else**:

target = target[:,:scaled.shape[1]]

**return** scaled

*# Lendo arquivos*

img = tif.imread('/content/drive/MyDrive/Dados\_PDI/CUBO\_GEOBIA.tif') vv = tif.imread('/content/S1A\_VV.tif')

vh = tif.imread('/content/S1A\_VH.tif')

*# Reamostrando*

vv\_20 = resample(vv, img[:,:,0], 0.6)

vh\_20 = resample(vh, img[:,:,0], 0.6)

*# Empilhando dados*

stack = np.dstack([img, vv\_20, vh\_20])

print('Dimensões do cubo: ', img.shape)

print('Dimensões da cena VV: ', vv.shape)

print('Dimensões da cena VH: ', vh.shape)

print('Dimensões da cena VV reamostrada: ', vv\_20.shape) print('Dimensões da cena VH reamostrada: ', vh\_20.shape)

**Expansão do histograma**

*# Bibliotecas*

import numpy as np

import tifffile as tif

import matplotlib.pyplot as plt

from spectral import imshow

*#Função de expansão*

**def** expansao(img, percent\_ini, percent\_fim): s = np.zeros\_like(img)

x,y = 0,255

w = np.percentile(img, percent\_ini)

z = np.percentile(img, percent\_fim)

p = x + (img - w) \* (y - x) / (z - w) p[p<x] = x

p[p>y] = y

s = p

**return** s

*#Leitura d imagem*

b3 = tif.imread('B3.tif')

imshow(b3)*# Visualização*

*#Cálculo da expansão e visualização*

s = expansao(b3, 2, 98)

imshow(s)

b3\_flat = b3.flatten()*#Transformando imagem em vetor 1D* plt.hist(b3\_flat, bins=200)

plt.show()

s\_flat = s.flatten()

plt.hist(s\_flat, bins=200)

plt.show()

**Segmentando imagens**

• Link do post https://www.instagram.com/p/ClD-GYLOh4I/

!pip install -q rasterio

*# Bibliotecas*

import numpy as np

from skimage import exposure

from skimage.segmentation import mark\_boundaries, felzenszwalb, slic, quickshift

import rasterio as rio

import matplotlib.pyplot as plt

import tifffile as tif

*# Lendo imagem como array*

src = rio.open('/content/drive/MyDrive/Curso PDI com Python/cubo\_s2.tif')

list\_band = [src.read(i+1) **for** i **in** range(src.count)] img = np.dstack(list\_band)

*# Armazenando metadados da imagem original*

meta = src.profile

*# Reamostrando para valoers entre -1 e 1*

img2 = exposure.rescale\_intensity(img)

*# Segmentadores*

quick = quickshift(img2[:,:,:3].astype('double'), kernel\_size=5, max\_dist=1000,

ratio=0.1)

slic\_ = slic(img2, n\_segments=5000, compactness=0.1, sigma=1, start\_label=1)

felzen = felzenszwalb(img2, scale=1, sigma=1, min\_size=70)

*# Função de expansão*

**def** expansao(img, percent\_ini=2, percent\_fim=98):

s = np.zeros\_like(img)

x,y = 0,1

w = np.percentile(img, percent\_ini)

z = np.percentile(img, percent\_fim)

p = x + (img - w) \* (y - x) / (z - w)

p[p<x] = x

p[p>y] = y

s = p

**return** s

*# Visualizando resultado*

fig, ax = plt.subplots(2, 2, figsize=(15, 15), sharex=True, sharey=True)

ax[0, 0].imshow(mark\_boundaries(expansao(img2[:,:,7]), felzen)) ax[0, 0].set\_title("Felzenszwalb", fontsize=15)

ax[0, 1].imshow(mark\_boundaries(expansao(img2[:,:,7]), slic\_)) ax[0, 1].set\_title('SLIC', fontsize=15)

ax[1, 0].imshow(mark\_boundaries(expansao(img2[:,:,7]), quick)) ax[1, 0].set\_title('Quickshift', fontsize=15)

ax[1, 1].imshow(expansao(img2[:,:,7]), cmap="gray") ax[1, 1].set\_title('Original', fontsize=15)

**for** a **in** ax.ravel():

a.set\_axis\_off()

plt.tight\_layout()

plt.show()

**Criando planos de informação**

• Link do post https://www.instagram.com/p/CkfzfaeOM7U/ *# Bibliotecas*

import numpy as np

import tifffile as tif

import matplotlib.pyplot as plt

from skimage.transform import rescale

import cv2

*# Lendo imagens*

img = tif.imread('L71221071\_07120010720\_DN.tif') sar = tif.imread('S1\_DF\_GRD.tif')

*# Função para redimensionar imagens*

**def** resample(source, target, scale):

scaled = rescale(source, (scale,scale))

**if** target.shape[0] < scaled.shape[0]:

scaled = scaled[:target.shape[0],:]

**else**:

target = target[:scaled.shape[0],:]

**if** target.shape[1] < scaled.shape[1]:

scaled = scaled[:,:target.shape[1]]

**else**:

target = target[:,:scaled.shape[1]]

**return** scaled

*#Função de expansão*

**def** expansao(img, percent\_ini=2, percent\_fim=98):

s = np.zeros\_like(img)

x,y = 0,255

w = np.percentile(img, percent\_ini)

z = np.percentile(img, percent\_fim)

p = x + (img - w) \* (y - x) / (z - w)

p[p<x] = x

p[p>y] = y

s = p

**return** s

*# Criando planos de informação*

ndvi = (img[:,:,3] - img[:,:,2] ) / ( img[:,:,3] + img[:,:,2]) sobelx = cv2.Sobel(src=ndvi, ddepth=-1, dx=1, dy=0, ksize=5) sobely = cv2.Sobel(src=ndvi, ddepth=-1, dx=0, dy=1, ksize=5) vv = resample(sar[:,:,0], ndvi, 1/3)

vh = resample(sar[:,:,1], ndvi, 1/3)

razao = vv/vh

*# Empilhando planos de informação*

stack\_features = np.dstack([ndvi, sobelx, sobely, vv, vh, razao]) lista\_nomes= ['ndvi', 'sobelx', 'sobely', 'vv', 'vh', 'razao']

*#Plotando em um gráfico de duas linhas e três colunas* fig,axes = plt.subplots(2,3,figsize=(15,10),sharex='all', sharey='all')

fig.suptitle('Planos adicionais', fontsize=20)

axes = axes.ravel()

**for** i **in** range(stack\_features.shape[2]):

axes[i].imshow(expansao(stack\_features[:,:,i]),cmap='gray') axes[i].set\_title(lista\_nomes[i],fontsize=15)

axes[i].axis('off')

**Outros tópicos importantes**

• Erros comuns em Python https://www.instagram.com/p/CkIsFYlgWWU/ • Dica de leitura 1 https://www.instagram.com/p/CklaOPGulUc/ • Dica de leitura 2 https://www.instagram.com/p/Ck3qokSp-qV/ • Download de imagens Sentinel2 https://www.instagram.com/p/CjF1DWrOXqL/ • Geopandas 1 https://www.instagram.com/p/CUXo7IFLh89/

• Geopandas 2 https://www.instagram.com/p/CUpjBqyLrEL/

• Geopandas 3 https://www.instagram.com/p/CVNmdHwrJuk/ • Geopandas 4 https://www.instagram.com/p/CVgpDq7sJ-m/

• Geopandas 5 https://www.instagram.com/p/CVyEcVbP-8\_/

• Github https://github.com/Gustavoohs

