

3_Align_IRR

June 20, 2018

This code uses the Python Open CV library to align near infrared and red band images in the format tif and combines them to produce an aligned image in the format JPG. In addition, this code transfers the GPS information from the image in the reference band to the aligned RGB image.

Extensions asociated to each name file refers to a diferente band as is detailed below '*_1.tif' = Blue Band '*_2.tif' = Green Band '*_3.tif' = Red Band '*_4.tif' = Near Infrared Band '*_5.tif' = Rededge Band

The output can be used to compute the NDVI vegetation index.

Unfourtunatly , the code does not align the images properly, so it needs to be improved.

```
In [11]: ##Preamble
          %matplotlib inline
          import cv2
          import numpy as np
          import matplotlib.pyplot as plt
          import os
          import glob
          import traceback
          import sys
          from PIL import Image, ImageFilter
          import PIL
          import matplotlib.pyplot as plt

          import datetime
          now = datetime.datetime.now()

          print(now)
```

2018-06-10 23:11:09.545761

```
In [12]: ##Setting directory
          dir_set='/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000 '
          num_set=dir_set[-2:]
          filenames=glob.glob(dir_set+'/*.tif')
          filenamesBLUE=[]
          filenamesGREEN=[]
          filenamesRED=[]
```



```

'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0181_1.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0182_1.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0183_1.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0197_1.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0198_1.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0199_1.

```

In [13]: *##Listing red images*

```

filenamesRED=[]

for i in range(len(filenames)):
    if filenames[i][83]=='3':
        filenamesRED.append(filenames[i])

filenamesRED.sort()
filenamesRED

```

Out[13]:

```

['/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0000_3.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0001_3.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0004_3.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0016_3.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0192_4.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0193_4.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0197_4.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0198_4.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0199_4.

```

In [15]: *##Listing rededge images*

```

filenamesREDGE=[]

for i in range(len(filenames)):
    if filenames[i][83]=='5':
        filenamesREDGE.append(filenames[i])

filenamesREDGE.sort()
filenamesREDGE

```

Out[15]:

```

['/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0000_5.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0001_5.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0027_5.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0028_5.

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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0173_5.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0175_5.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0186_5.
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'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0197_5.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0198_5.
'/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000/IMG_0199_5.

```

```

In [16]: ##Creating folder to save aligned images
         if not os.path.exists(dir_set+'_IRR_ALIGNED/'):
             os.makedirs(dir_set+'_IRR_ALIGNED/')

```

```

In [17]: # Define motion model
         warp_mode = cv2.MOTION_EUCLIDEAN  #(Options: MOTION_TRANSLATION, MOTION_EUCLIDEAN, MOTION_HOMOGRAPHY)
         # Set the warp matrix to identity.
         if warp_mode == cv2.MOTION_HOMOGRAPHY:
             warp_matrix = np.eye(3, 3, dtype=np.float32)
         else:
             warp_matrix = np.eye(2, 3, dtype=np.float32)

```

```

In [18]: # Set the stopping criteria for the algorithm.
         criteria = (cv2.TERM_CRITERIA_EPS | cv2.TERM_CRITERIA_COUNT, 100000, 1e-5)

```

```

In [19]: dir_irr=dir_set+'_IRR_ALIGNED/'

         print(dir_irr)

```

```

/tidchile/collaborative/udd/ids/agro/AGRIFRUT_10-02/MICASENSE/0000SET/000_IRR_ALIGNED/

```

```

In [20]: ##Aligning images and saving as .JPG
         #Creating log file. List images which were not aligned

log = open(dir_irr + "error_align.log", "w")

for i in range(len(filenameesRED)):
    try:
        print("Processing: " + filenameesRED[i][74:82])
        im_red          = cv2.imread(filenameesRED[i],0);
        im_ir           = cv2.imread(filenameesIR[i],0);
        im_redge        = cv2.imread(filenameesREDGE[i],0);

        sz = im_red.shape
        print (sz)
        height = int(sz[0])
        width = sz[1]

        im_aligned = np.zeros((height,width,3), dtype=np.uint8 )

        #Red
        (cc, warp_matrix) = cv2.findTransformECC (im_redge[:,:], im_red[:,:],warp_matrix)

        im_aligned[:, :,2] = cv2.warpAffine(im_red[:, :], warp_matrix, (width, height), f

        #Ir
        (cc, warp_matrix) = cv2.findTransformECC (im_redge[:,:], im_ir[:, :],warp_matrix)

        im_aligned[:, :,1] = cv2.warpAffine(im_ir[:, :], warp_matrix, (width, height), fl
        cv2.imwrite(dir_irr + filenameesRED[i][74:82]+'_IRR.JPG',im_aligned)
    except Exception:
        print("Error processing: " + filenameesRED[i][74:82])
        log.write("Error processing: " + filenameesRED[i][74:82] + '\n')
        continue

```

```

Processing: IMG_0000
(960, 1280)
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Processing: IMG_0005

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