Drone Image Processing Toolbox (DIP-Toolbox):

DIP_RGB User Guide

Download Toolbox:
github.com/gabrielarabelo/DIP

Author:
Gabriela Rabelo Andrade
gabrielarabelo@gmail.com

1. Introduction

DIP is a Matlab Toolbox for processing multispectral image captured with Drones.

This document presents the manual of the following tools:
DIP_RGB - Tool for generating RGB compositions once the bands have been aligned. Note: some of the features in *DIP_RGB* are already included in *DIP_align*.

Development Notes:
These tools were tested on images from the *Micasense Altum* and *Micasense RedEgde cameras*. However, the code was designed to work on other models, as long as the files for each band are saved separately, and named according to the standard "`<image_prefix>_<band_number>.tif`" (example: "`IMG_043_1. tif`" for Band 1, and "`IMG_043_2.tif`" for Band 2, and so on).

The **DIP_RGB** tool executes the following actions:
- Import all bands;
- generation of RGB compositions from selected bands;
- enhancement of the RGB composition with the use of histogram correction, haze elimination and gamma correction tools;
- saving RGB composition files;

The technique used for image alignment is the Intensity-based image registration (`imregister`), native to Matlab (introduced in R2012a).

The image enhancement of the RGB compositions is performed using the native tools `imreducehaze`, `imadjust`, and `stretchlim`.

2. DIP_RGB User Manual

2.1. Calling the Function

The DIP_RGB tool can be used by calling the function **`DIP_RGB()`**. The function has 1 optional input (`parameter`), which is a struct-type variable and can contain information about the camera, image bands, and image enhancement.

```
DIP_RGB
DIP_RGB(parameters)
```

Note: the program folder contains an example file (`DIP_RGB_example.m`) and sample Altum image files (folder: sample/sample_DIP_RGB).

2.2. Input Parameters

The following parameters are accepted in the current version (july, 2021):

PARAMETER	TYPE	DESCRIPTION
`nband`	number (double)	Number of bands captured by the camera
`camera`	string	Camera model
`band_specs`	cell array	Cell array containing the specification of each band of the camera (automatically generated for Altum and RedEdge)
`RGB_bands`	3-column vector or matrix	Band sequence for traditional RGB composition. Default is 321.
`customRGB`	3-column or matrix	Band sequence for RGB prompt compositions that will be generated without user
`customMode`	logical	Opens a dialog box so the user can enter custom RGB compositions
`scale`	number (double)	Factor to scale images (useful for images that are too big)
`haze_adj`	number (double)	Number between 0 and 1 as input for `imreducehaze`
`haze_adj_method`	string	Method for `imreducehaze`
`gamma_adj`	number (double)	Number between 0 and 1 as input for gamma correction using `imadjust`

the input parameters Should be declared the variable fields of the struct of type, as follows:

```
parameters.nband
parameters.camera
parameters.band_specs
parameters.RGB_bands
parameters.customRGB
parameters.customMode
parameters.scale
parameters.haze_adj
parameters.haze_adj_method
parameters.gamma_adj
```

2.3. Running the Program

After calling the function **`DIP_RGB`**, the program will start to run.

The user will first be prompted to select a multiband .tif or one band of the multispectral image. Selecting only one band is enough and the program will automatically identify and import the other band files.

The user will then be prompted to select a folder to save the output files.

The user will then be prompted to enter a custom name prefix for the output images that will be exported.

After that, the program will create, plot and save high-resolution RGB Compositions in the following sequence: Regular RGB; Haze & Gamma Adjusted RGB; Stretch Limits Adjusted RGB.

After that, in case the user selected the Custom Mode, the user will be prompted to enter any band combinations to generate other custom RGB compositions.

Finally, all the high-resolution images will be saved in the output folder.