

Análise de Imagens de Sensoriamento Remoto - 2018.1

Assignment #1

1) Pansharpening

Pansharpen an IKONOS image using the HSI and the PCA methods.

Use the image bands contained in the following files:

- Blue Band: sjc_blu.png
- Red Band: sjc_red.png
- Green Band: sjc_blu.png
- NIR Band: sjc_pan.png
- Panchromatic Band: sjc_pan.png

Create two pansharpened color composites for each pansharpening method:

- R(Red Band), G(Green Band), B(Blue Band)
- R(NIR Band), G(Red Band), B(Green Band)

You can use either MATLAB or Octave in the implementation, and you must submit the programs/scripts and a document with a snapshot of the composite images.

Consider using the following functions: `im2double`, `rgb2hsv`, `hsv2rgb`, `imresize`, `eig`.

2) Multispectral Transformation

Use the ratio between the NIR and red band to delimit areas of Vegetation, Soil and Water.

$$\frac{g_{nir}(x,y)}{g_{red}(x,y)} \begin{cases} >> 1 & \text{Vegetation} \\ \approx 1 & \text{Soil} \\ < 1 & \text{Water} \end{cases}$$

Use the following images:

- `maragojipe_rgb.tif` (the image contains three bands: band 1 – Red; band 2 – Green; band 3 – Blue)
- `maragojipe_nir.tif` (the image contains only one band – the Near Infra-Red band)

Inspect the ratio image histogram (use the `imhist` function) to help define thresholds, and use the thresholds to create three masks: one for each land cover class.

Use the masks to produce three images, each showing only one land cover class.

Can the classes be perfectly discriminated? Comment the results.

Análise de Imagens de Sensoriamento Remoto - 2018.1

Assignment #1

3) Vegetation Indices

Compute the NDVI, EVI and ARVI vegetation indices to delimit vegetated areas.

Use the following image bands:

- Red = gavea_r.tif
- Green = gavea_g.tif
- Blue = gavea_b.tif
- Near Infra-Red = gavea_nir.tif

Mask out the areas without vegetation (so that the result images show only the vegetated areas) with each of the three images.

Comment the results.

4) Atmospheric Correction

Use one of the methods shown in class to perform atmospheric correction of any one of the available remote sensing images in the course's site.

Comment the results.