Instructions for running Dsen2 - Super-Resolution of Sentinel-2 Images

Super-Resolution of Sentinel-2 Images: Learning a Globally Applicable Deep Neural Network

Download the repository at https://raw.githubusercontent.com/lanha/DSen2

Requirements

- tensorflow-gpu (or tensorflow)
- keras
- nupmy
- scikit-image
- argparse
- imageio
- matplotlib (optional)
- GDAL >= 2.2 (optional)

Installation instructions for Anaconda-3

NOTE: Seems to work only (?) with tensorflow==1.14. For v>=2 it breaks... 😣 Does not work with tensorflow-gpu as errors occur for keras...

1. *Install Anaconda/Python-3.7*

2. *Create a new environment*

```
conda create -n "dsen2" python=3.7
```

3. Activate the newly created environment

```
conda activate dsen2_gpu
```

4. *Run the remaining installation commands in the new environment:*

```
python -m pip install --upgrade pip

pip install msgpack

pip install argparse

conda install scikit-image
```

```
conda install imageio

conda install -c conda-forge gdal

conda install -c conda-forge tensorflow==1.14

conda install -c conda-forge keras
```

Usage instructions

- In Windows button/search go to "Anaconda Prompt (Anaconda 3)"

- Using the command prompt, navigate to the DSen2 repository folder

- Inside that directory, go to folder "testing"

- Run the **s2_tiles_supres.py** python script (which will use a pre-trained deep neural network) for a single Sentinel-2 image/scene

Here's an example (replace image input and output paths...):

```
python s2_tiles_supres.py
D:/DATA/S2/L2A/S2B_MSIL2A_20190530T112119_N0212_R037_T29TNF_20190530T132835.SAFE/M
TD_MSIL2A.xml
C:/MyFiles/temp/S2/S2B_MSIL2A_20190530T112119_N0212_R037_T29TNF_20190530T132835.ti
f --copy_original_bands
```

Wait like two or three hours!?.... 😕

The write order of the original bands and the super-resolved ones is the following:

- [1] B4 (665 nm) - Red
- [2] B3 (560 nm) - Green
- [3] B2 (490 nm) - Blue
- [4] B8 (842 nm) - NIR
- [5] SRB5 (705 nm) - Red Edge 1
- [6] SRB6 (740 nm) - Red Edge 2
- [7] SRB7 (783 nm) - Red Edge 3
- [8] SRB8A (865 nm) - Red Edge 4
- [9] SRB11 (1610 nm) - SWIR 1
- [10] SRB12 (2190 nm) - SWIR 2

Additional notes

- Can't find GDAL module issue: to solve this go to the script and import from osgeo