Instruction of SFSDAF Program v1.0 (Matlab code)

This code according to the paper 'Li Xiaodong, Giles M. Foody, Doreen S. Boyd, Ge Yong, Zhang Yihang, Du Yun, Ling Feng, SFSDAF: An enhanced FSDAF that incorporates sub-pixel class fraction change information for spatio-temporal image fusion, *Remote Sensing of Environment*' is a combination of sub-pixel class fraction change model and FSDAF. The authors greatly thank the great work of FSDAF from Xiaolin Zhu, E. H. Helmer, Feng Gao, Desheng Liu, Jin Chen, and Michael A Lefsky.

1.   Open SFSDAF.m using Matlab, and run it.

2.   Input:

One Landsat image (input this image when the dialog "input the fine image of the first pair" appears); the image size is $(m \times s) \times (n \times s)$ (s is the scale factor);
One MODIS images at the same time as Landsat image (input this image when the dialog "input the coarse image of the first pair" appears); the image size is $m \times n$;
One MODIS image at the prediction time (input this image when the dialog "input the coarse image at the prediction date" appears); the image size is $m \times n$;

3.   Output:

One Landsat image at the prediction time; the image size is $(m \times s) \times (n \times s)$;
If the MODIS and Landsat images are Geo-rectified with geographic information, the output image is geotiff image with the same geographic information; Otherwise, SFSDAF outputs ASCII data of each band with no geographic information (the ASCII data outputting will take some computation time), and you can open the ASCII data and combine them to multi-spectral image in ENVI.
The name of output image is 'SFSDAF_###.tif', and ### is the input file name of the CR image at the prediction date. If outputting ASCII data, the name is 'SFSDAF_prediction_b#.txt' , and # is the number of band.
The output is in double precision format. Open it in ENVI will take a little longer time than opening data in integer precision format.

SFSDAF parameters:

The default number of classes is 4; the optimal value is usually 4 - 6;

SFSDAF is used to fuse multi-spectral image instead of one-band image such as NDVI; please fuse the multi-spectral image first and then calculate the index.

Test data: Landsat data and the corresponding degraded MODIS-like data with DN values. The data are from USGS.

(1) data-960by960: size: 960×960

input the fine image of the first pair: 20011124_sub960_DN

input the coarse image of the first pair: 20011124_sub960_DN_DegradedImage

input the coarse image at the prediction date: 20020212_sub960_DN_DegradedImage

validation data: 20020212_sub960_DN

(2) data-3200by1200: size: 3200×1200

input the fine image of the first pair: 20011124_sub1200by3200

input the coarse image of the first pair: 20011124_sub1200by3200_DegradedImage

input the coarse image at the prediction date:
              20020212_sub1200by3200_DegradedImage

validation data: 20020212_sub1200by3200

Please contact lixiaodong@whigg.ac.cn if there is any problem in using SFSDAF, and thank you for giving suggestions to improve it!