User Guide

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May 9, 2024

Description

Based on our research paper "CODE-IF: A convex/deep image fusion algorithm for efficient hyperspectral super-resolution", we prepare a demo file for researchers to investigate our theory and algorithm. The users can select two modes about simulated data (i.e., mode=0) and real data (i.e., mode=1), respectively.

Prerequisites (Tested by Python 3.8.16 and CUDA 11.4 under Windows OS)

1. Create a conda environment for obtaining $\mathbf{Z}_{\mathrm{DE}}$.
   - " conda create -n env python=3.8.16 -y "
   - " conda activate env "
2. Install all dependencies.
   - " conda install pytorch==2.0.0 pytorch-cuda=11.7 -c pytorch -c nvidia"
   - " pip install scipy==1.5.4 "

Run the code

Open MATLAB in the environment that has installed Pytorch. Then, run the Matlab program "main.m" to see the quantitative and qualitative performances of CODE-IF.

- If you want to run this code with your own **simulated data**, just put the data in the "dataset" folder and modify lines 12 (load data), 14 (load spectral response function), and 17 (load permutation matrix) in "main.m".(If you do not have the permutation matrix, you can generate it by performing line 16.)
- If you want to run this code with your own **real data**, just put the data in the "dataset" folder and modify lines 44 (load data), 45 (load spectral response function), and 48 (load permutation matrix) in "main.m". (If you do not have the permutation matrix, you can generate it by performing line 47.)

In the meanwhile, the arguments of "test_Chikusei.py"/"test_Houston.py" in the "function" folder should be modified.

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Alternatives to deep learning result $\mathbf{Z_{DE}}$

If you want to change DE part in the CODE-IF framework, you can replace our $\mathbf{Z}_{\mathrm{DE}}$ with your DE result by putting it into "Small_Data_Result" folder.

- For the **simulated data**, comment out line 20 and modify line 21 in "main.m" to load your DE result.
- For the **real data**, comment out line 51 and modify line 52 in "main.m" to load your DE result.

Citation

If you find our work useful in your research or publication, please kindly cite our work:

- @ARTICLE{10493051,
  author={Lin, Chia-Hsiang and Hsieh, Cheng-Ying and Lin, Jhao-Ting},
  journal={IEEE Transactions on Geoscience and Remote Sensing},
  title={{CODE-IF: A} Convex/Deep Image Fusion Algorithm for Efficient Hyperspectral Super-Resolution},
  year={2024},
  volume={62},
  pages={1-18}}