A Simple User Manual for the Source Code

In the 'AQI-Prediction' pack, a user manual ('User Manual.PDF'), a main function file('MAIN_func_decentral.py') and several related folders are included.

The source code was tested with a Windows 10 64bit computer equipped with Intel i7-8700K CPU and NVIDIA GeForce GTX 1080 GPU, and it should be compatible with any other machines as long as the system requirements are fulfilled.

1 System Requirements

In order to run the code, the following software tools are required to be installed in a 64bit computer:

- Python 3.6.6 or above.

Other vital site-packages for python are also needed:

- Keras (version 2.3.1 recommended);
- TensorFlow (version 1.12.0 recommended);
- NumPy;
- SciPy;
- Matplotlib;
- Pandas;
- CSV;
- PyWavelets;
- sklearn;
- pyhht.

2 AQI-prediction

In 'AQI-prediction' folder there are:

MAIN_func_decentral.py: This file is the main function file. This runnable python file contains all it needs to conduct a full experiment. Several parameters can be set in it to modify the settings of the training & forecasting process.

- 'dataset' folder: This folder contains the used AQI dataset of 12 observing stations. The data main function needs to train and predict is read from the CSV files in here.
- 'Part' folder: This folder contains two python files, which are 'part_data_preprocessing.py' and 'part_evaluate.py'. 'part_data_preprocessing.py' file stores several functions the main functions need to process the data read from the CSV files. 'part_evaluate.py' file contains several functions for evaluating the forecasting performance.
- 'Support' folder: This folder contains several supportive files, which are essential to run the wavelet transform function and NLSTM neural network.
- 'Model' folder: This folder contains 'model_major.py' file, which contains built deep learning model in it.
- 'result' folder: This folder contains CSV files, in which the results of evaluation to the experiment are recorded after conducting the experiment.