Requirements:

The following environment and packages are required to run the program:

- Linux with Python 3.6+.
- OS X with Python 3.6+.
- Pytorch 1.0+.
- Numpy
- Pandas
- rpy2
- matplotlib
- tensorboardX
- tqdm

Running Instructions

Simple approach:

run command "python test.py". The program will run on default configurations.

Changing configurations:

It is very easy to run SHARQ along with other hierarchical time series forecasting algorithms. The following is a running example:

```
from sharq import sharq
sharq_model = sharq(DATASET='labour', FORECAST_GRANULARITY='M',
IS_HIERARCHICAL=True, FORECAST_HORIZON=2,VERBOSE=True, TRAINING_METHOD='sharq')
sharq_model.fit_and_predict()
```

To change the reconciliation method, assign TRAINING_METHOD with different input string. The list of available method is ['sharq', 'base', 'mint_shr', 'mint_sam', 'mint_ols', 'erm', 'BU'].

To change the forecasting algorithm and its hyper-parameters, assign MODEL_HYPER_PARAMS with a dictionary that contains model information, for example:

MODEL_HYPER_PARAMS = {'alg': 'rnn', 'num_epoch': 1000, 'lr': 0.1, 'hidden_dim': 5, 'layer_dim': 2, 'nonlinearity': 'tanh'}.

You can either specify all the above hyper-parameters or only one of them. The list of available algorithms include ['rnn', 'ar', 'lstm', 'LSTNet'].

The full list of parameters that can be specified in SHARQ are listed as follows:

DATASET (str): Specify which dataset to use for experiment (default User specified if use your own data).
DATA (pd): User specified time series data (default None, cannot be None together with DATASET).
IF_TIME_SERIES (bool): Whether the user specified data is time series or sequence data (default True).
FORECAST_GRANULARITY (str): Forecasting granularity for time series data (default daily).
IS_HIERARCHICAL (bool): Whether the user specified data contains hierarchical structure (default False).
FORECAST_HORIZON (int): Forecasting horizon (default 1).
HIERARCHY_GRAPH (list): Hierarchical structure of user specified data in 2D array (default None).
MODEL_HYPER_PARAMS (dict): Hyper-parameters of forecasting model, dictionary.
TRAINING_METHOD (str): Reconciliation method (default base).
CATEGORICAL_FEATURES (list): Categorical features to formulate hts (default None).
QUANTILE (bool): Whether use quantile loss to perform probabilistic forecast (default True).