Assisted Learning for Organizations with Limited Imbalanced Data

This folder contains the main file (`main_cc.py`), command arguments (`cmd_args_cc.py`), data preprocessing codes (`data_sampling_cc.py`), helper functions (`utils_cc.py`), example command (`run.sh` **which will not be used and implemented directly**), and a sub-folder `models_fed`. And we put the models in the sub-folder `models_fed`.

Requirements

- The version of Python should be 3.6 or above (3.6 is preferred);
- The version of PyTorch should be 1.1.0 or above (1.1.0 is preferred);
- The dataset CIFAR-10 can be automatically downloaded when run the codes.

Commands for Running Experiments

As shown in the `cmd_args_cc.py`, the AssistSGD, standard SGD, Learner-SGD and FedAvg algorithms are implemented under the following default hyperparameters:

training mode: `--command='train'` ;
dataset with choice CIFAR-10 (`'cifar10'`): `--data='cifar10'` ;
Learner batch size: `--U-batch-size= 256`;
Provider batch size: --A-batch-size=256;
assistance rounds: `--epochs=10` ;
learning rate: `--learning-rate=0.01` **(default but can be changed);**
models with choices AlexNet: `--arch='alexnet'`**(default but can be changed);**
loss measurement: `--loss='cross_entropy'` ;
training/learning algorithms with choices AssistSGD (`'SAASGD'`), standard SGD (`'SGD'`), Learner-SGD (`'USGD'`) and FedAvg (`'fedavg'`);: `--learn-type='SGD'` **(default but can be changed)**;
Learner data heterogeneity γ_L between `0.1` and `1.0`: `--U-iid-ratio=0.1` **(default but can be changed)** ;
Provider data heterogeneity γ_P between 0.1 and 1.0: --A-iid-ratio=0.1;
The number of total local SGD steps: --local-steps-init=2000;
The sampling period for delivering the models between Learner and Provider: --local-interval=50 **(default but can be changed)**; The total data size of CIFAR-10 training dataset: --data-init=50000;
The parameter ρ: --rou=0.1 **(default but can be changed)**;
The parameter ε for differential privacy: --eps=1.0 **(default but can be changed)**;

Hence, the command for an experiment is: `python main_cc.py` followed by some of the hyperparameters above. The specific example command of an experiment is shown in file (run.sh).