MPML REPORT

Qiu Wei

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Contents

Abstract

to be finished

1 Implementation

The python version is implemented with MPI,the source code is partitioned into several parts via its functions. I will introduce the main structure of this project in the following.

1.1 structure

All the source code can be found in src/ folder. src/core/ stores the main part of brute liblinear, serialized min-max and paralleled min-max algorithm. src/data/ stores the training data, testing data and all the template .pickle files. src/models/ stores all the svm models. src/tools/ stores many tool function for this project. src/timer/ contains timer class. src/utils/ contains util functions. src/settings.py contains default settings. src/main.py is the main program. src/drawROC.py draw ROC graphs via the result file in src/data/ folder.

1.2 settings

The *settings.py* file contains default settings of this project, containing default algorithm, partition function in min-max algorithm,some constant and some folder/file name. As there are no time to implement a parser, you must edit *settings.py* to configure the algorithm.

To start with, set ALGORITHM to BRUTE_$_{\text{ALGORITHM}}$, MIN$_{\text{MAXALGORITHM}}$ or PARALLELIZED$_{\text{MINMAX}}$ to specify which kind of algorithm you want and set the value of PARTITION$_{\text{ALGORITHM}}$ to choose partition function(labeled of randomed). If you want to use post models, set MEMORIZE = True. Other settings are seldom used and you can learn about their function by comments.

1.3 tools & utils

2 Trainning Result

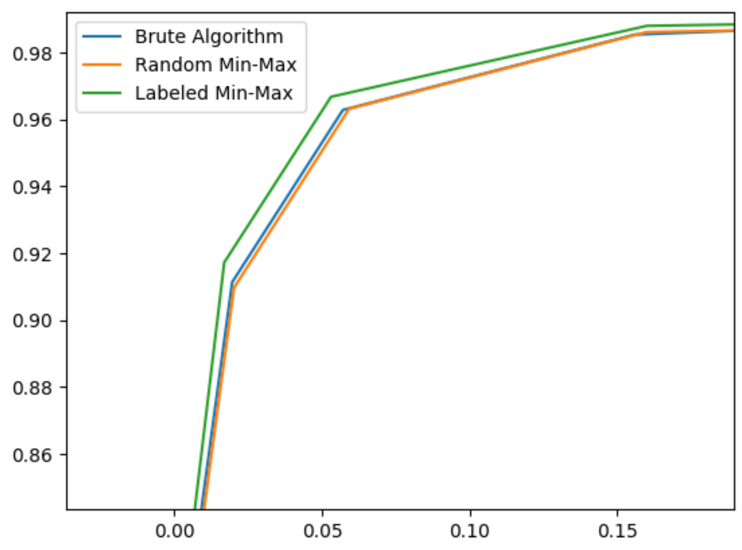
The trainning result is as following:

No.	Algorithm	paralleled?	Time/s	Accuracy	F1 value	AUC value
1	brute svm	\	34.04	96.37167%	0.92404	0.48782
2	random min-max	no	305.47	96.26846%	0.92194	\
3	random min-max	yes	140.08	96.26846%	0.92184	0.48307
4	labeled min-max	no	204.35	96.71042%	0.93101	\
5	labeled min-max	yes	204.35	96.69719%	0.93074	0.48567

The random min-max algorithm separate the input data into 5 parts randomly(5*5 models). The labeled min-max seperate the input data via the first two letters(4*12 models).

The total contains the time of load data, save model and other IO operations. Parsing is finished before the program runs.

The ROC Graph is as following:



The time cost between serialized min-max and parallelized min-max is:

No.	Parallelized?	Algorithm	Trainning time	Testing time	Total time
1	Yes	labeled	59.37346 s	144.54046 s	203.93383 s
2	No	labeled	115.96271 s	371.83840 s	489.00508 s
3	Yes	random	54.49303 s	84.16756 s	138.69087 s
4	No	random	103.98813 s	200.19163 s	305.47026 s

Test environment is Ubuntu, 4 kernal. Python version is 3.5.