Furnace

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FURNACE

An open-source tool for machine learning model

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This README.md is for machine learning researchers.

Guides

Recommended configuration

1. MATLAB 2022b

Installation

```
git clone https://github.com/xinyu-pu/furnace.git
```

Place the folder `furnace` in your project directory.

Introduction

Class `furnace` conducts comparative experiments or grid searches. Furthermore, The `furnace` can covert results to $\LaTeX$ table.

Properties

- ▶ datasets - cell of datasets

Size: $n \times 3$

- The first column is the tag of certain datasets.
- The second column is the name of the datasets.
- The third column is the path or real value of datasets.

Example:

```
>> datasets
  data =

3×3 cell array

  {[1]}    {'3source' }    {'Dataset\3source_Per0.mat' }
  {[2]}    {'bbcsport'}    {'Dataset\bbcsport_Per0.mat'}
  {[3]}    {'Caltech7'}    {'Dataset\Caltech7_Per0.mat'}
```

- ▶ models - cell of models

Size: $n \times 3$

- The first column is the tag of certain models.
- The second column is the name of the models.
- The third column is the function handle of models.

Example:

```
>> models
  models =

3×3 cell array

  {[1]}    {'RWLTA' }    {@runRWLTA}
  {[2]}    {'PGP'}       {@runPGP}
  {[3]}    {'Kmeans'}    {@runKmeans}
```

- ▶ status - Runtime Status

Example: `ans = 0` denotes the example of furnace has not yet performed `compara` or `gridsearch`.

`ans = 3` denotes the example has performed `compara`.

`ans = 2` denotes the example has performed `gridsearch`.

- ▶ InputParameters - Input parameter logging

Fields:

  - InputsFlags (A 6×1 array, indicates whether the following parameters are passed in)
  - ParallelThread (An integer, that denotes the used cores for running in parallel)
  - metrics (A cell, that denotes the field values used for printouts.)
  - uCtrl (Unified control parameter.)
  - sCtrl (A cell, specific control parameter.)
  - SavePath (The path to save single-step results.)
  - ShowBar (If it is given, the `waitbor` is valid.)
- ▶ ReportTable - Table

  Size: $n\times m$, where n and m are the numbers of models and datasets, respectively.

  Example:

```
>> ReportTable
ReportTable =

3×3 table

                 3source      bbcsport     Caltech7
               __________    __________   __________

  FastPGP_g1   1×1 struct    1×1 struct   1×1 struct
  FastPGP_g2   1×1 struct    1×1 struct   1×1 struct
  FastPGP_g3   1×1 struct    1×1 struct   1×1 struct
```

Methods

- ▶ furnace

  Example:

```
exa = furnace( datasets, models )
exa = furnace(  )
```

`datasets` and `models` are cells (n x 3). The first, second, and third columns are tag, name, and data (path, numerical, or function_hanle). E.g.

```
>> datasets
 3x3 cell
  {[1]}    {'3source' }    {'Dataset\3source_Per0.mat' }
  {[2]}    {'bbcsport'}    {'Dataset\bbcsport_Per0.mat'}
  {[3]}    {'Caltech7'}    {'Dataset\Caltech7_Per0.mat'}


>> models
  models =
3×3 cell array

  {[1]}    {'RWLTA' }    {@runRWLTA}
  {[2]}    {'PGP'}       {@runPGP}
  {[3]}    {'Kmeans'}    {@runKmeans}
```

Note that the following `compara` and `gridsearch` depend on `datasets` and `models`. If you want to run `compara` or `gridsearch`, `furnace( datasets, models )` is required.

- ▶ compara

  Example:

  ▶ `[ Performance ] = exa.compara()`
  ▶ `[ Performance ] = exa.compara('parallel', NUMBER_OF_CORES)`
  ▶ `[ Performance ] = exa.compara( __, 'print', { ... } )`
  ▶ `[ Performance ] = exa.compara( __, 'uCtrl', uCtrl )`
  ▶ `[ Performance ] = exa.compara( __, 'sCtrl', sCtrl )`
  ▶ `[ Performance ] = exa.compara( __, 'savepath', '...' )`
  ▶ `[ Performance ] = exa.compara( __, 'waitbar' )`
- ▶ gridsearch

  Example:

  ▶ `[ Performance ] = exa.gridsearch()`
  ▶ `[ Performance ] = exa.gridsearch('parallel', NUMBER_OF_CORES)`
  ▶ `[ Performance ] = exa.gridsearch( __, 'print', { ... } )`
  ▶ `[ Performance ] = exa.gridsearch( __, 'uCtrl', uCtrl )`
  ▶ `[ Performance ] = exa.gridsearch( __, 'sCtrl', sCtrl )`
  ▶ `[ Performance ] = exa.gridsearch( __, 'savepath', '...' )`
  ▶ `[ Performance ] = exa.gridsearch( __, 'waitbar' )`
- ▶ getlatextable

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