FrovedisBlockcyclicMatrix

NAME

FrovedisBlockcyclicMatrix - A data structure used in modeling the in-memory blockcyclic matrix data of frovedis server side at client python side.

SYNOPSIS

class frovedis.matrix.dense.FrovedisBlockcyclicMatrix(mat=None)

Overloaded Operators

operator= (mat)
operator+ (mat)
operator- (mat)
operator* (mat)
operator~ (mat)

Public Member Functions

load (mat)
load_numpy_matrix (mat)
load_text (filename)
load_binary (dirname)
save_text (filename)
save_binary (dirname)
transpose()
to_numpy_matrix ()
debug_print()
release()

DESCRIPTION

FrovedisBlockcyclicMatrix is a pseudo matrix structure at client python side which aims to model the frovedis server side `blockcyclic_matrix<double>` (see manual of frovedis blockcyclic_matrix for details).

Note that the actual matrix data is created at frovedis server side only. Python side FrovedisBlockcyclicMatrix contains a proxy handle of the in-memory matrix data created at frovedis server, along with number of rows and number of columns information.

Constructor Documentation

FrovedisBlockcyclicMatrix (mat=None)

Parameters
mat: It can be a string containing filename having text data to be loaded, or another FrovedisBlockcyclicMatrix instance for copy or any python array-like object or None. In case of None (Default), it does not make any request to server.

Purpose

This constructor can be used to construct a FrovedisBlockcyclicMatrix instance, as follows:

```
mat1 = FrovedisBlockcyclicMatrix() # empty matrix, no server request is made
mat2 = FrovedisBlockcyclicMatrix("./data") # will load data from given text file
mat3 = FrovedisBlockcyclicMatrix(mat2) # copy constructor
mat4 = FrovedisBlockcyclicMatrix([1,2,3,4]) # will load data from the given list
```

Return Type

It simply returns "self" reference.

Overloaded Operators Documentation

operator= (mat)

Parameters
mat: An existing FrovedisBlockcyclicMatrix instance to be copied.

Purpose
It can be used to copy the input matrix in the target matrix. It returns a self reference to support operator chaining.

For example,

```
m1 = FrovedisBlockcyclicMatrix([1,2,3,4])
m2 = m1 (copy operatror)
m3 = m2 = m1
```

Return Type
It returns "self" reference.

operator+ (mat)

Parameters
mat: An instance of FrovedisBlockcyclicMatrix or an array-like structure.

Purpose
It can be used to perform addition between two blockcyclic matrices. If the input data is not a FrovedisBlockcyclicMatrix instance, internally it will get converted into a FrovedisBlockcyclicMatrix instance first and then that will be added with the source matrix.

For example,

```
m1 = FrovedisBlockcyclicMatrix([1,2,3,4])
m2 = FrovedisBlockcyclicMatrix([1,2,3,4])
m3 = m2 + m1
```

Return Type
It returns the resultant matrix of the type FrovedisBlockcyclicMatrix.

operator- (mat)

Parameters
mat: An instance of FrovedisBlockcyclicMatrix or an array-like structure.

Purpose
It can be used to perform subtraction between two blockcyclic matrices. If the input data is not a FrovedisBlockcyclicMatrix instance, internally it will get converted into a FrovedisBlockcyclicMatrix instance first and then that will be subtracted from the source matrix.

For example,

```
m1 = FrovedisBlockcyclicMatrix([1,2,3,4])
m2 = FrovedisBlockcyclicMatrix([1,2,3,4])
m3 = m2 - m1
```

Return Type
It returns the resultant matrix of the type FrovedisBlockcyclicMatrix.

operator* (mat)

Parameters
mat: An instance of FrovedisBlockcyclicMatrix or an array-like structure.

Purpose
It can be used to perform multiplication between two blockcyclic matrices. If the input data is not a FrovedisBlockcyclicMatrix instance, internally it will get converted into a FrovedisBlockcyclicMatrix instance first and then that will be multiplied with the source matrix.

For example,

```
m1 = FrovedisBlockcyclicMatrix([1,2,3,4])
m2 = FrovedisBlockcyclicMatrix([1,2,3,4])
m3 = m2 * m1
```

Return Type
It returns the resultant matrix of the type FrovedisBlockcyclicMatrix.

operator~ ()

Purpose
It can be used to obtain transpose of the target matrix. If the input data is not a FrovedisBlockcyclicMatrix instance, internally it will get converted into a FrovedisBlockcyclicMatrix instance first and then the transpose will get computed.

For example,

```
m1 = FrovedisBlockcyclicMatrix([1,2,3,4])
m2 = ~m1
```

Return Type
It returns the resultant matrix of the type FrovedisBlockcyclicMatrix.

Pubic Member Function Documentation

load (mat)

Parameters
mat: It can be a string containing filename having text data to be loaded, or another FrovedisBlockcyclicMatrix instance for copy or any python array-like object (but it can not be None).

Purpose

This function works similar to the constructor. It can be used to load a FrovedisBlockcyclicMatrix instance, as follows:

```
mat1 = FrovedisBlockcyclicMatrix().load("./data")  # will load data from given text file
mat2 = FrovedisBlockcyclicMatrix().load(mat1)      # copy operation
mat3 = FrovedisBlockcyclicMatrix().load([1,2,3,4]) # will load data from the given list
```

Return Type

It simply returns "self" reference.

load_numpy_matrix (mat)

Parameters
mat: A numpy matrix with values to be loaded in.

Purpose
This function can be used to load a python side dense data matrix into a frovedis server side blockcyclic matrix. It accepts a numpy matrix object and converts it into the frovedis server side blockcyclic matrix whose proxy along with number of rows and number of columns information are stored in the target FrovedisBlockcyclicMatrix object.

Return Type
It simply returns "self" reference.

load_text (filename)

Parameters
filename: A string object containing the text file name to be loaded.

Purpose
This function can be used to load the data from a text file into the target matrix. Note that the file must be placed at server side at the given path.

Return Type
It simply returns "self" reference.

load_binary (dirname)

Parameters
dirname: A string object containing the directory name having the binary data to be loaded.

Purpose
This function can be used to load the data from the specified directory with binary data file into the target matrix. Note that the file must be placed at server side at the given path.

Return Type
It simply returns "self" reference.

save_text (filename)

Parameters
filename: A string object containing the text file name in which the data is to be saved.

Purpose

This function is used to save the target matrix as text file with the filename at the given path. Note that the file will be saved at server side at the given path.

Return Type
It returns nothing.

save_binary (dirname)

Parameters
dirname: A string object containing the directory name in which the data is to be saved as little-endian binary form.

Purpose

This function is used to save the target matrix as little-endian binary file with the filename at the given path. Note that the file will be saved at server side at the given path.

Return Type
It returns nothing.

transpose ()

Purpose

This function will compute the transpose of the given matrix.

Return Type
It returns the transposed blockcyclic matrix of the type FrovedisBlockcyclicMatrix.

to_numpy_matrix ()

Purpose
This function is used to convert the target blockcyclic matrix into numpy matrix.
Note that this function will request frovedis server to gather the distributed data, and send back that data in the rowmajor array form and the python client will then convert the received numpy array from frovedis server to python numpy matrix.

Return Type
It returns a two-dimensional dense numpy matrix

numRows()

Purpose
It returns the number of rows in the matrix

Return Type
An integer value containing rows count in the target matrix.

numCols()

Purpose
It returns the number of columns in the matrix

Return Type
An integer value containing columns count in the target matrix.

debug_print()

Purpose
It prints the contents of the server side distributed matrix data on the server side user terminal. It is mainly useful for debugging purpose.

Return Type
It returns nothing.

release()

Purpose
This function can be used to release the existing in-memory data at frovedis server side.

Return Type
It returns nothing.

FrovedisBlockcyclicMatrix.asBCM(mat)

Parameters
mat: An instance of FrovedisBlockcyclicMatrix or any python array-like structure.

Purpose
This static function is used in order to convert a given matrix to a blockcyclic matrix. If the input is already an instance of FrovedisBlockcyclicMatrix, then the same will be returned.

Return Type

An instance of FrovedisBlockcyclicMatrix.