Contents:
CHAPTER 1

Introduction

This is the documentation for the Python-RDM package for relational data mining. The aim of this tool is to make relational learning and inductive logic programming approaches publicly accessible. The tool offers a common and easy-to-use interface to several relational learning algorithms and provides data access to several relational database management systems. To this end we have developed a stand-alone Python library and a corresponding package for the open source ClowdFlows online data mining platform.

1.1 Help

If you need help please open an issue on GitHub.
The package was successfully installed on Linux, Windows and OS X systems.

Latest release from PyPI:

```
pip install python-rdm
```

Latest from GitHub:

```
pip install https://github.com/xflows/rdm/archive/master.zip
```

The prerequisites are listed in `requirements.txt`.

### 2.1 Prerequisites of specific ILP/RDM algorithms

Depending on what algorithms you wish to use, these are their dependencies.

#### 2.1.1 Aleph and RSD

- Yap prolog (preferably compiled with `--table` enabled for speedups)

There are sources as well as binaries for Windows and OS X available [here](#).

On Debian-based systems you can simply install it as:

```
apt install yap
```

#### 2.1.2 TreeLiker, Caraf, Cardinalization, Quantiles, Relaggs

- Java

#### 2.1.3 1BC, 1BC2, Tertius

These approaches depend on one original C program which must be compiled. The sources are included with `python-rdm` in `rdm/wrappers/tertius/src/`. 
2.2 Documentation

You’ll need Sphinx to build the documentation you are currently looking at:

```
pip install -U Sphinx
```
from rdm.db import DBVendor, DBConnection, DBContext, AlephConverter
from rdm.wrappers import Aleph

# Provide connection information
connection = DBConnection(
    'ilp',  # User
    'ilpl23',  # Password
    'workflow.ijs.si',  # Host
    'ilp',  # Database
)

# Define learning context
context = DBContext(connection, target_table='trains', target_att='direction')

# Convert the data and induce features using Aleph
conv = AlephConverter(context, target_att_val='east')
aleph = Aleph()
theory, features = aleph.induce('induce_features', conv.positive_examples(),
                                conv.negative_examples(),
                                conv.background_knowledge())
print theory
import orange

from rdm.db import DBVendor, DBConnection, DBContext, RSDConverter, mapper
from rdm.wrappers import RSD
from rdm.validation import cv_split
from rdm.helpers import arff_to_orange_table

# Provide connection information
connection = DBConnection(
    'ilp', # User
    'ilp123', # Password
    'ged.ijs.si', # Host
    'imdb_top', # Database
    vendor=DBVendor.MySQL
)

# Define learning context
context = DBContext(connection, target_table='movies', target_att='quality')

# Cross-validation loop
predictions = []
folds = 10
for train_context, test_context in cv_split(context, folds=folds, random_seed=0):
    # Find features on the train set
    conv = RSDConverter(train_context)
    rsd = RSD()
    features, train_arff, _ = rsd.induce(
        conv.background_knowledge(), # Background knowledge
        examples=conv.all_examples(), # Training examples
        cn2sd=False # Disable built-in subgroup discovery
    )

    # Train the classifier on the *train set*
    train_data = arff_to_orange_table(train_arff)
    tree_classifier = orange.TreeLearner(train_data, max_depth=5)

    # Map the *test set* using the features from the train set
    test_arff = mapper.domain_map(features, 'rsd', train_context, test_context,
                                  format='arff')

    # Classify the test set
    test_data = arff_to_orange_table(test_arff)
fold_predictions = [(ex[-1], tree_classifier(ex)) for ex in test_data]
predictions.append(fold_predictions)

acc = 0
for fold_predictions in predictions:
    acc += sum([1.0 for actual, predicted in fold_predictions if actual == predicted])/len(fold_predictions)
acc = 100 * acc/folds

print 'Estimated predictive accuracy: {0:.2f}%'.format(acc)
ClowdFlows is an open source web-based data mining platform. The python-rdm package also includes ClowdFlows widgets, which can be used to easily compose workflows for mining relational databases.

### 5.1 User Documentation

Here’s an example workflow that demonstrates the usage of RDM widgets in Clowdflows. More specifically, the workflow constructs a decision tree on the Michalski Trains dataset (stored in a MySQL database) using Aleph to propositionalize the dataset.

![ClowdFlows workflow diagram](image)

**Fig. 5.1:** Click the image to open the ClowdFlows workflow.

- Full ClowdFlows User docs
- Public instance of ClowdFlows

### 5.2 Developer Documentation

You can relatively easily extend your local ClowdFlows installation by developing new widgets. See the Developer documentation on ReadTheDocs.org, for instructions on how to develop and deploy widgets.

You are of course welcome to share your widgets with everyone. To do so, please issue a pull request.

- GitHub repository
- Wiki
- Developer documentation
The `python-rdm` ClowdFlows widgets follow the main ClowdFlows convention: `rdm.db` and `rdm.wrappers` can be imported as ClowdFlows packages and have the following internal structure:

- `rdm/<package_name>` - package root,
- `rdm/<package_name>/package_data` - widget database fixtures,
- `rdm/<package_name>/static` - widget-related static files, e.g., icons,
- `rdm/<package_name>/library.py` - main widget views,
- `rdm/<package_name>/interaction_views.py` - widget views that require a user interaction before doing a computation,
- `rdm/<package_name>/visualization_views.py` - widget views that visualize something after computation.
The package is divided into two main independent subpackages: `rdm.db` and `rdm.wrappers`.

## 6.1 Database interaction

Databases can be accessed via different so-called data sources. You can add your own data source by subclassing the base `rdm.db.datasource.DataSource` class.

### 6.1.1 Base DataSource

```python
class rdm.db.datasource.DataSource
    A data abstraction layer for accessing datasets.
    This layer is typically hidden from end-users, as they only access the database through DBConnection and DBContext objects.

column_values (table, col)
    Returns a list of distinct values for the given table and column.
    param table target table
    param cols list of columns to select

connect ()
    Returns a connection object.
    Return type DBConnection

connected (tables, cols, find_connections=False)
    Returns a list of tuples of connected table pairs.
    param tables a list of table names
    param cols a list of column names
    param find_connections set this to True to detect relationships from column names.
    return a tuple (connected, pkeys, fkeys, reverse_fkeys)

fetch (table, cols)
    Fetches rows for the given table and columns.
    param table target table
```
param cols  list of columns to select
return  rows from the given table and columns
rtype  list

fetch_types (table, cols)
Returns a dictionary of field types for the given table and columns.
param table  target table
param cols  list of columns to select
return  a dictionary of types for each attribute
rtype  dict

foreign_keys ()
Returns a list of foreign key relations in the form (table_name, column_name, referenced_table_name, referenced_column_name).
Return type  list

select_where (table, cols, pk_att, pk)
Select with where clause.
param table  target table
param cols  list of columns to select
param pk_att  attribute for the where clause
param pk  the id that the pk_att should match
return  rows from the given table and cols, with the condition pk_att==pk
rtype  list

table_column_names ()
Returns a list of table / column names in the form (table, col_name).
Return type  list

table_columns (table_name)
Parameters table_name – table name for which to retrieve column names
Returns  a list of columns for the given table.
Return type  list

table_primary_key (table_name)
Returns the primary key attribute name for the given table.
param table_name  table name string

tables ()
Returns  a list of table names.
Return type  list
6.1.2 MySQLDataSource

```python
class rdm.db.datasource.MySQLDataSource (connection)
A DataSource implementation for accessing datasets from a MySQL DBMS.
    __init__ (connection)
    Parameters connection – a DBConnection instance.
```

6.1.3 PgSQLDataSource

```python
class rdm.db.datasource.PgSQLDataSource (connection)
A DataSource implementation for accessing datasets from a PostgreSQL DBMS.
    __init__ (connection)
    Parameters connection – a DBConnection instance.
```

6.1.4 Database Context

A DBContext object represents a view of a particular data source that can be used for learning. Example uses include: selecting only particular tables, table columns, a target attribute, and so on.

```python
class rdm.db.context.DBContext (connection, target_table=None, target_att=None, find_connections=False, in_memory=True)
    __init__ (connection, target_table=None, target_att=None, find_connections=False, in_memory=True)
    Initializes a new DBContext object from the given DBConnection.
    Parameters
    • connection – a DBConnection instance
    • target_table – set a target table for learning
    • target_att – set a target table attribute for learning
    • find_connections – set to True if you want to detect relationships based on attribute and table names, e.g., train_id is the foreign key referring to id in table train.
    • in_memory – Load the database into main memory (currently required for most approaches and pre-processing)

    copy ()
    Makes a deep copy of the DBContext object (e.g., for making folds)
    returns a deep copy of self.
    rtype DBContext

    fetch (table, cols)
    Fetches rows from the db.
    param table table name to select
    cols list of columns to select
    return list of rows
    rtype list
```
**fetch_types** *(table, cols)*

Returns a dictionary of field types for the given table and columns.

- **param** `table` target table
- **param** `cols` list of columns to select
- **return** a dictionary of types for each attribute
- **rtype** dict

**rows** *(table, cols)*

Fetches rows from the local cache or from the db if there’s no cache.

- **param** `table` table name to select
- **param** `cols` list of columns to select
- **return** list of rows
- **rtype** list

**select_where** *(table, cols, pk_att, pk)*

SELECT with WHERE clause.

- **param** `table` target table
- **param** `cols` list of columns to select
- **param** `pk_att` attribute for the where clause
- **param** `pk` the id that the pk_att should match
- **return** rows from the given table and cols, with the condition pk_att==pk
- **rtype** list

### 6.2 Database converters

Converters are used to change the representation of the input database to a native representation of a particular algorithm.

```python
class rdm.db.converters.Converter (dbcontext)
    Base class for converters.
    __init__ (dbcontext)
        Base class for handling converting DBContexts to various relational learning systems.
        **param** `dbcontext` DBContext object for a learning problem

class rdm.db.converters.ILPConverter (*args, **kwargs)
    Base class for converting between a given database context (selected tables, columns, etc) to inputs acceptable by a specific ILP system.
    **param** `discr_intervals` (optional) discretization intervals in the form:

        >>> [{'table1': {'att1': [0.4, 1.0], 'att2': [0.1, 2.0, 4.5]}, 'table2': {'att2': [0.02]}}

        given these intervals, e.g., att1 would be discretized into three intervals: att1 =< 0.4, 0.4 < att1 =< 1.0, att1 >= 1.0
    **param** `settings` dictionary of setting: value pairs
```
mode \(\text{(predicate, args, recall=1, head=False)}\)
Emits mode declarations in Aleph-like format.

- **param predicate** predicate name
- **param args** predicate arguments with input/output specification, e.g.:

\[
\text{[('+', 'train'), ('-', 'car')]}\]

- **param recall** recall setting (see Aleph manual)
- **param head** set to True for head clauses

**user_settings ()**
Emits prolog code for algorithm settings, such as :\text{-set(minpos,5)}.

**class rdm.db.converters.RSDConverter ( *args, **kwargs)**
Converts the database context to RSD inputs.
Inherits from ILPConverter.

**all_examples ( pred_name=None)**
Emits all examples in prolog form for RSD.
- **param pred_name** override for the emitted predicate name

**background_knowledge ()**
Emits the background knowledge in prolog form for RSD.

**class rdm.db.converters.AlephConverter ( *args, **kwargs)**
Converts the database context to Aleph inputs.
Inherits from ILPConverter.

**__init__ ( *args, **kwargs)**

**Parameters**
- **discr_intervals** – (optional) discretization intervals in the form:

\[
\text{[table1}: \{'att1': [0.4, 1.0], 'att2': [0.1, 2.0, 4.5], 'table2': \{'att2 \rightarrow': [0.02]\}\]}

given these intervals, e.g., att1 would be discretized into three intervals: att1 =< 0.4, 0.4 < att1 =< 1.0, att1 >= 1.0

- **settings** – dictionary of setting: value pairs
- **target_att_val** – target attribute value for learning.

**background_knowledge ()**
Emits the background knowledge in prolog form for Aleph.

**negative_examples ()**
Emits the negative examples in prolog form for Aleph.

**positive_examples ()**
Emits the positive examples in prolog form for Aleph.

**class rdm.db.converters.OrangeConverter ( *args, **kwargs)**
Converts the selected tables in the given context to Orange example tables.

**convert_table ( table_name, cls_att=None)**
Returns the specified table as an orange example table.
param table_name  table name to convert
cls_att  class attribute name
rtype  orange.ExampleTable

**_rng_type_** (table_name, col)
Returns an Orange datatype for a given mysql column.

param table_name  target table name
param col  column to determine the Orange datatype

**other_Orange_tables_** ()
Returns the related tables as Orange example tables.

**Return type**  list
target_Orange_table ()
Returns the target table as an Orange example table.

**rtype**  orange.ExampleTable

class rdm.db.converters.TreeLikerConverter (*args, **kwargs)
Converts a db context to the TreeLiker dataset format.

**param discr_intervals_** (optional) discretization intervals in the form:

```python
>>> {'table1': {'att1': [0.4, 1.0], 'att2': [0.1, 2.0, 4.5]}, 'table2': {
    'att2': [0.02]}}
```
given these intervals, e.g., att1 would be discretized into three intervals: att1 <= 0.4, 0.4 < att1 <= 1.0, att1 >= 1.0
dataset ()
Returns the DBContext as a list of interpretations, i.e., a list of facts true for each example in the format for TreeLiker.
default_template ()
Default learning template for TreeLiker.

### 6.3 Algorithm wrappers

The **rdm.wrappers** module provides classes for working with the various algorithm wrappers.

#### 6.3.1 Aleph

This is a wrapper for the very popular ILP algorithm Aleph. Aleph is an ILP toolkit with many modes of functionality: learning theories, feature construction, incremental learning, etc. Aleph uses mode declarations to define the syntactic bias. Input relations are Prolog clauses, defined either extensionally or intensionally.

**Official documentation.**

See **Getting started** for an example of using Aleph in your python code.

class rdm.wrappers.Aleph (verbosity=0)
Aleph python wrapper.

```python
__init__ (verbosity=0)
Creates an Aleph object.
```
**param logging**  Can be DEBUG, INFO or NOTSET (default).

This controls the verbosity of the output.

```
__weakref__
```

list of weak references to the object (if defined)

```
induce ( mode, pos, neg, b, filestem='default', printOutput=False)
```

Induce a theory or features in ‘mode’.

```
param filestem  The base name of this experiment.
param mode  In which mode to induce rules/features.
param pos  String of positive examples.
param neg  String of negative examples.
param b  String of background knowledge.
return  The theory as a string or an arff dataset in induce_features mode.
```

```
rtype  str
```

```
set ( name, value)
```

Sets the value of setting ‘name’ to ‘value’.

```
param name  Name of the setting
param value  Value of the setting
```

```
setPostScript ( goal, script)
```

After learning call the given script using ‘goal’.

```
param goal  goal name
param script  prolog script to call
```

```
settingsAsFacts ( settings)
```

Parses a string of settings.

```
param setting  String of settings in the form:
set(name1,val1),set(name2,val2)...
```

### 6.3.2 RSD

*RSD* is a relational subgroup discovery algorithm (Zelezny et al, 2001) composed of two main steps: the proposition-alization step and the (optional) subgroup discovery step. RSD effectively produces an exhaustive list of first-order features that comply with the user-defined mode constraints, similar to those of Progol (Muggleton, 1995) and Aleph.

See Example use case for an example of using RSD in your code.

```
class rdm.wrappers. RSD ( verbosity=0)
```

RSD python wrapper.

```
__init__ ( verbosity=0)
```

Creates an RSD object.

```
param logging  Can be DEBUG, INFO or NOTSET (default).
```

This controls the verbosity of the output.

```
__weakref__
```

list of weak references to the object (if defined)
**induce** *(b, filestem='default', examples=None, pos=None, neg=None, cn2sd=True, printOutput=False)*

Generate features and find subgroups.

- **param filestem** The base name of this experiment.
- **param examples** Classified examples; can be used instead of separate pos / neg files below.
- **param pos** String of positive examples.
- **param neg** String of negative examples.
- **param b** String with background knowledge.
- **param cn2sd** Find subgroups after feature construction?

**return** a tuple *(features, weka, rules)*, where:

- features is a set of prolog clauses of generated features,
- weka is the propositional form of the input data,
- rules is a set of generated cn2sd subgroup descriptions; this will be an empty string if cn2sd is set to False.

**rtype** tuple

**set** *(name, value)*

Sets the value of setting ‘name’ to ‘value’.

- **param name** Name of the setting
- **param value** Value of the setting

**settingsAsFacts** *(settings)*

Parses a string of settings.

- **param setting** String of settings in the form:
  
  set(name1, val1), set(name2, val2)...

### 6.3.3 TreeLiker

*TreeLiker* (by Ondrej Kuzelka et al) is a suite of multiple algorithms (controlled by the `algorithm` setting), RelF, Poly and HiFi:

*RelF* constructs a set of tree-like relational features by combining smaller conjunctive blocks. The novelty is that RelF preserves the monotonicity of feature reducibility and redundancy (instead of the typical monotonicity of frequency), which allows the algorithm to scale far better than other state-of-the-art propositionalization algorithms.

*HiFi* is a propositionalization approach that constructs first-order features with hierarchical structure. Due to this feature property, the algorithm performs the transformation in polynomial time of the maximum feature length. Furthermore, the resulting features are the smallest in their semantic equivalence class.

[Official website](#)

Example usage:
>>> context = DBContext(...)
>>> conv = TreeLikerConverter(context)
>>> treeliker = TreeLiker(conv.dataset(), conv.default_template()) # Runs RelF by
˓→default
>>> arff, _ = treeliker.run()

class rdm.wrappers.TreeLiker ( dataset, template, test_dataset=None, settings={})
TreeLiker python wrapper.

    __init__ ( dataset, template, test_dataset=None, settings={})

Parameters

    • dataset – dataset in TreeLiker format
    • template – feature template
    • test_dataset – (optional) test dataset to transform with the features from the training
      set
    • settings – dictionary of settings (see TreeLiker documentation)

    run ( cleanup=True, printOutput=False)
Runs TreeLiker with the given settings.

        param cleanup  deletes temporary files after completion
        param printOutput  print algorithm output to the terminal

6.3.4 Wordification

Wordification (Perovsek et al, 2015) is a propositionalization method inspired by text mining that can be viewed as
a transformation of a relational database into a corpus of text documents. Wordification constructs simple, easily
interpretable features, acting as words in the transformed Bag-Of-Words representation.

Example usage:

>>> context = DBContext(...)
>>> orange = OrangeConverter(context)
>>> wordification = Wordification(orange.target_Orange_table(), orange.other_Orange_˓→tables(), context)
>>> wordification.run(1)
>>> wordification.calculate_weights()
>>> arff = wordification.to_arff()

class rdm.wrappers.Wordification ( target_table, other_tables, context, word_att_length=1,
       idf=None)

    __init__ ( target_table, other_tables, context, word_att_length=1, idf=None)
Wordification object constructor.

        param target_table  Orange ExampleTable, representing the primary table
        param other_tables secondary tables, Orange ExampleTables

    __weakref__
        list of weak references to the object (if defined)

    att_to_s ( att)
        Constructs a “wordification” word for the given attribute
param att Orange attribute

calculate_weights (measure='tfidf')
Counts word frequency and calculates tf-idf values for words in every document.

param measure example weights approach (can be one of tfidf,binary,tf).

prune (minimum_word_frequency_percentage=1)
Filter out words that occur less than minimum_word_frequency times.

param minimum_word_frequency_percentage minimum frequency of words to keep

run (num_of_processes=4)
Applies the wordification methodology on the target table

param num_of_processes number of processes

to_arff ()
Returns the “wordified” representation in ARFF.

rtype str
wordify ()
Constructs string of all documents.

return document representation of the dataset, one line per document

rtype str

6.3.5 Proper

class rdm.wrappers.Proper (input_dict, is_relaggs)

__dict__ = dict_proxy(‘__module__‘: ‘rdm.wrappers.proper.proper‘, ‘run‘: <function run>, ‘init_args_list‘: <function . . .

__init__ (input_dict, is_relaggs)

__module__ = ‘rdm.wrappers.proper.proper’

__weakref__
list of weak references to the object (if defined)

init_args_list (input_dict, is_relaggs)

parse_excluded_fields (context)

run ()

6.3.6 Tertius

class rdm.wrappers.Tertius (input_dict)

__dict__ = dict_proxy(‘__module__‘: ‘rdm.wrappers.tertius.tertius‘, ‘run‘: <function run>, ‘init_args_list‘: <function . . .

__init__ (input_dict)

__module__ = ‘rdm.wrappers.tertius.tertius’

__weakref__
list of weak references to the object (if defined)

init_args_list (input_dict)
run()

6.3.7 OneBC

class rdm.wrappers.OneBC (input_dict, is1BC2)

__dict__ = dict_proxy({'__module__': 'rdm.wrappers.tertius.onebc', 'run': <function run>, 'init_args_list': <function ... objects>, '__weakref__': <attribute '__weakref__' of 'OneBC' objects>, '__doc__': None, '__init__': <function __init__>})

__init__ (input_dict, is1BC2)

__module__ = 'rdm.wrappers.tertius.onebc'

__weakref__

    list of weak references to the object (if defined)

init_args_list (input_dict)

run()

6.3.8 Caraf

class rdm.wrappers.Caraf (input_dict)

__dict__ = dict_proxy({'__module__': 'rdm.wrappers.caraf.caraf', 'run': <function run>, '__dict__': <attribute '__dict__' of 'Caraf' objects>, '__weakref__': <attribute '__weakref__' of 'Caraf' objects>, '__doc__': None, '__init__': <function __init__>})

__init__ (input_dict)

__module__ = 'rdm.wrappers.caraf.caraf'

__weakref__

    list of weak references to the object (if defined)

run()

6.4 Utilities

This section documents helper utilities provided by the python-rdm package that are useful in various scenarios.

6.4.1 Mapping unseen examples into propositional feature space

When testing classifiers (or in a real-world scenario) you’ll need to map unseen (or new) examples into the feature space used by the classifier. In order to do this, use the rdm.db.mapper function.

See Example use case for usage in a cross-validation setting.

drm.db.mapper.domain_map (features, feature_format, train_context, test_context, intervals={}, format='arff', positive_class=None)

Use the features returned by a propositionalization method to map unseen test examples into the new feature space.

param features  string of features as returned by rsd, aleph or treeliker

param feature_format  ‘rsd’, ‘aleph’, ‘treeliker’

param train_context  DBContext with training examples
param test_context  DBContext with test examples
param intervals  discretization intervals (optional)
param format  output format (only arff is used atm)
param positive_class  required for aleph
return  returns the test examples in propositional form
rtype  str

Example

```python
>>> test_arff = mapper.domain_map(features, 'rsd', train_context, test_context)
```

### 6.4.2 Validation

Python-rdm provides a helper function for splitting a dataset into folds for cross-validation. See [Example use case](#) for a cross-validation example using RSD.

rdm.validation.cv_split(context, folds=10, random_seed=None)

Returns a list of pairs (train_context, test_context), one for each cross-validation fold.

The split is stratified.

param context  DBContext to be split
param folds  number of folds
param random_seed  random seed to be used
return  returns a list of (train_context, test_context) pairs
rtype  list

Example

```python
>>> for train_context, test_context in cv_split(context, folds=10, random_seed=0):
    pass  # Your CV loop
```
Licences of included approaches

Although python-rdm itself is MIT licensed, we include approaches that have their own licenses (all of the sources are unmodified). To be sure, please contact the respective authors if you want to use their approach for any commercial purposes.

- **Aleph**
  - [Official page](#)
  - Freely available for academic purposes, contact the author Ashwin Srinivasan for commercial use
  - The source code is included [here](#) (aleph.pl)

- **RSD**
  - by Filip Železný et al
  - [Official page](#)
  - The source code is included [here](#) (.pl files)
  - Included with permission by the author

- **TreeLiker** (includes HiFi, RelF and Poly)
  - [Official page](#)
  - The binaries are included [here](#)
  - GPL license

- **Wordification**
  - by Matic Perovšek et al
  - python-rdm is currently the main repository for this approach.
  - The source code is included [here](#)
  - MIT license

Nicolas Lachiche’s team at the University of Strasbourg contributions:

- **1BC, 1BC2, Tertius**
  - By Peter Flach and Nicolas Lachiche
  - Sources included [here](#)
  - Official sites: Tertius, 1BC
  - Included with permission by the authors; please contact the authors for commercial use
• Caraf
  – By Clement Charnay, Agnès Braud and Nicolas Lachiche et al
  – All implemented in the Caraf java binaries included here
  – Included with permission by the authors; please contact the authors for commercial use

• Relaggs (Krogel and Wrobel, 2001), Quantiles, Cardinalization
  – Original Proper adapted by Nicolas Lachiche et al
  – GPLv2 license
  – All implemented in the Proper java binaries included here
Indices and tables

- genindex
- modindex
- search
Python Module Index

rdm.db.context, 15
rdm.db.converters, 16
rdm.db.datasource, 15
rdm.db.mapper, 23
rdm.validation, 24
rdm.wrappers, 18
Symbols

__dict__ (rdm.wrappers.Caraf attribute), 23
__dict__ (rdm.wrappers.OneBC attribute), 23
__dict__ (rdm.wrappers.Proper attribute), 22
__dict__ (rdm.wrappers.Tertius attribute), 22
__init__() (rdm.db.context.DBContext method), 15
__init__() (rdm.db.converters.AlephConverter method), 17
__init__() (rdm.db.converters.Converter method), 16
__init__() (rdm.db.datasource.MySQLDataSource method), 15
__init__() (rdm.db.datasource.PgSQLDataSource method), 15
__init__() (rdm.wrappers.Aleph method), 18
__init__() (rdm.wrappers.Caraf method), 23
__init__() (rdm.wrappers.OneBC method), 23
__init__() (rdm.wrappers.Proper method), 22
__init__() (rdm.wrappers.RSD method), 19
__init__() (rdm.wrappers.Tertius method), 22
__init__() (rdm.wrappers.TreeLiker method), 21
__init__() (rdm.wrappers.Wordification method), 21
__module__ (rdm.wrappers.Caraf attribute), 23
__module__ (rdm.wrappers.OneBC attribute), 23
__module__ (rdm.wrappers.Proper attribute), 22
__module__ (rdm.wrappers.Tertius attribute), 22
__weakref__ (rdm.wrappers.Aleph attribute), 19
__weakref__ (rdm.wrappers.Caraf attribute), 23
__weakref__ (rdm.wrappers.OneBC attribute), 23
__weakref__ (rdm.wrappers.Proper attribute), 22

A

Aleph (class in rdm.wrappers), 18
AlephConverter (class in rdm.db.converters), 17
all_examples() (rdm.db.converters.RSDConverter method), 17
att_to_s() (rdm.wrappers.Wordification method), 21

B

background_knowledge() (rdm.db.converters.AlephConverter method), 17
background_knowledge() (rdm.db.converters.RSDConverter method), 17

C

calculate_weights() (rdm.wrappers.Wordification method), 22
Caraf (class in rdm.wrappers), 23
column_values() (rdm.db.datasource.DataSource method), 13
cv_split() (in module rdm.validation), 24

D

dataset() (rdm.db.converters.TreeLikerConverter method), 18
DataSource (class in rdm.db.datasource), 13
DBContext (class in rdm.db.context), 15
default_template() (rdm.db.converters.TreeLikerConverter method), 18
domain_map() (in module rdm.db.mapper), 23

F

fetch() (rdm.db.context.DBContext method), 15
fetch() (rdm.db.datasource.DataSource method), 13
fetch_types() (rdm.db.context.DBContext method), 14
fetch_types() (rdm.db.datasource.DataSource method), 14
foreign_keys() (rdm.db.datasource.DataSource method), 14

I

ILPConverter (class in rdm.db.converters), 16
induce() (rdm.wrappers.Aleph method), 19
induce() (rdm.wrappers.RSD method), 19
init_args_list() (rdm.wrappers.OneBC method), 23
init_args_list() (rdm.wrappers.Proper method), 22
init_args_list() (rdm.wrappers.Tertius method), 22

M
mode() (rdm.db.converters.ILPConverter method), 16
MySQLDataSource (class in rdm.db.datasource), 15

N
negative_examples() (rdm.db.converters.AlephConverter method), 17

O
OneBC (class in rdm.wrappers), 23
OrangeConverter (class in rdm.db.converters), 17
orng_type() (rdm.db.converters.OrangeConverter method), 18
other_Orange_tables() (rdm.db.converters.OrangeConverter method), 18

P
parse_excluded_fields() (rdm.wrappers.Proper method), 22
PgSQLDataSource (class in rdm.db.datasource), 15
positive_examples() (rdm.db.converters.AlephConverter method), 17
Proper (class in rdm.wrappers), 22
prune() (rdm.wrappers.Wordification method), 22

R
rdm.db.context (module), 15
rdm.db.converters (module), 16
rdm.db.datasource (module), 13, 15
rdm.db.mapper (module), 23
rdm.validation (module), 23, 24
rdm.wrappers (module), 18
rows() (rdm.db.context.DBContext method), 16
RSD (class in rdm.wrappers), 19
RSDConverter (class in rdm.db.converters), 17
run() (rdm.wrappers.Caraf method), 23
run() (rdm.wrappers.OneBC method), 23
run() (rdm.wrappers.Proper method), 22
run() (rdm.wrappers.Tertius method), 23
run() (rdm.wrappers.TreeLiker method), 21
run() (rdm.wrappers.Wordification method), 22

S
select_where() (rdm.db.context.DBContext method), 16
select_where() (rdm.db.datasource.DataSource method), 14
set() (rdm.wrappers.Aleph method), 19
set() (rdm.wrappers.RSD method), 20
setPostScript() (rdm.wrappers.Aleph method), 19
settingsAsFacts() (rdm.wrappers.Aleph method), 19
settingsAsFacts() (rdm.wrappers.RSD method), 20

T
table_column_names() (rdm.db.datasource.DataSource method), 14
table_columns() (rdm.db.datasource.DataSource method), 14
table_primary_key() (rdm.db.datasource.DataSource method), 14
tables() (rdm.db.datasource.DataSource method), 14
target_Orange_table() (rdm.db.converters.OrangeConverter method), 18
Tertius (class in rdm.wrappers), 22
to_arff() (rdm.wrappers.Wordification method), 22
TreeLiker (class in rdm.wrappers), 21
TreeLikerConverter (class in rdm.db.converters), 18

U
user_settings() (rdm.db.converters.ILPConverter method), 17

W
Wordification (class in rdm.wrappers), 21
wordify() (rdm.wrappers.Wordification method), 22