Multi-Label Dataset Analyzer
API Documentation

Contents

Chapter 1

Introduction

This API implemented in Java provides a wide set of metrics for characterization of multi-label learning (MLL) datasets. Charte defined a taxonomy for characterization metrics of multi-label datasets. [1] Based on this taxonomy also we have considered to include the metrics from Mulan [2] and Meka [3] , and the metrics proposed by Chekina [4] . All the metrics have been grouped in the taxonomy, adding one more group for attributes metrics. The final groups of metrics are: dimensionality, label distribution, relationship among labels, imbalance and attributes.

1.1 Structure

The API uses the Mulan and Weka [5] libraries. It is divided in the following packages:

- **base:** it includes the basic classes for dataset characterization. These are *MLDataMetric* and *MLDataCharacterization*. The former is the base implementation for any implemented metric, including the *calculate()* method, which calculates the metric value. The latter is useful to calculate a set of metrics instead of only one.
- **attributes:** it includes the implementation of attributes metrics.
- **dimensionality:** it includes the implementation of dimensionality metrics.
- **imbalance:** it includes the implementation of imbalance metrics.
- **labelsDistribution:** it includes the implementation of labels distribution metrics.
- **labelsRelation:** it includes the implementation of labels relationship metrics.
- **metricNames:** it includes the name of all implemented metrics.
- **util:** it includes some necessary methods for metrics calculation.

[1] F. Charte and D. Charte. "A first approach to deal with imbalance in multi-label datasets. In: Lecture Notes in Computer Science, 8073 LNAI (2013), pp. 150-160.

[2] G. Tsoumakas et al. "Mulan: A Java Library for Multi-Label Learning. In: Journal of Machine Learning Research 12 (2011), pp. 24112414.

[3] MEKA: A Multi-label Extension to WEKA. http://meka.sourceforge.net/. Last accessed: 21-04-2016.

[4] L. Chekina et al. "Meta-learning for selecting a multi-label classification algorithm. In Proceedings of IEEE International Conference on Data Mining, ICDM, 2011, pp. 220227.

[5] Mark Hall et al. "The WEKA Data Mining Software: An Update". In: SIGKDD Explor. Newsl. 11.1 (2009), pp. 1018.

1.2 Examples

The API can be downloaded from http://www.uco.es/grupos/kdis/kdiswiki/MLLResources/Software/MLDC_API_v1_1.zip. Once downloaded, it has to be included in the Java project. This API has two main goals: calculate one characterization metric for a multi-label dataset or calculate a set of metrics for the same dataset.

To calculate one metric, an object of the desired metric have to be calculated. After creating the metric object, the *calculate()* method have to be called with the multi-label dataset as parameter. The metric value can be obtained in two ways: getting the returned value of the *calculate()* method, or accessing to the metric value with the *getValue()* method. Figure 1.1 shows an example for calculating one metric.

```
1 //Creating the object corresponding to the metric
2 Density density = new Density();
3
4 //Calculating metric value
5 double value = density.calculate(mlData);
6
7 //Other way to get the metric value
8  //After calling calculate() method
9 double value2 = density.getValue();
```

Figure 1.1: Calculating one metric

On the other hand, to calculate a set of metrics instead of only one, the API includes the *MLDataCharacterization* class. To create a *MLDataCharacterization* object it just need the multi-label dataset as parameter. Then, the metrics are added with *addMetric()* or *addMetrics()* methods, passing as parameter a metric or a list of metrics respectively. Once calculated with *calculateMetrics()* method, the *getMetric()* method returns a metric of the list identified by its name. The *getAvailableMetrics()* method returns a set with the names of all available metrics. Figure 1.2 shows an example of how to calculate some metrics for a dataset.

```java
//Creating object MLDataCharacterization
MLDataCharacterization mldc = new MLDataCharacterization(mlData);

//Including metrics with addMetrics method
ArrayList<MLDataMetric> m = new ArrayList<>();
m.add(new Attributes());
m.add(new Labels());
m.add(new Instances());
mldc.addMetrics(m);

//Including metrics with addMetric method
mldc.addMetric(new Cardinality());
mldc.addMetric(new Density());

//Calculating
mldc.calculateMetrics();

//Getting values
double attributes = mldc.getMetrc("Attributes").getValue();
double labels = mldc.getMetric("Labels").getValue();
double instances = mldc.getMetric("Instances").getValue();
double cardinality = mldc.getMetric("Cardinality").getValue();
double density = mldc.getMetric("Density").getValue();
```

Figure 1.2: Calculating some metrics

Chapter 2

Class Hierarchy

2.1 Classes

- java.lang.Object
  - mldc.base.MLDataCharacterization (in 4.1, page 141)
  - mldc.base.MLDataMetric (in 4.2, page 145)
    - mldc.attributes.AvgAbsoluteCorrelationBetweenNumericAttributes (in 3.1, page 127)
    - mldc.attributes.AvgGainRatio (in 3.2, page 128)
    - mldc.attributes.BinaryAttributes (in 3.3, page 129)
    - mldc.attributes.MeanEntropiesNominalAttributes (in 3.4, page 130)
    - mldc.attributes.MeanKurtosis (in 3.5, page 131)
    - mldc.attributes.MeanOfMeanOfNumericAttributes (in 3.6, page 132)
    - mldc.attributes.MeanSkewnessNumericAttributes (in 3.7, page 133)
    - mldc.attributes.MeanStdvNumericAttributes (in 3.8, page 134)
    - mldc.attributes.NominalAttributes (in 3.9, page 135)
    - mldc.attributes.NumericAttributes (in 3.10, page 136)
    - mldc.attributes.ProportionBinaryAttributes (in 3.11, page 137)
    - mldc.attributes.ProportionNominalAttributes (in 3.12, page 138)
    - mldc.attributes.ProportionNumericAttributes (in 3.13, page 139)
    - mldc.attributes.ProportionNumericAttributesWithOutliers (in 3.14, page 140)
    - mldc.dimensionality.Attributes (in 5.1, page 149)
    - mldc.dimensionality.DistinctLabelsets (in 5.2, page 150)
    - mldc.dimensionality.Instances (in 5.3, page 151)
    - mldc.dimensionality.Labels (in 5.4, page 152)
    - mldc.dimensionality.LxIxF (in 5.5, page 153)
    - mldc.dimensionality.RatioInstancesToAttributes (in 5.6, page 154)
    - mldc.imbalance.ImbalanceDataMetric (in 6.2, page 158)
      - mldc.imbalance.CVIRInterClass (in 6.1, page 157)
      - mldc.imbalance.KurtosisCardinality (in 6.3, page 159)
      - mldc.imbalance.MaxIRInterClass (in 6.4, page 160)
      - mldc.imbalance.MaxIRIntraClass (in 6.5, page 161)
      - mldc.imbalance.MaxIRLabelset (in 6.6, page 163)
      - mldc.imbalance.MeanIRInterClass (in 6.7, page 164)
      - mldc.imbalance.MeanIRIntraClass (in 6.8, page 165)

Chapter 3

Package mldc.attributes

Package Contents *Page*

Classes

3.1 Class AvgAbsoluteCorrelationBetweenNumericAttributes

Class implementing the Average absolute correlation between numeric attributes

3.1.1 Declaration

```
public class AvgAbsoluteCorrelationBetweenNumericAttributes
 extends mldc.base.MLDataMetric
```

3.1.2 Constructor summary

AvgAbsoluteCorrelationBetweenNumericAttributes() Constructor

3.1.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.1.4 Constructors

- **AvgAbsoluteCorrelationBetweenNumericAttributes**

```
public AvgAbsoluteCorrelationBetweenNumericAttributes()
```

  - **Description**
    Constructor

3.1.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.1.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.2 Class AvgGainRatio

Class implementing the Average gain ratio

3.2.1 Declaration

```
public class AvgGainRatio
 extends mldc.base.MLDataMetric
```

3.2.2 Constructor summary

AvgGainRatio() Constructor

3.2.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.2.4 Constructors

- **AvgGainRatio**

```
public AvgGainRatio()
```

  - **Description**
    Constructor

3.2.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.2.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.3 Class BinaryAttributes

Class implementing the Number of binary attributes

3.3.1 Declaration

```
public class BinaryAttributes
 extends mldc.base.MLDataMetric
```

3.3.2 Constructor summary

BinaryAttributes() Constructor

3.3.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.3.4 Constructors

- **BinaryAttributes**

```
public BinaryAttributes()
```

  - **Description**
    Constructor

3.3.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.3.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.4 Class MeanEntropiesNominalAttributes

Class implementing the Mean of entropies of nominal attributes

3.4.1 Declaration

```
public class MeanEntropiesNominalAttributes
 extends mldc.base.MLDataMetric
```

3.4.2 Constructor summary

MeanEntropiesNominalAttributes() Constructor

3.4.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.4.4 Constructors

- **MeanEntropiesNominalAttributes**

```
public MeanEntropiesNominalAttributes()
```

  - **Description**
    Constructor

3.4.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.4.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.5 Class MeanKurtosis

Class implementing the Mean of kurtosis

3.5.1 Declaration

```
public class MeanKurtosis
 extends mldc.base.MLDataMetric
```

3.5.2 Constructor summary

MeanKurtosis() Constructor

3.5.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.5.4 Constructors

- **MeanKurtosis**

```
public MeanKurtosis()
```

  - **Description**
    Constructor

3.5.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.5.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.6 Class MeanOfMeanOfNumericAttributes

Class implementing the Mean of mean of numeric attributes

3.6.1 Declaration

```
public class MeanOfMeanOfNumericAttributes
 extends mldc.base.MLDataMetric
```

3.6.2 Constructor summary

MeanOfMeanOfNumericAttributes() Constructor

3.6.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.6.4 Constructors

- **MeanOfMeanOfNumericAttributes**

```
public MeanOfMeanOfNumericAttributes()
```

  - **Description**
    Constructor

3.6.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.6.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.7 Class MeanSkewnessNumericAttributes

Class implementing the Mean of skewness of numeric attributes

3.7.1 Declaration

```
public class MeanSkewnessNumericAttributes
 extends mldc.base.MLDataMetric
```

3.7.2 Constructor summary

MeanSkewnessNumericAttributes() Constructor

3.7.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.7.4 Constructors

- **MeanSkewnessNumericAttributes**

```
public MeanSkewnessNumericAttributes()
```

  - **Description**
    Constructor

3.7.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.7.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.8 Class MeanStdvNumericAttributes

Class implementing the Mean of standard deviation of numeric attributes

3.8.1 Declaration

```
public class MeanStdvNumericAttributes
 extends mldc.base.MLDataMetric
```

3.8.2 Constructor summary

MeanStdvNumericAttributes() Constructor

3.8.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.8.4 Constructors

- **MeanStdvNumericAttributes**

```
public MeanStdvNumericAttributes()
```

  - **Description**
    Constructor

3.8.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.8.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.9 Class NominalAttributes

Class implementing the Number of nominal attributes

3.9.1 Declaration

```
public class NominalAttributes
 extends mldc.base.MLDataMetric
```

3.9.2 Constructor summary

NominalAttributes() Constructor

3.9.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.9.4 Constructors

- **NominalAttributes**

```
public NominalAttributes()
```

  - **Description**
    Constructor

3.9.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.9.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.10 Class NumericAttributes

Class implementing the Number of numeric attributes

3.10.1 Declaration

```
public class NumericAttributes
 extends mldc.base.MLDataMetric
```

3.10.2 Constructor summary

NumericAttributes() Constructor

3.10.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.10.4 Constructors

- **NumericAttributes**

```
public NumericAttributes()
```

  - **Description**
    Constructor

3.10.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.10.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.11 Class ProportionBinaryAttributes

Class implementing the Proportion of binary attributes

3.11.1 Declaration

```
public class ProportionBinaryAttributes
 extends mldc.base.MLDataMetric
```

3.11.2 Constructor summary

ProportionBinaryAttributes() Constructor

3.11.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.11.4 Constructors

- **ProportionBinaryAttributes**

```
public ProportionBinaryAttributes()
```

  - **Description**
    Constructor

3.11.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.11.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.12 Class ProportionNominalAttributes

Class implementing the Proportion of nominal attributes

3.12.1 Declaration

```
public class ProportionNominalAttributes
 extends mldc.base.MLDataMetric
```

3.12.2 Constructor summary

ProportionNominalAttributes() Constructor

3.12.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.12.4 Constructors

- **ProportionNominalAttributes**

```
public ProportionNominalAttributes()
```

  - **Description**
    Constructor

3.12.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.12.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.13 Class ProportionNumericAttributes

Class implementing the Proportion of numeric attributes

3.13.1 Declaration

```
public class ProportionNumericAttributes
 extends mldc.base.MLDataMetric
```

3.13.2 Constructor summary

ProportionNumericAttributes() Constructor

3.13.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.13.4 Constructors

- **ProportionNumericAttributes**

```
public ProportionNumericAttributes()
```

  - **Description**
    Constructor

3.13.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.13.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

3.14 Class ProportionNumericAttributesWithOutliers

Class implementing the Proportion of numeric attributes with outliers

3.14.1 Declaration

```
public class ProportionNumericAttributesWithOutliers
 extends mldc.base.MLDataMetric
```

3.14.2 Constructor summary

ProportionNumericAttributesWithOutliers() Constructor

3.14.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

3.14.4 Constructors

- **ProportionNumericAttributesWithOutliers**

```
public ProportionNumericAttributesWithOutliers()
```

  - **Description**
    Constructor

3.14.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

3.14.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

Chapter 4

Package mldc.base

Package Contents *Page*

Classes

4.1 Class MLDataCharacterization

Class for calculating a set of characterization metrics for a multi-label dataset

4.1.1 Declaration

```
public class MLDataCharacterization
 extends java.lang.Object
```

4.1.2 Field summary

availableMetrics List of available metrics
metrics List of metrics
mlData MultiLabel Dataset

4.1.3 Constructor summary

MLDataCharacterization(MultiLabelInstances) Constructor with dataset
MLDataCharacterization(MultiLabelInstances, ArrayList) Constructor with dataset and list of metrics
MLDataCharacterization(MultiLabelInstances, MLDataMetric) Constructor with dataset and metric

4.1.4 Method summary

addMetric(MLDataMetric) Add metric to the list
addMetrics(ArrayList) Add metrics to the list
calculateMetrics() Calculate values of all the metrics in the list
calculateMetrics(MultiLabelInstances) Calculate values of all the metrics in the list for a new mlData
clear() Clear metrics list
getAvailableMetrics() return the list of available metrics
getMetric(String) Get metric from the list
getMetrics() Get list of metrics
isAvailable(String) Know if a metric name is available
toString() To String method

4.1.5 Fields

- `protected MultiLabelInstances` **mlData**
  - MultiLabel Dataset
- `protected java.util.ArrayList` **metrics**
  - List of metrics
- `protected java.lang.String[]` **availableMetrics**
  - List of available metrics

4.1.6 Constructors

- **MLDataCharacterization**

```
1 public MLDataCharacterization(MultiLabelInstances mlData)
```

  - **Description**
    Constructor with dataset
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metrics

- **MLDataCharacterization**

```
1 public MLDataCharacterization(MultiLabelInstances mlData,java.util.ArrayList
    metrics)
```

  - **Description**
    Constructor with dataset and list of metrics

- **Parameters**
  - `mlData` – Multi-label dataset to which calculate the metrics
  - `metrics` – List of metrics to calculate

- **MLDataCharacterization**

```
1 public MLDataCharacterization(MultiLabelInstances mlData,MLDataMetric metric)
```

  - **Description**
    Constructor with dataset and metric
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metrics
    - `metric` – Metric to be added to the list

4.1.7 Methods

- **addMetric**

```
1 public boolean addMetric(MLDataMetric metric)
```

  - **Description**
    Add metric to the list
  - **Parameters**
    - `metric` – Metric to add to the list
  - **Returns** – True if successful added and false otherwise

- **addMetrics**

```
1 public boolean addMetrics(java.util.ArrayList metrics)
```

  - **Description**
    Add metrics to the list
  - **Parameters**
    - `metrics` – A list of MLDataMetrics to add to the current list
  - **Returns** – True if all metrics are successfully added and false otherwise

- **calculateMetrics**

```
1 public void calculateMetrics()
```

  - **Description**
    Calculate values of all the metrics in the list

- **calculateMetrics**

```
1 public void calculateMetrics(MultiLabelInstances mlData)
```

  - **Description**
    Calculate values of all the metrics in the list for a new mlData
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric

- **clear**

```
1 public void clear()
```

  - **Description**
    Clear metrics list

- **getAvailableMetrics**

```
1 public java.lang.String[] getAvailableMetrics()
```

  - **Description**
    return the list of available metrics
  - **Returns** – An array with the names of all the available metrics

- **getMetric**

```
1 public MLDataMetric getMetric(java.lang.String metricName)
```

  - **Description**
    Get metric from the list
  - **Parameters**

* `metricName` – Name of the metric to get

– **Returns** – A MLDataMetric object with the metric required

- **getMetrics**

```
1 public java.util.ArrayList getMetrics()
```

– **Description**
Get list of metrics

– **Returns** – A list with the metrics of the object

- **isAvailable**

```
1 public boolean isAvailable(java.lang.String metricName)
```

– **Description**
Know if a metric name is available

– **Parameters**

* `metricName` – Name of the metric

– **Returns** – True if it is available and false otherwise

- **toString**

```
1 public java.lang.String toString()
```

– **Description**
To String method

– **Returns** – All metrics as a String with name and value, separated by ” “n”

4.2 Class MLDataMetric

Class implementing a metric for multi-label data characterization

4.2.1 Declaration

```
1 public class MLDataMetric
2  extends java.lang.Object implements java.lang.Comparable
```

4.2.2 All known subclasses

ProportionNumericAttributesWithOutliers (in 3.14, page 140), ProportionNumericAttributes (in 3.13, page 139), ProportionNominalAttributes (in 3.12, page 138), ProportionBinaryAttributes (in 3.11, page 137), NumericAttributes (in 3.10, page 136), NominalAttributes (in 3.9, page 135), MeanStdvNumericAttributes (in 3.8, page 134), MeanSkewnessNumericAttributes (in 3.7, page 133), MeanOfMeanOfNumericAttributes (in 3.6, page 132), MeanKurtosis (in 3.5, page 131), MeanEntropies-NominalAttributes (in 3.4, page 130), BinaryAttributes (in 3.3, page 129), AvgGainRatio (in 3.2, page 128), AvgAbsoluteCorrelationBetweenNumericAttributes (in 3.1, page 127), RatioInstancesToAttributes (in 5.6, page 154), LxIxF (in 5.5, page 153), Labels (in 5.4, page 152), Instances (in 5.3, page 151), DistinctLabelsets (in 5.2, page 150), Attributes (in 5.1, page 149), SkewnessCardinality (in 6.13, page 171), PUniq (in 6.12, page 169), PMax (in 6.11, page 168), MeanStdvIRIntraClass (in 6.10, page 167), MeanIR-Labelset (in 6.9, page 166), MeanIRIntraClass (in 6.8, page 165), MeanIRInterClass (in 6.7, page 164), MaxIRLabelset (in 6.6, page 163), MaxIRIntraClass (in 6.5, page 161), MaxIRInterClass (in 6.4, page 160), KurtosisCardinality (in 6.3, page 159), ImbalanceDataMetric (in 6.2, page 158), CVIRInterClass (in 6.1, page 157), StdvCardinality (in 7.6, page 178), MinEntropy (in 7.5, page 177), MeanEntropy (in 7.4, page 176), MaxEntropy (in 7.3, page 175), Density (in 7.2, page 174), Cardinality (in 7.1, page 173), UniqueLabelsets (in 8.22, page 201), StdvExamplesPerLabelset (in 8.21, page 200), SCUMBLE (in 8.20, page 199), RatioUnconditionalDependentLabelPairsByChiSquare (in 8.19, page 198), Ratio-LabelsetsWithExamplesLessThanHalfAttributes (in 8.18, page 197), RatioLabelsetsUpToNExamples (in 8.17, page 195), RatioLabelsetsUpTo5Examples (in 8.16, page 194), RatioLabelsetsUpTo50Examples (in 8.15, page 194), RatioLabelsetsUpTo2Examples (in 8.14, page 193), RatioLabelsetsUpTo10Examples (in 8.13, page 192), ProportionDistinctLabelsets (in 8.12, page 191), NumUnconditionalDependentLabelPairsByChiSquare (in 8.11, page 190), MeanExamplesPerLabelset (in 8.10, page 189), LabelsetsUpToNExamples (in 8.9, page 188), LabelsetsUpTo5Examples (in 8.8, page 187), LabelsetsUpTo50Examples (in 8.7, page 186), LabelsetsUpTo2Examples (in 8.6, page 186), LabelsetsUpTo10Examples (in 8.5, page 185), Diversity (in 8.4, page 184), Bound (in 8.3, page 183), AvgUnconditionalDependentLabelPairsBy-ChiSquare (in 8.2, page 182), AvgExamplesPerLabelset (in 8.1, page 181)

4.2.3 Field summary

name Metric name
value Metric value

4.2.4 Constructor summary

MLDataMetric(String) Constructor

4.2.5 Method summary

calculate(MultiLabelInstances) Calculate metric value.
compareTo(MLDataMetric)
getName() Get metric name
getValue() Get metric value
toString() To String method

4.2.6 Fields

- `protected java.lang.String` **name**
  - Metric name
- `protected double` **value**
  - Metric value

4.2.7 Constructors

- **MLDataMetric**

```
1 public MLDataMetric(java.lang.String name)
```

  - **Description**
    Constructor
  - **Parameters**
    - `name` – Name of the metric

4.2.8 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value. To be implemented in each metric
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Calculated value of the metric

- **compareTo**

```
1 public int compareTo(MLDataMetric other)
```

- **getName**

```
1 public java.lang.String getName()
```

- **Description**
  Get metric name
- **Returns** – Name of the metric

- **getValue**

```
1 public double getValue()
```

- **Description**
  Get metric value
- **Returns** – Value of the metric

- **toString**

```
1 public java.lang.String toString()
```

- **Description**
  To String method
- **Returns** – MLDataMetric as String, including name and value

Chapter 5

Package mldc.dimensionality

Package Contents *Page*

Classes

5.1 Class Attributes

Class implementing the Attributes metric

5.1.1 Declaration

```
public class Attributes
 extends mldc.base.MLDataMetric
```

5.1.2 Constructor summary

Attributes()

5.1.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.1.4 Constructors

- **Attributes**

```
1 public Attributes()
```

5.1.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.1.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

5.2 Class DistinctLabelsets

Class implementing the Distinct labelsets metric

5.2.1 Declaration

```
1 public class DistinctLabelsets
2  extends mldc.base.MLDataMetric
```

5.2.2 Constructor summary

DistinctLabelsets()

5.2.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.2.4 Constructors

- **DistinctLabelsets**

```
1 public DistinctLabelsets()
```

5.2.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.2.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

5.3 Class Instances

Class implementing the Instances metric

5.3.1 Declaration

```
1 public class Instances
2  extends mldc.base.MLDataMetric
```

5.3.2 Constructor summary

Instances()

5.3.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.3.4 Constructors

- **Instances**

```
1 public Instances()
```

5.3.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.3.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

5.4 Class Labels

Class implementing the Labels metric

5.4.1 Declaration

```
1 public class Labels
2  extends mldc.base.MLDataMetric
```

5.4.2 Constructor summary

Labels()

5.4.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.4.4 Constructors

- **Labels**

```
1 public Labels()
```

5.4.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.4.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

5.5 Class LxIxF

Class implementing the LxIxF metric

5.5.1 Declaration

```
1 public class LxIxF
2  extends mldc.base.MLDataMetric
```

5.5.2 Constructor summary

LxIxF()

5.5.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.5.4 Constructors

- **LxIxF**

```
1 public LxIxF()
```

5.5.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.5.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

5.6 Class RatioInstancesToAttributes

Class implementing the Ratio of number of instances to the number of attributes

5.6.1 Declaration

```
1 public class RatioInstancesToAttributes
2  extends mldc.base.MLDataMetric
```

5.6.2 Constructor summary

RatioInstancesToAttributes()

5.6.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

5.6.4 Constructors

- **RatioInstancesToAttributes**

```
1 public RatioInstancesToAttributes()
```

5.6.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

5.6.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

Chapter 6

Package mldc.imbalance

Package Contents *Page*

Classes

6.1 Class CVIRInterClass

Class implementing the CVIR inter class

6.1.1 Declaration

```
public class CVIRInterClass
 extends mldc.imbalance.ImbalanceDataMetric
```

6.1.2 Constructor summary

CVIRInterClass() Constructor

6.1.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.1.4 Constructors

- **CVIRInterClass**

```
public CVIRInterClass()
```

  - **Description**
    Constructor

6.1.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.1.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.1.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.2 Class ImbalanceDataMetric

Class for all Imbalance Metrics including characteristics for imbalanced data

6.2.1 Declaration

```
public class ImbalanceDataMetric
 extends mldc.base.MLDataMetric
```

6.2.2 All known subclasses

SkewnessCardinality (in 6.13, page 171), PUniq (in 6.12, page 169), PMax (in 6.11, page 168), MeanStdvIRIntraClass (in 6.10, page 167), MeanIRLabelset (in 6.9, page 166), MeanIRIntraClass (in 6.8, page 165), MeanIRInterClass (in 6.7, page 164), MaxIRLabelset (in 6.6, page 163), MaxIRIntraClass (in 6.5, page 161), MaxIRInterClass (in 6.4, page 160), KurtosisCardinality (in 6.3, page 159), CVIRInterClass (in 6.1, page 157)

6.2.3 Field summary

imbalancedData

6.2.4 Constructor summary

ImbalanceDataMetric(String) Constructor

6.2.5 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.2.6 Fields

- `protected mldc.util.ImbalancedFeature[]` **imbalancedData**

6.2.7 Constructors

- **ImbalanceDataMetric**

```
public ImbalanceDataMetric(java.lang.String name)
```

– **Description**
Constructor
– **Parameters**
* `name` – Metric name

6.2.8 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

– **Description**
Calculate metric value
– **Parameters**
* `mlData` – Multi-label dataset to which calculate the metric
– **Returns** – Value of the metric

6.2.9 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.3 Class KurtosisCardinality

Class implementing the Kurtosis cardinality

6.3.1 Declaration

```
1 public class KurtosisCardinality
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.3.2 Constructor summary

KurtosisCardinality() Constructor

6.3.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.3.4 Constructors

- **KurtosisCardinality**

```
1 public KurtosisCardinality()
```

  - **Description**
    Constructor

6.3.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.3.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.3.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.4 Class MaxIRInterClass

Class implementing the Max IR inter class

6.4.1 Declaration

```
1 public class MaxIRInterClass
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.4.2 Constructor summary

MaxIRInterClass() Constructor

6.4.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.4.4 Constructors

- **MaxIRInterClass**

```
1 public MaxIRInterClass()
```

  - **Description**
    Constructor

6.4.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.4.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.4.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.5 Class MaxIRIntraClass

Class implementing the Max IR intra class

6.5.1 Declaration

```
public class MaxIRIntraClass
 extends mldc.imbalance.ImbalanceDataMetric
```

6.5.2 Constructor summary

MaxIRIntraClass() Constructor

6.5.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.5.4 Constructors

- **MaxIRIntraClass**

```
public MaxIRIntraClass()
```

  - **Description**
    Constructor

6.5.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.5.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.5.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.6 Class MaxIRLabelset

Class implementing the Max IR per labelset

6.6.1 Declaration

```
public class MaxIRLabelset
 extends mldc.imbalance.ImbalanceDataMetric
```

6.6.2 Constructor summary

MaxIRLabelset() Constructor

6.6.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.6.4 Constructors

- **MaxIRLabelset**

```
public MaxIRLabelset()
```

  - **Description**
    Constructor

6.6.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.6.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.6.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.7 Class MeanIRInterClass

Class implementing the Mean of IR inter class

6.7.1 Declaration

```
public class MeanIRInterClass
 extends mldc.imbalance.ImbalanceDataMetric
```

6.7.2 Constructor summary

MeanIRInterClass() Constructor

6.7.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.7.4 Constructors

- **MeanIRInterClass**

```
public MeanIRInterClass()
```

  - **Description**
    Constructor

6.7.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.7.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.7.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.8 Class MeanIRIntraClass

Class implementing the Mean of IR intra class

6.8.1 Declaration

```
1 public class MeanIRIntraClass
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.8.2 Constructor summary

MeanIRIntraClass() Constructor

6.8.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.8.4 Constructors

- **MeanIRIntraClass**

```
1 public MeanIRIntraClass()
```

  - **Description**
    Constructor

6.8.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

- **Description**
  Calculate metric value
- **Parameters**
  - `mlData` – Multi-label dataset to which calculate the metric
- **Returns** – Value of the metric

6.8.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.8.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.9 Class MeanIRLabelset

Class implementing the Mean of IR per labelset

6.9.1 Declaration

```
1 public class MeanIRLabelset
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.9.2 Constructor summary

MeanIRLabelset() Constructor

6.9.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.9.4 Constructors

- **MeanIRLabelset**

```
1 public MeanIRLabelset()
```

  - **Description**
    Constructor

6.9.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.9.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.9.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.10 Class MeanStdvIRIntraClass

Class implementing the Mean of standard deviation of IR intra class

6.10.1 Declaration

```
1 public class MeanStdvIRIntraClass
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.10.2 Constructor summary

MeanStdvIRIntraClass() Constructor

6.10.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.10.4 Constructors

- **MeanStdvIRIntraClass**

```
1 public MeanStdvIRIntraClass()
```

  - **Description**
    Constructor

6.10.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.10.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.10.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.11 Class PMax

Class implementing the Proportion of maxim label combination (PMax)

6.11.1 Declaration

```
1 public class PMax
2  extends mldc.imbalance.ImbalanceDataMetric
```

6.11.2 Constructor summary

PMax() Constructor

6.11.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.11.4 Constructors

- **PMax**

```
1 public PMax()
```

  - **Description**
    Constructor

6.11.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.11.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.11.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.12 Class PUniq

Class implementing the Proportion of unique label combination (PUniq)

6.12.1 Declaration

```
public class PUniq
 extends mldc.imbalance.ImbalanceDataMetric
```

6.12.2 Constructor summary

PUniq() Constructor

6.12.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.12.4 Constructors

- **PUniq**

```
public PUniq()
```

  - **Description**
    Constructor

6.12.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.12.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.12.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

6.13 Class SkewnessCardinality

Class implementing the Skewness cardinality

6.13.1 Declaration

```
public class SkewnessCardinality
 extends mldc.imbalance.ImbalanceDataMetric
```

6.13.2 Constructor summary

SkewnessCardinality() Constructor

6.13.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

6.13.4 Constructors

- **SkewnessCardinality**

```
public SkewnessCardinality()
```

  - **Description**
    Constructor

6.13.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

6.13.6 Members inherited from class ImbalanceDataMetric

`mldc.imbalance.ImbalanceDataMetric` (in 6.2, page 158)
calculate, imbalancedData

6.13.7 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)

calculate, compareTo, getName, getValue, name, toString, value

Chapter 7

Package mldc.labelsDistribution

Package Contents *Page*

Classes

7.1 Class Cardinality

Class implementing the Cardinality

7.1.1 Declaration

```
public class Cardinality
 extends mldc.base.MLDataMetric
```

7.1.2 Constructor summary

Cardinality() Constructor

7.1.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.1.4 Constructors

- **Cardinality**

```
1 public Cardinality()
```

  - **Description**
    Constructor

7.1.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.1.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

7.2 Class Density

Class implementing the Density

7.2.1 Declaration

```
1 public class Density
2  extends mldc.base.MLDataMetric
```

7.2.2 Constructor summary

Density() Constructor

7.2.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.2.4 Constructors

- **Density**

```
1 public Density()
```

  - **Description**
    Constructor

7.2.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.2.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

7.3 Class MaxEntropy

Class implementing the Maximal entropy of labels

7.3.1 Declaration

```
1 public class MaxEntropy
2  extends mldc.base.MLDataMetric
```

7.3.2 Constructor summary

MaxEntropy() Constructor

7.3.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.3.4 Constructors

- **MaxEntropy**

```
1 public MaxEntropy()
```

  - **Description**
    Constructor

7.3.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.3.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

7.4 Class MeanEntropy

Class implementing the Mean of entropies of labels

7.4.1 Declaration

```
1 public class MeanEntropy
2  extends mldc.base.MLDataMetric
```

7.4.2 Constructor summary

MeanEntropy() Constructor

7.4.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.4.4 Constructors

- **MeanEntropy**

```
1 public MeanEntropy()
```

  - **Description**
    Constructor

7.4.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.4.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

7.5 Class MinEntropy

Class implementing the Minimal entropy of labels

7.5.1 Declaration

```
1 public class MinEntropy
2  extends mldc.base.MLDataMetric
```

7.5.2 Constructor summary

MinEntropy() Constructor

7.5.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.5.4 Constructors

- **MinEntropy**

```
1 public MinEntropy()
```

  - **Description**
    Constructor

7.5.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.5.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

7.6 Class StdvCardinality

Class implementing the Standard deviation of label cardinality

7.6.1 Declaration

```
1 public class StdvCardinality
2  extends mldc.base.MLDataMetric
```

7.6.2 Constructor summary

StdvCardinality()

7.6.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

7.6.4 Constructors

- **StdvCardinality**

```
1 public StdvCardinality()
```

7.6.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

7.6.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

Chapter 8

Package mldc.labelsRelation

Package Contents *Page*

Classes

8.1 Class AvgExamplesPerLabelset

Class implementing the Average examples per labelset

8.1.1 Declaration

```
public class AvgExamplesPerLabelset
 extends mldc.base.MLDataMetric
```

8.1.2 Constructor summary

AvgExamplesPerLabelset() Constructor

8.1.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.1.4 Constructors

- **AvgExamplesPerLabelset**

```
public AvgExamplesPerLabelset()
```

  - **Description**
    Constructor

8.1.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.1.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.2 Class AvgUnconditionalDependentLabelPairsByChiSquare

Class implementing the Average of unconditionally dependent label pairs by chi-square test

8.2.1 Declaration

```
1 public class AvgUnconditionalDependentLabelPairsByChiSquare
2  extends mldc.base.MLDataMetric
```

8.2.2 Constructor summary

AvgUnconditionalDependentLabelPairsByChiSquare() Constructor

8.2.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.2.4 Constructors

- **AvgUnconditionalDependentLabelPairsByChiSquare**

```
1 public AvgUnconditionalDependentLabelPairsByChiSquare()
```

  - **Description**
    Constructor

8.2.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.2.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.3 Class Bound

Class implementing the Bound

8.3.1 Declaration

```
1 public class Bound
2  extends mldc.base.MLDataMetric
```

8.3.2 Constructor summary

Bound() Constructor

8.3.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.3.4 Constructors

- **Bound**

```
1 public Bound()
```

  - **Description**
    Constructor

8.3.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.3.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.4 Class Diversity

Class implementing the Diversity

8.4.1 Declaration

```
1 public class Diversity
2  extends mldc.base.MLDataMetric
```

8.4.2 Constructor summary

Diversity() Constructor

8.4.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.4.4 Constructors

- **Diversity**

```
1 public Diversity()
```

  - **Description**
    Constructor

8.4.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.4.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.5 Class LabelsetsUpTo10Examples

Class implementing the Number of labelsets up to 10 examples

8.5.1 Declaration

```
1 public class LabelsetsUpTo10Examples
2  extends mldc.labelsRelation.LabelsetsUpToNExamples
```

8.5.2 Constructor summary

LabelsetsUpTo10Examples() Constructor

8.5.3 Constructors

- **LabelsetsUpTo10Examples**

```
1 public LabelsetsUpTo10Examples()
```

  - **Description**
    Constructor

8.5.4 Members inherited from class LabelsetsUpToNExamples

`mldc.labelsRelation.LabelsetsUpToNExamples` (in 8.9, page 188)
calculate, n

8.5.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.6 Class LabelsetsUpTo2Examples

Class implementing the Number of labelsets up to 2 examples

8.6.1 Declaration

```
1 public class LabelsetsUpTo2Examples
2  extends mldc.labelsRelation.LabelsetsUpToNExamples
```

8.6.2 Constructor summary

LabelsetsUpTo2Examples() Constructor

8.6.3 Constructors

- **LabelsetsUpTo2Examples**

```
1 public LabelsetsUpTo2Examples()
```

  - **Description**
    Constructor

8.6.4 Members inherited from class LabelsetsUpToNExamples

`mldc.labelsRelation.LabelsetsUpToNExamples` (in 8.9, page 188)
calculate, n

8.6.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.7 Class LabelsetsUpTo50Examples

Class implementing the Number of labelsets up to 50 examples

8.7.1 Declaration

```
public class LabelsetsUpTo50Examples
 extends mldc.labelsRelation.LabelsetsUpToNExamples
```

8.7.2 Constructor summary

LabelsetsUpTo50Examples() Constructor

8.7.3 Constructors

- **LabelsetsUpTo50Examples**

```
public LabelsetsUpTo50Examples()
```

  - **Description**
    Constructor

8.7.4 Members inherited from class LabelsetsUpToNExamples

`mldc.labelsRelation.LabelsetsUpToNExamples` (in 8.9, page 188)
calculate, n

8.7.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.8 Class LabelsetsUpTo5Examples

Class implementing the Number of labelsets up to 5 examples

8.8.1 Declaration

```
public class LabelsetsUpTo5Examples
 extends mldc.labelsRelation.LabelsetsUpToNExamples
```

8.8.2 Constructor summary

LabelsetsUpTo5Examples() Constructor

8.8.3 Constructors

- **LabelsetsUpTo5Examples**

```
1 public LabelsetsUpTo5Examples()
```

  - **Description**
    Constructor

8.8.4 Members inherited from class LabelsetsUpToNExamples

`mldc.labelsRelation.LabelsetsUpToNExamples` (in 8.9, page 188)
calculate, n

8.8.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.9 Class LabelsetsUpToNExamples

Class implementing the Number of labelsets up to N examples

8.9.1 Declaration

```
1 public class LabelsetsUpToNExamples
2  extends mldc.base.MLDataMetric
```

8.9.2 All known subclasses

LabelsetsUpTo5Examples (in 8.8, page 187), LabelsetsUpTo50Examples (in 8.7, page 186), LabelsetsUpTo2Examples (in 8.6, page 186), LabelsetsUpTo10Examples (in 8.5, page 185)

8.9.3 Field summary

n

8.9.4 Constructor summary

LabelsetsUpToNExamples(int) Constructor

8.9.5 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.9.6 Fields

- `protected int n`

8.9.7 Constructors

- **LabelsetsUpToNExamples**

```
1 public LabelsetsUpToNExamples(int n)
```

  - **Description**
    Constructor
  - **Parameters**
    - `n` – Number of examples

8.9.8 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.9.9 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.10 Class MeanExamplesPerLabelset

Class implementing the Mean examples per labelset

8.10.1 Declaration

```
1 public class MeanExamplesPerLabelset
2  extends mldc.base.MLDataMetric
```

8.10.2 Constructor summary

MeanExamplesPerLabelset() Constructor

8.10.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.10.4 Constructors

- **MeanExamplesPerLabelset**

```
1 public MeanExamplesPerLabelset()
```

  - **Description**
    Constructor

8.10.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.10.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.11 Class NumUnconditionalDependentLabelPairsByChiSquare

Class implementing the Number of unconditionally dependent label pairs by chi-square test

8.11.1 Declaration

```
1 public class NumUnconditionalDependentLabelPairsByChiSquare
2  extends mldc.base.MLDataMetric
```

8.11.2 Constructor summary

NumUnconditionalDependentLabelPairsByChiSquare() Constructor

8.11.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.11.4 Constructors

- **NumUnconditionalDependentLabelPairsByChiSquare**

```
1 public NumUnconditionalDependentLabelPairsByChiSquare()
```

  - **Description**
    Constructor

8.11.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.11.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.12 Class ProportionDistinctLabelsets

Class implementing the Proportion of distinct labelsets

8.12.1 Declaration

```
1 public class ProportionDistinctLabelsets
2  extends mldc.base.MLDataMetric
```

8.12.2 Constructor summary

ProportionDistinctLabelsets() Constructor

8.12.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.12.4 Constructors

- **ProportionDistinctLabelsets**

```
1 public ProportionDistinctLabelsets()
```

  - **Description**
    Constructor

8.12.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.12.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.13 Class RatioLabelsetsUpTo10Examples

Class implementing the Ratio of number of labelsets up to 10 examples

8.13.1 Declaration

```
1 public class RatioLabelsetsUpTo10Examples
2  extends mldc.labelsRelation.RatioLabelsetsUpToNExamples
```

8.13.2 Constructor summary

RatioLabelsetsUpTo10Examples() Constructor

8.13.3 Constructors

- **RatioLabelsetsUpTo10Examples**

```
1 public RatioLabelsetsUpTo10Examples()
```

  - **Description**
    Constructor

8.13.4 Members inherited from class RatioLabelsetsUpToNExamples

`mldc.labelsRelation.RatioLabelsetsUpToNExamples` (in 8.17, page 195)
calculate, n

8.13.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.14 Class RatioLabelsetsUpTo2Examples

Class implementing the Ratio of number of labelsets up to 2 examples

8.14.1 Declaration

```
1 public class RatioLabelsetsUpTo2Examples
2  extends mldc.labelsRelation.RatioLabelsetsUpToNExamples
```

8.14.2 Constructor summary

RatioLabelsetsUpTo2Examples() Constructor

8.14.3 Constructors

- **RatioLabelsetsUpTo2Examples**

```
1 public RatioLabelsetsUpTo2Examples()
```

  - **Description**
    Constructor

8.14.4 Members inherited from class RatioLabelsetsUpToNExamples

`mldc.labelsRelation.RatioLabelsetsUpToNExamples` (in 8.17, page 195)
calculate, n

8.14.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.15 Class RatioLabelsetsUpTo50Examples

Class implementing the Ratio of number of labelsets up to 50 examples

8.15.1 Declaration

```
1 public class RatioLabelsetsUpTo50Examples
2  extends mldc.labelsRelation.RatioLabelsetsUpToNExamples
```

8.15.2 Constructor summary

RatioLabelsetsUpTo50Examples() Constructor

8.15.3 Constructors

- **RatioLabelsetsUpTo50Examples**

```
1 public RatioLabelsetsUpTo50Examples()
```

  - **Description**
    Constructor

8.15.4 Members inherited from class RatioLabelsetsUpToNExamples

`mldc.labelsRelation.RatioLabelsetsUpToNExamples` (in 8.17, page 195)
calculate, n

8.15.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.16 Class RatioLabelsetsUpTo5Examples

Class implementing the Ratio of number of labelsets up to 5 examples

8.16.1 Declaration

```
public class RatioLabelsetsUpTo5Examples
 extends mldc.labelsRelation.RatioLabelsetsUpToNExamples
```

8.16.2 Constructor summary

RatioLabelsetsUpTo5Examples() Constructor

8.16.3 Constructors

- **RatioLabelsetsUpTo5Examples**

```
public RatioLabelsetsUpTo5Examples()
```

  - **Description**
    Constructor

8.16.4 Members inherited from class RatioLabelsetsUpToNExamples

`mldc.labelsRelation.RatioLabelsetsUpToNExamples` (in 8.17, page 195)
calculate, n

8.16.5 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.17 Class RatioLabelsetsUpToNExamples

Class implementing the Ratio of number of labelsets up to N examples

8.17.1 Declaration

```
public class RatioLabelsetsUpToNExamples
 extends mldc.base.MLDataMetric
```

8.17.2 All known subclasses

RatioLabelsetsUpTo5Examples (in 8.16, page 194), RatioLabelsetsUpTo50Examples (in 8.15, page 194), RatioLabelsetsUpTo2Examples (in 8.14, page 193), RatioLabelsetsUpTo10Examples (in 8.13, page 192)

8.17.3 Field summary

n

8.17.4 Constructor summary

RatioLabelsetsUpToNExamples(int) Constructor

8.17.5 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.17.6 Fields

- `protected int` **n**

8.17.7 Constructors

- **RatioLabelsetsUpToNExamples**

```
1 public RatioLabelsetsUpToNExamples(int n)
```

  - **Description**
    Constructor
  - **Parameters**
    - `n` – Number of examples

8.17.8 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    - `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.17.9 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.18 Class RatioLabelsetsWithExamplesLessThanHalfAttributes

Class implementing the Ratio of labelsets with number of examples less than half of the attributes

8.18.1 Declaration

```
public class RatioLabelsetsWithExamplesLessThanHalfAttributes
 extends mldc.base.MLDataMetric
```

8.18.2 Constructor summary

RatioLabelsetsWithExamplesLessThanHalfAttributes() Constructor

8.18.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.18.4 Constructors

- **RatioLabelsetsWithExamplesLessThanHalfAttributes**

```
public RatioLabelsetsWithExamplesLessThanHalfAttributes()
```

  - **Description**
    Constructor

8.18.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.18.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.19 Class RatioUnconditionalDependentLabelPairsByChiSquare

Class implementing the Ratio of unconditionally dependent label pairs by chi-square test

8.19.1 Declaration

```
1 public class RatioUnconditionalDependentLabelPairsByChiSquare
2  extends mldc.base.MLDataMetric
```

8.19.2 Constructor summary

RatioUnconditionalDependentLabelPairsByChiSquare() Constructor

8.19.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.19.4 Constructors

- **RatioUnconditionalDependentLabelPairsByChiSquare**

```
1 public RatioUnconditionalDependentLabelPairsByChiSquare()
```

  - **Description**
    Constructor

8.19.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.19.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.20 Class SCUMBLE

Class implementing the SCUMBLE

8.20.1 Declaration

```
public class SCUMBLE
 extends mldc.base.MLDataMetric
```

8.20.2 Constructor summary

SCUMBLE() Constructor

8.20.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.20.4 Constructors

- **SCUMBLE**

```
public SCUMBLE()
```

  - **Description**
    Constructor

8.20.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.20.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.21 Class StdvExamplesPerLabelset

Class implementing the Standard deviation of examples per labelset

8.21.1 Declaration

```
1 public class StdvExamplesPerLabelset
2  extends mldc.base.MLDataMetric
```

8.21.2 Constructor summary

StdvExamplesPerLabelset() Constructor

8.21.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.21.4 Constructors

- **StdvExamplesPerLabelset**

```
1 public StdvExamplesPerLabelset()
```

  - **Description**
    Constructor

8.21.5 Methods

- **calculate**

```
1 public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.21.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)
calculate, compareTo, getName, getValue, name, toString, value

8.22 Class UniqueLabelsets

Class implementing the Number of unique labelsets

8.22.1 Declaration

```
public class UniqueLabelsets
 extends mldc.base.MLDataMetric
```

8.22.2 Constructor summary

UniqueLabelsets() Constructor

8.22.3 Method summary

calculate(MultiLabelInstances) Calculate metric value

8.22.4 Constructors

- **UniqueLabelsets**

```
public UniqueLabelsets()
```

  - **Description**
    Constructor

8.22.5 Methods

- **calculate**

```
public double calculate(MultiLabelInstances mlData)
```

  - **Description**
    Calculate metric value
  - **Parameters**
    * `mlData` – Multi-label dataset to which calculate the metric
  - **Returns** – Value of the metric

8.22.6 Members inherited from class MLDataMetric

`mldc.base.MLDataMetric` (in 4.2, page 145)

calculate, compareTo, getName, getValue, name, toString, value

Chapter 9

Package mldc.metricNames

Package Contents *Page*

Classes

9.1 Class AttributesMetrics

Class storing the attribute metrics names

9.1.1 Declaration

```
public class AttributesMetrics
 extends java.lang.Object
```

9.1.2 Constructor summary

AttributesMetrics()

9.1.3 Method summary

getAvailableMetrics() Get the names of the available attributes metrics

9.1.4 Constructors

- **AttributesMetrics**

```
1 public AttributesMetrics()
```

9.1.5 Methods

- **getAvailableMetrics**

```
1 public static java.lang.String[] getAvailableMetrics()
```

  - **Description**
    Get the names of the available attributes metrics
  - **Returns** – An array with the names

9.2 Class DimensionalityMetrics

Class storing the dimensionality metrics names

9.2.1 Declaration

```
1 public class DimensionalityMetrics
2  extends java.lang.Object
```

9.2.2 Constructor summary

DimensionalityMetrics()

9.2.3 Method summary

getAvailableMetrics() Get the names of the available dimensionality metrics

9.2.4 Constructors

- **DimensionalityMetrics**

```
1 public DimensionalityMetrics()
```

9.2.5 Methods

- **getAvailableMetrics**

```
1 public static java.lang.String[] getAvailableMetrics()
```

  - **Description**
    Get the names of the available dimensionality metrics
  - **Returns** – An array with the names

9.3 Class ImbalanceMetrics

Class storing the imbalance metrics names

9.3.1 Declaration

```
1 public class ImbalanceMetrics
2  extends java.lang.Object
```

9.3.2 Constructor summary

ImbalanceMetrics()

9.3.3 Method summary

getAvailableMetrics() Get the names of the available imbalance metrics

9.3.4 Constructors

- **ImbalanceMetrics**

```
1 public ImbalanceMetrics()
```

9.3.5 Methods

- **getAvailableMetrics**

```
1 public static java.lang.String[] getAvailableMetrics()
```

  - **Description**
    Get the names of the available imbalance metrics
  - **Returns** – An array with the names

9.4 Class LabelsDistributionMetrics

Class storing the labels distribution metrics names

9.4.1 Declaration

```
public class LabelsDistributionMetrics
 extends java.lang.Object
```

9.4.2 Constructor summary

LabelsDistributionMetrics()

9.4.3 Method summary

getAvailableMetrics() Get the names of the available labels distribution metrics

9.4.4 Constructors

- **LabelsDistributionMetrics**

```
public LabelsDistributionMetrics()
```

9.4.5 Methods

- **getAvailableMetrics**

```
public static java.lang.String[] getAvailableMetrics()
```

  - **Description**
    Get the names of the available labels distribution metrics
  - **Returns** – An array with the names

9.5 Class LabelsRelationMetrics

Class storing the labels relation metrics names

9.5.1 Declaration

```
public class LabelsRelationMetrics
 extends java.lang.Object
```

9.5.2 Constructor summary

LabelsRelationMetrics()

9.5.3 Method summary

getAvailableMetrics() Get the names of the available labels relation metrics

9.5.4 Constructors

- **LabelsRelationMetrics**

```
1 public LabelsRelationMetrics()
```

9.5.5 Methods

- **getAvailableMetrics**

```
1 public static java.lang.String[] getAvailableMetrics()
```

  - **Description**
    Get the names of the available labels relation metrics
  - **Returns** – An array with the names

Chapter 10

Package mldc.util

Package Contents *Page*

Classes

10.1 Class ImbalancedFeature

Class for imbalanced data, storing characteristics of an imbalanced attribute

10.1.1 Declaration

```
public class ImbalancedFeature
 extends java.lang.Object
```

10.1.2 Constructor summary

ImbalancedFeature(String) Constructor
ImbalancedFeature(String, double, double) Constructor
ImbalancedFeature(String, int) Constructor
ImbalancedFeature(String, int, double) Constructor
ImbalancedFeature(String, int, double, double, double) Constructor

10.1.3 Method summary

getAppearances() Get number of appearances
getIRInterClass() Get IR Inter-class
getIRIntraClass() Get IR Intra-class
getName() Get metric name
getVariance() Get variance

10.1.4 Constructors

- **ImbalancedFeature**

```
1 public ImbalancedFeature(java.lang.String name)
```

  - **Description**
    Constructor
  - **Parameters**
    * `name` – Name of the metric

- **ImbalancedFeature**

```
1 public ImbalancedFeature(java.lang.String name,double IRIntraClass,double variance)
```

  - **Description**
    Constructor
  - **Parameters**
    * `name` – Name of the metric
    * `IRIntraClass` – IR Intra-class value of the feature
    * `variance` – Variance

- **ImbalancedFeature**

```
1 public ImbalancedFeature(java.lang.String name,int appearances)
```

  - **Description**
    Constructor
  - **Parameters**
    * `name` – Name of the metric
    * `appearances` – Number of appearances of the feature in the dataset

- **ImbalancedFeature**

```
1 public ImbalancedFeature(java.lang.String name,int appearances,double IRIntraClass)
```

  - **Description**
    Constructor

- **Parameters**
  - `name` – Name of the metric
  - `appearances` – Number of appearances of the feature in the dataset
  - `IRIntraClass` – IR Intra-class value

- **ImbalancedFeature**

```
public ImbalancedFeature(java.lang.String name,int appearances,double IRInterClass,
    double IRIntraClass,double variance)
```

  - **Description**
    Constructor
  - **Parameters**
    - `name` – Name of the metric
    - `appearances` – Number of appearances of the feature in the dataset
    - `IRInterClass` – IR Inter-class value of the feature
    - `IRIntraClass` – IR Intra-class value of the feature
    - `variance` – Variance

10.1.5 Methods

- **getAppearances**

```
public int getAppearances()
```

  - **Description**
    Get number of appearances
  - **Returns** – Number of appearances in the dataset

- **getIRInterClass**

```
public double getIRInterClass()
```

  - **Description**
    Get IR Inter-class
  - **Returns** – IR Inter-class

- **getIRIntraClass**

```
1 public double getIRIntraClass()
```

- **Description**
  Get IR Intra-class
- **Returns** – IR Intra-class

- **getName**

```
1 public java.lang.String getName()
```

- **Description**
  Get metric name
- **Returns** – Name of the metric

- **getVariance**

```
1 public double getVariance()
```

- **Description**
  Get variance
- **Returns** – Variance

10.2 Class Utils

Class implementing different utils for metrics calculation

10.2.1 Declaration

```
1 public class Utils
2  extends java.lang.Object
```

10.2.2 Constructor summary

Utils()

10.2.3 Method summary

entropy(int[]) Entropy of array values
getAppearancesPerLabel(MultiLabelInstances) Get array of ImbalancedFeature with labels frequency
getImbalancedWithIR(MultiLabelInstances, ImbalancedFeature[]) Calculate IRs of the ImbalancedFeatures
getLabelByName(String, ImbalancedFeature[]) Get an ImbalancedFeature with the label given by name
getMaxAppearance(ArrayList) Get the max appearance in the list
getSortedByFrequency(ImbalancedFeature[]) Get array of ImbalancedFeature in desdendent order of frequency
labelsForInstance(MultiLabelInstances) Get number of labels associated with each instance

10.2.4 Constructors

- **Utils**

```
1 public Utils()
```

10.2.5 Methods

- **entropy**

```
1 public static double entropy(int[] array)
```

  - **Description**
    Entropy of array values
  - **Parameters**
    * `array` – Array with values to calculate entropy
  - **Returns** – Entropy value

- **getAppearancesPerLabel**

```
1 public static ImbalancedFeature[] getAppearancesPerLabel(MultiLabelInstances
    dataset)
```

  - **Description**
    Get array of ImbalancedFeature with labels frequency
  - **Parameters**

* `dataset` – Multi-label dataset

– **Returns** – Array of ImbalancedFeature with the labels frequency

- **getImbalancedWithIR**

```
public static ImbalancedFeature[] getImbalancedWithIR(MultiLabelInstances dataset,
    ImbalancedFeature[] labels)
```

– **Description**

Calculate IRs of the ImbalancedFeatures

– **Parameters**

* `dataset` – Multi-label dataset
* `labels` – Labels of the dataset as ImbalancedFeature objects

– **Returns** – Array of ImbalancedFeature objects with calculated IR

- **getLabelByName**

```
public static ImbalancedFeature getLabelByName(java.lang.String labelname,
    ImbalancedFeature[] list)
```

– **Description**

Get an ImbalancedFeature with the label given by name

– **Parameters**

* `labelname` – Name of the label
* `list` – Array of ImbalancedFeature

– **Returns** – ImbalancedFeature according to the label name given

- **getMaxAppearance**

```
public static ImbalancedFeature getMaxAppearance(java.util.ArrayList list)
```

– **Description**

Get the max appearance in the list

– **Parameters**

* `list` – List of ImbalancedFeature

– **Returns** – Max value of appearance in the list

- **getSortedByFrequency**

```
1 public static ImbalancedFeature[] getSortedByFrequency(ImbalancedFeature[] labels)
```

- **Description**
  Get array of ImbalancedFeature in desdendent order of frequency
- **Parameters**
  - `labels` – Labels of the dataset as ImbalancedFeature objects
- **Returns** – Array of ImbalancedFeature in desdendent order of frequency

- **labelsForInstance**

```
1 public static int[] labelsForInstance(MultiLabelInstances mlData)
```

- **Description**
  Get number of labels associated with each instance
- **Parameters**
  - `mlData` – Multi-label dataset
- **Returns** – Array with the number of labels associated with each instance