

## Contents

<b>1 Executive summary</b>	<b>4</b>
<b>2 Use Case - Data Bases (DB)</b>	<b>5</b>
2.1 Attributes . . . . .	6
2.2 Data File Reader . . . . .	7
2.3 Data Instance . . . . .	8
2.4 Scalable DataInstance management . . . . .	9
2.5 Time Tables . . . . .	10
<b>3 Use Case - Basic Data Structures (BS)</b>	<b>12</b>
3.1 Static Variables . . . . .	13
3.2 Dynamic Variables . . . . .	14
3.3 Directed Acyclic Graph . . . . .	15
3.4 Distributions . . . . .	16
3.5 Bayesian Network . . . . .	17
3.6 2T-DBN . . . . .	18
3.7 Time Tables . . . . .	19
<b>4 Use Case - Hugin Link (HL)</b>	<b>21</b>
<b>5 Use Case - Importance Sampling (IS)</b>	<b>22</b>
<b>6 Use Case - Maximum Likelihood (ML)</b>	<b>23</b>
<b>7 Use Case - Variational Message Passing (VMP)</b>	<b>24</b>
<b>8 Use Case - Expectation Propagation (EP)</b>	<b>25</b>
<b>9 Use Case - MAP with Deterministic Approximations (DMAP)</b>	<b>26</b>
<b>10 Use Case - Variational MAP Inference (VMAP)</b>	<b>27</b>
<b>11 Use Case - TAN Classifier (TAN)</b>	<b>28</b>

<b>12 Use Case - Parallel PC (PPC)</b>	<b>29</b>
<b>13 Use Case - Dynamic Classifiers (DC)</b>	<b>30</b>
<b>14 Use Case - Feature Selection (FS)</b>	<b>31</b>
<b>15 Class diagrams</b>	<b>32</b>
15.1 Package core . . . . .	32
15.2 Package core.database . . . . .	33
15.3 Package core.database.dynamics . . . . .	34
15.4 Package core.database.readers . . . . .	34
15.5 Package core.database.filereaders . . . . .	35
15.6 Package core.database.arffFileReader . . . . .	36
15.7 Package core.database.arffWekaReader . . . . .	36
15.8 Package core.distribution . . . . .	37
15.9 Package core.exponentialfamily . . . . .	38
15.10 Package core.exponentialfamily . . . . .	39
15.11 Package core.modelstructure . . . . .	40
15.12 Package core.potential . . . . .	41
15.13 Package core.utils . . . . .	42
15.14 Package core.variables . . . . .	43
<b>A Code Description (Doxygen Document)</b>	<b>45</b>

## Document history

Version	Date	Author (Unit)	Description
v0.3			First draft finished

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## 1 Executive summary

The aim of this document is to track the development of the coding of the AMIDST toolbox. The document is structured by the different use cases of the toolbox. For each use case (included in independent sections), we include a description of the purpose of the use case as well as a categorized list of the associated requirements. We then associate to each use case a list of so-called *functionalities* (included in independent subsections) that are coded in the toolbox to cover the specific use case and their associated requirements. A *functionality*, or also called a *feature*, is a set of java classes which allow to perform a specific task or which define a coherent concept within the toolbox. For example, the creation and managing of random variables, reading a data set from a file, building and handling dynamic Bayesian networks, the maximum likelihood estimation etc. The set of *functionalities* identify those key parts of the toolbox that any developer or toolbox user need to understand in order to make a proper use of the software tool.

Another important part of this document is to detail the time line of the toolbox development. Each of the use cases contain a subsection titled *Time Tables* which contain details about the development phase of each one of the *functionalities* associated to this use case. Six main phases are identified: design, prototype, code-review, testing, documentation and (first) release. Looking at this section we can easily track the evolution of the use case.

In the last section we detail the class diagram of each code package of the toolbox. The document is concluded with an appendix which contains a pdf document generated by the toolbox Doxygen and which contain all the java docs of all the coded java classes.

We highlight that the contents detailed here can be later transformed or reorganized to create the different deliverables and the final user-manual of this toolbox.

## 2 Use Case - Data Bases (DB)

**Priority:** Must

**Deadline:** M15

**Responsible:** Sigve

### Description of the Use Case

This use case will cover the managing of the data bases that will be used by the models and learning algorithms implemented in the toolbox.

### Must-Requirements List of the Use Case

1. Data on memory
2. Data on disk

### Should-Requirements List of the Use Case

1. Data on stream

### Could-Requirements List of the Use Case

1. Short Description

## 2.1 Attributes

**Deadline:** M12

**Responsible:** Sigve

**Code-Package:** core.databases

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

### Detailed functionality

- Short Description

### Code Example

## 2.2 Data File Reader

**Deadline:** M12

**Responsible:** Sigve

**Code-Package:** core.database.filereaders

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

1. DataRow.
2. Weka wrapper reader.
3. AMIDST arff reader.

### Detailed functionality

- Short Description

### Code Example

## 2.3 Data Instance

**Deadline:** M12

**Responsible:** Sigve

**Code-Package:** core.database

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

- StaticDataInstance.
- DynamicDataInstance: TimeID, SequenceID.

### Detailed functionality

- Short Description

### Code Example

## 2.4 Scalable DataInstance management

**Deadline:** M12

**Responsible:** Sigve

**Code-Package:** core.database

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

- Static:
  - Data on memory
  - Data on disk
  - Data on stream.
- Dynamic:
  - Data on memory
  - Data on disk
  - Data on stream.

### Detailed functionality

- Short Description

### Code Example

---

## 2.5 Time Tables

### Attributes

Version	Phase	Author(s)	Deadline	Start Date	End Date
0.1	Design	Sigve	M15	M10	M10
0.2	Prototype	Sigve,Ana	M15	M10	M10
0.3	Code Review	Ana	M15	M11	M10
0.4	Testing	Ana	M15	M11	M11
0.5	Java-Doc	Sigve	M15		
0.6	First Release	Post-docs	M15		

### Data File Reader

Version	Phase	Author(s)	Deadline	Start Date	End Date
0.1	Design	Andres,Ana	M15	M10	M11
0.2	1st Prototype (AMIDSTarffParser)	Sigve	M15	M10	Unfinished
0.2	Prototype (WekaArffParser)	Ana	M15	M11	M11
0.2	Testing (WekaArffParser)	Ana	M15	M11	M11
0.3	Code Review	Post-docs	M15		
0.4	Testing	Sigve	M15		
0.5	Java-Doc	Sigve	M15		
0.6	First Release	Post-docs	M15		

### DataInstance

Version	Phase	Author(s)	Deadline	Start Date	End Date
0.1	Design	Andres, Ana	M15	M11	M11
0.2	Prototype	Ana	M15	M11	M11
0.2	Prototype testing	Ana	M15	M11	M11
0.3	Code Review	Sigve	M15		
0.4	Testing	Sigve	M15		
0.5	Java-Doc	Sigve	M15		
0.6	First Release	Post-docs	M15		

## Scalable DataInstance Management

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Andres,Ana	M15	M11	M11
0.2	Prototype	Ana	M15	M11	M11
0.2	Prototye Testing	Ana	M15	M11	M11
0.3	Code Review	Sigve	M15		
0.4	Testing	Sigve	M15		
0.5	Java-Doc	Sigve	M15		
0.6	First Release	Post-docs	M15		

### 3 Use Case - Basic Data Structures (BS)

**Priority:** Must

**Deadline:** M15

**Responsible:** Hanen

#### Description of the Use Case

This use case will cover the basic data structures to handle the probabilistic graphical models belonging to the AMIDST model class.

#### Must-Requirements List of the Use Case

1. Static Bayesian networks
2. 2T - Dynamic Bayesian networks
3. Bounded Dynamic Bayesian neworks

#### Should-Requirements List of the Use Case

1. Short Description

#### Could-Requirements List of the Use Case

1. Factor Graphs

### 3.1 Static Variables

**Deadline:** M12

**Responsible:**

**Code-Package:** core.variables

#### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

#### Detailed functionality

- Short Description

#### Code Example

## 3.2 Dynamic Variables

**Deadline:** M12

**Responsible:**

**Code-Package:** core.variables

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

### Detailed functionality

- Short Description

### Code Example

### 3.3 Directed Acyclic Graph

**Deadline:** M12

**Responsible:**

**Code-Package:** core.modelstructure

#### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

#### Detailed functionality

- Short Description

#### Code Example

### 3.4 Distributions

**Deadline:** M15

**Responsible:** Antonio Fernández

**Code-Package:** eu.amidst.core.distributions

#### Description

This functionality addresses the set of conditional probability distributions considered to be included in the toolbox. Variables with Gaussian and multinomial distributions are modeled. The variables arrangement in the model structure gives rise to the different types of probability distributions, one for each variable in the network.

This functionality is tightly connected to functionality `Variable` (REF) and `DAG`, `StaticModelHeader` REF to know both the nature of the variables and also the set of parents involved.

#### Detailed functionality

The type of each variable and its parents determine the different probability distributions detailed next:

- Multinomial variable with no parents
- Multinomial variable with multinomial parents.
- Gaussian variable with no parents.
- Gaussian variable with multinomial parents.
- Gaussian variable with Gaussian parents.
- Gaussian variable with a mixture of multinomial and Gaussian parents.

Note that a multinomial variable is not allowed to have Gaussian parents and therefore it has not been included in the list above. Multinomial parents are only used for indexing the set of possible distributions of the variable, so the functionality when no multinomial parents reduces to the general case.

---

### 3.5 Bayesian Network

**Deadline:** M12

**Responsible:**

**Code-Package:** core.modelstructure

#### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

#### Description

Enter a textual description of the functionality. Link to other functionalities if needed.

#### Detailed functionality

- Short Description

#### Code Example

### 3.6 2T-DBN

**Deadline:** M12

**Responsible:**

**Code-Package:** core.modelstructure

#### Description

Similarly to 3.5 but for dynamic Bayesian networks, this functionality aims to serve as the representation of a 2-time dynamic BN. It handles the structure (Dynamic DAG) and the distributions of a 2TDNB at Time 0 and Time T.

#### Detailed functionality

- This functionality is presumably going to need a DynamicDAG.

#### Code Example

#### Detailed functionality

### 3.7 Time Tables

#### Static Variables

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Post-docs	00/00/00	00/00/00	00/00/00
0.2	Prototype	Post-docs	00/00/00	00/00/00	00/00/00
0.3	Code Review	Post-docs	00/00/00	00/00/00	00/00/00
0.4	Testing	Post-docs	00/00/00	00/00/00	00/00/00
0.5	Java-Doc	Post-docs	00/00/00	00/00/00	00/00/00
0.6	First Release	Post-docs	00/00/00	00/00/00	00/00/00

#### Dynamic Variables

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Post-docs	00/00/00	00/00/00	00/00/00
0.2	Prototype	Post-docs	00/00/00	00/00/00	00/00/00
0.3	Code Review	Post-docs	00/00/00	00/00/00	00/00/00
0.4	Testing	Post-docs	00/00/00	00/00/00	00/00/00
0.5	Java-Doc	Post-docs	00/00/00	00/00/00	00/00/00
0.6	First Release	Post-docs	00/00/00	00/00/00	00/00/00

#### Directed Acyclic Graph

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Post-docs	00/00/00	00/00/00	00/00/00
0.2	Prototype	Post-docs	00/00/00	00/00/00	00/00/00
0.3	Code Review	Post-docs	00/00/00	00/00/00	00/00/00
0.4	Testing	Post-docs	00/00/00	00/00/00	00/00/00
0.5	Java-Doc	Post-docs	00/00/00	00/00/00	00/00/00
0.6	First Release	Post-docs	00/00/00	00/00/00	00/00/00

## Distributions

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	A. Fernández	03/09/14	15/09/14	03/11/14
0.2	Prototype	A. Fernández	15/11/14	04/11/14	15/11/14
0.3	Code Review	A. Fernández	10/11/14	03/11/14	07/11/14
0.4	Testing	A. Fernández	30/11/14	7/11/14	00/00/00
0.5	Java-Doc	A. Fernández	00/00/00	00/00/00	00/00/00
0.6	First Release	A. Fernández	00/00/00	00/00/00	00/00/00

## Bayesian Network

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Post-docs	00/00/00	00/00/00	00/00/00
0.2	Prototype	Post-docs	00/00/00	00/00/00	00/00/00
0.3	Code Review	Post-docs	00/00/00	00/00/00	00/00/00
0.4	Testing	Post-docs	00/00/00	00/00/00	00/00/00
0.5	Java-Doc	Post-docs	00/00/00	00/00/00	00/00/00
0.6	First Release	Post-docs	00/00/00	00/00/00	00/00/00

## 2T-DBN

<b>Version</b>	<b>Phase</b>	<b>Author(s)</b>	<b>Deadline</b>	<b>Start Date</b>	<b>End Date</b>
0.1	Design	Post-docs	00/00/00	00/00/00	00/00/00
0.2	Prototype	Post-docs	00/00/00	00/00/00	00/00/00
0.3	Code Review	Post-docs	00/00/00	00/00/00	00/00/00
0.4	Testing	Post-docs	00/00/00	00/00/00	00/00/00
0.5	Java-Doc	Post-docs	00/00/00	00/00/00	00/00/00
0.6	First Release	Post-docs	00/00/00	00/00/00	00/00/00

## 4 Use Case - Hugin Link (HL)

**Priority:** Must

**Deadline:** M15

**Responsible:** A. Fernández

### Description of the Use Case

This use case contains all the functionality needed to link the AMIDST toolbox with the HUGIN software. This linkage is addressed by converting Hugin models into AMIDST models, and vice versa. This feature is extremely useful as it allows expanding the testing possibilities of the AMIDST models within a well-established platform as Hugin. Also, the link to Hugin can be used for providing some extra functionality to AMIDST that will not be implemented. Finally, the linkage is useful for comparison purposes, i.e., a new inference algorithm implemented in AMIDST could be compared with some state-of-the-art algorithm included in Hugin.

### Must-Requirements List of the Use Case

1. Bayesian network converter from AMIDST to Hugin format.
2. Bayesian network converter from Hugin to AMIDST format.
3. Possibility of saving the converted Hugin network in a .net file.

### Should-Requirements List of the Use Case

- 1.

### Could-Requirements List of the Use Case

1. Converter from AMIDST to HUGIN and vice versa of some functionality that is not relevant for model representation.
-

## 5 Use Case - Importance Sampling (IS)

**Priority:** Must

**Deadline:** M16

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 6 Use Case - Maximum Likelihood (ML)

**Priority:** Must

**Deadline:** M12

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 7 Use Case - Variational Message Passing (VMP)

**Priority:** Must

**Deadline:** M15

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 8 Use Case - Expectation Propagation (EP)

**Priority:** Must

**Deadline:** M18

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 9 Use Case - MAP with Deterministic Approximations (DMAP)

**Priority:** Must

**Deadline:** M17

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 10 Use Case - Variational MAP Inference (VMAP)

**Priority:** Should

**Deadline:** M28

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 11 Use Case - TAN Classifier (TAN)

**Priority:** Must

**Deadline:** M18

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 12 Use Case - Parallel PC (PPC)

**Priority:** Must

**Deadline:** M17

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 13 Use Case - Dynamic Classifiers (DC)

**Priority:** Could

**Deadline:** M29

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

1. Short Description

### Could-Requirements List of the Use Case

1. Short Description

## 14 Use Case - Feature Selection (FS)

**Priority:** Must

**Deadline:** M20

**Responsible:**

### Description of the Use Case

Enter a textual description of the use case. Link to other use cases or functionalities if needed.

### Must-Requirements List of the Use Case

1. Short Description

### Should-Requirements List of the Use Case

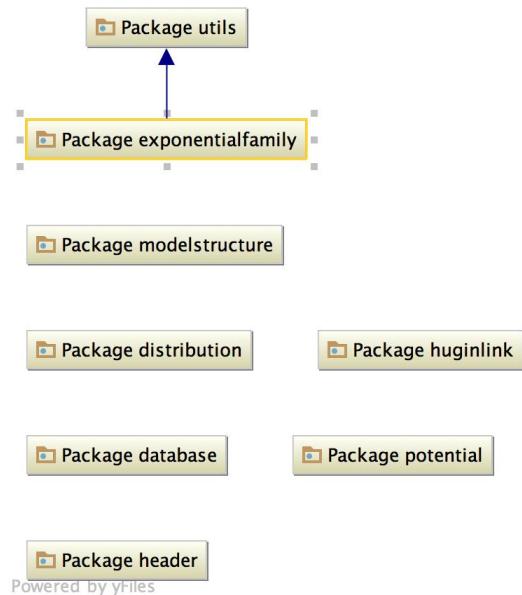
1. Short Description

### Could-Requirements List of the Use Case

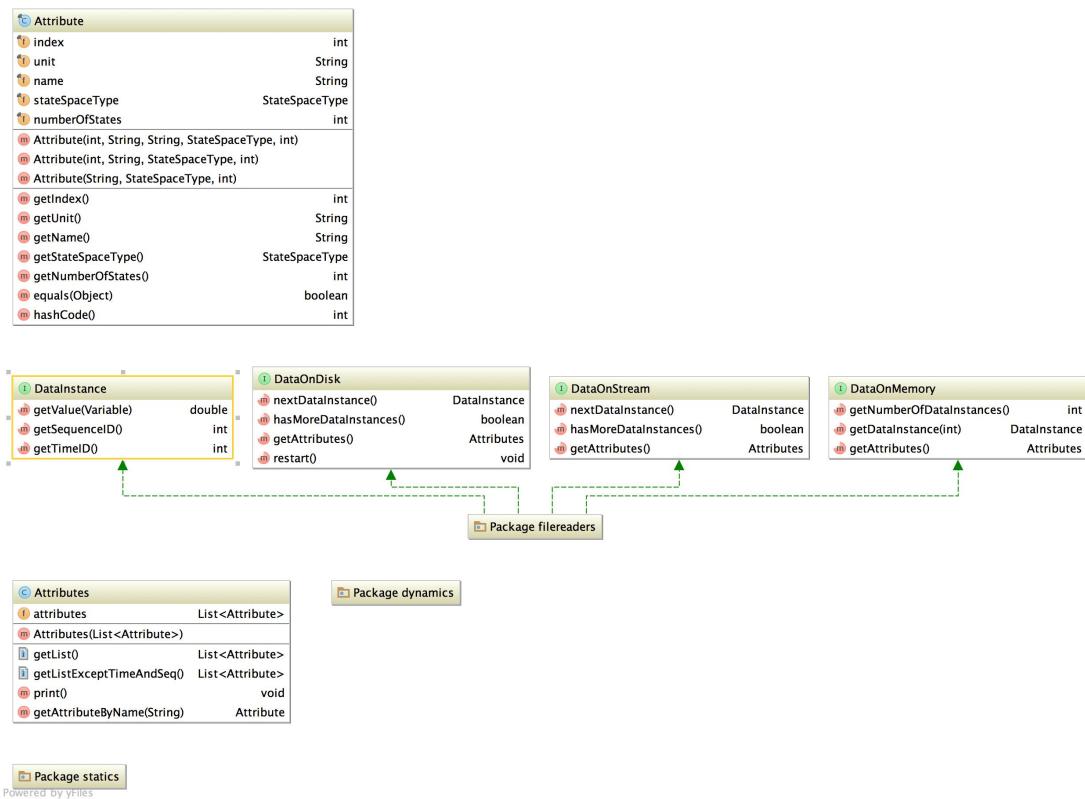
1. Short Description

## 15 Class diagrams

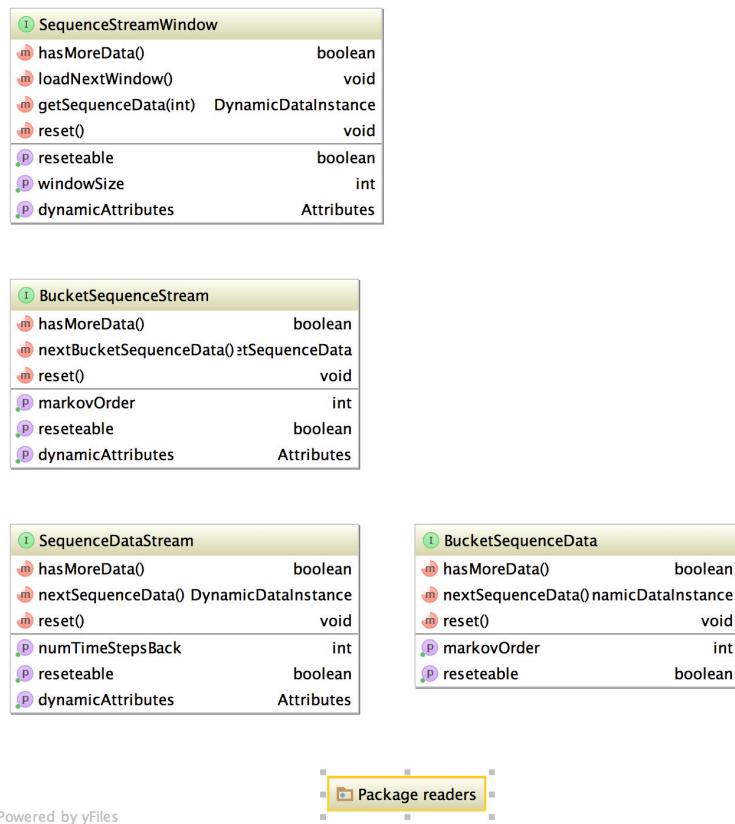
### 15.1 Package core



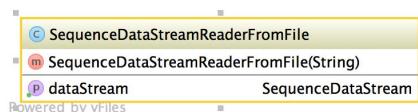
## 15.2 Package core.database



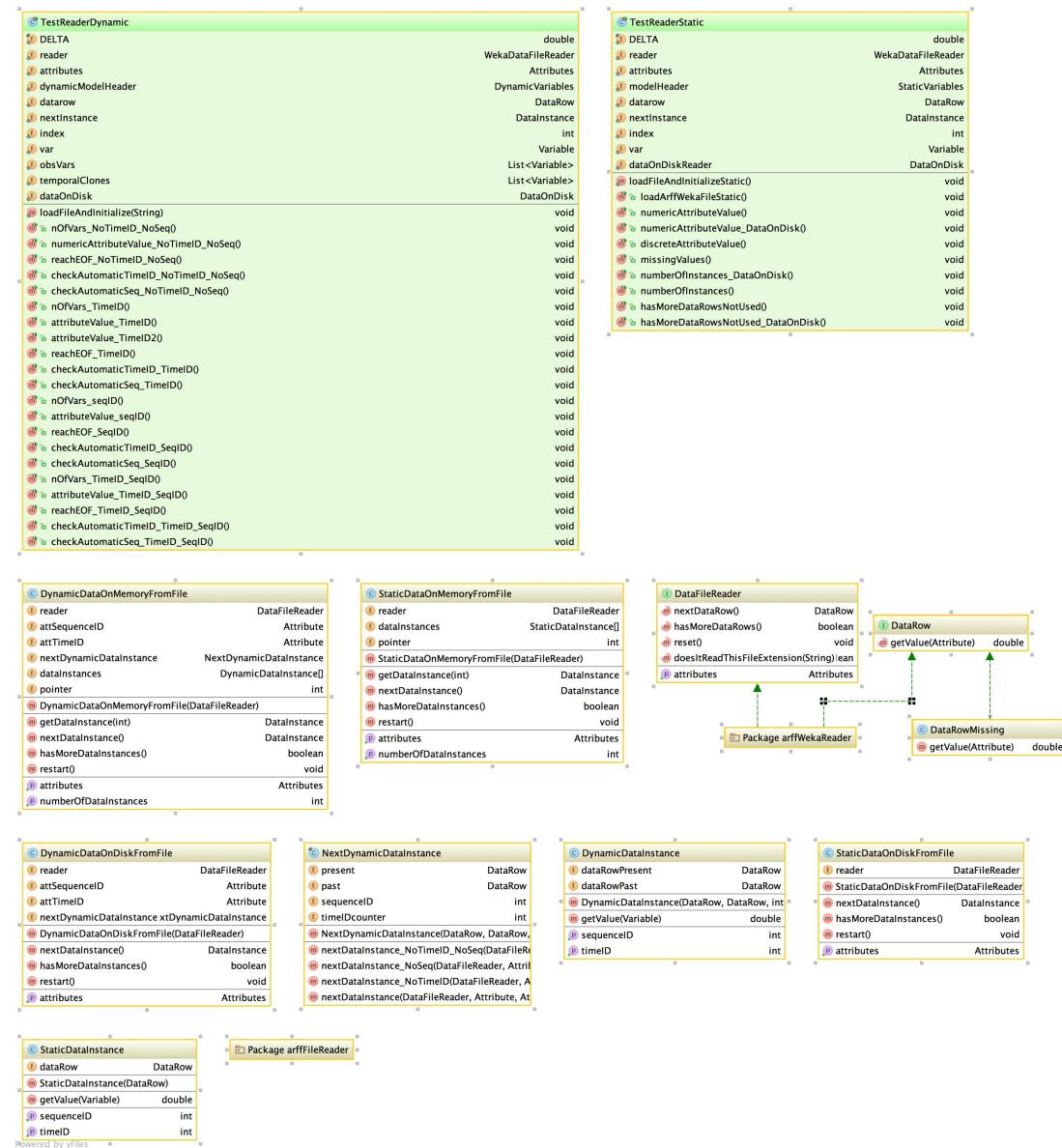
### 15.3 Package core.database.dynamics



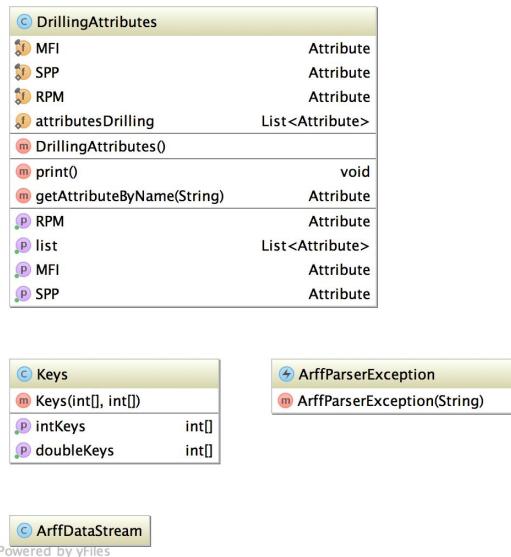
### 15.4 Package core.database.readers



## 15.5 Package core.database.filereaders



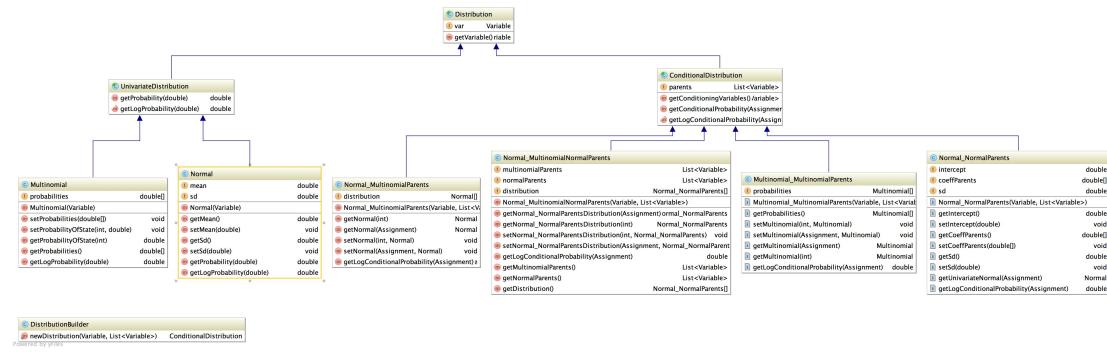
## 15.6 Package core.database.arffFileReader



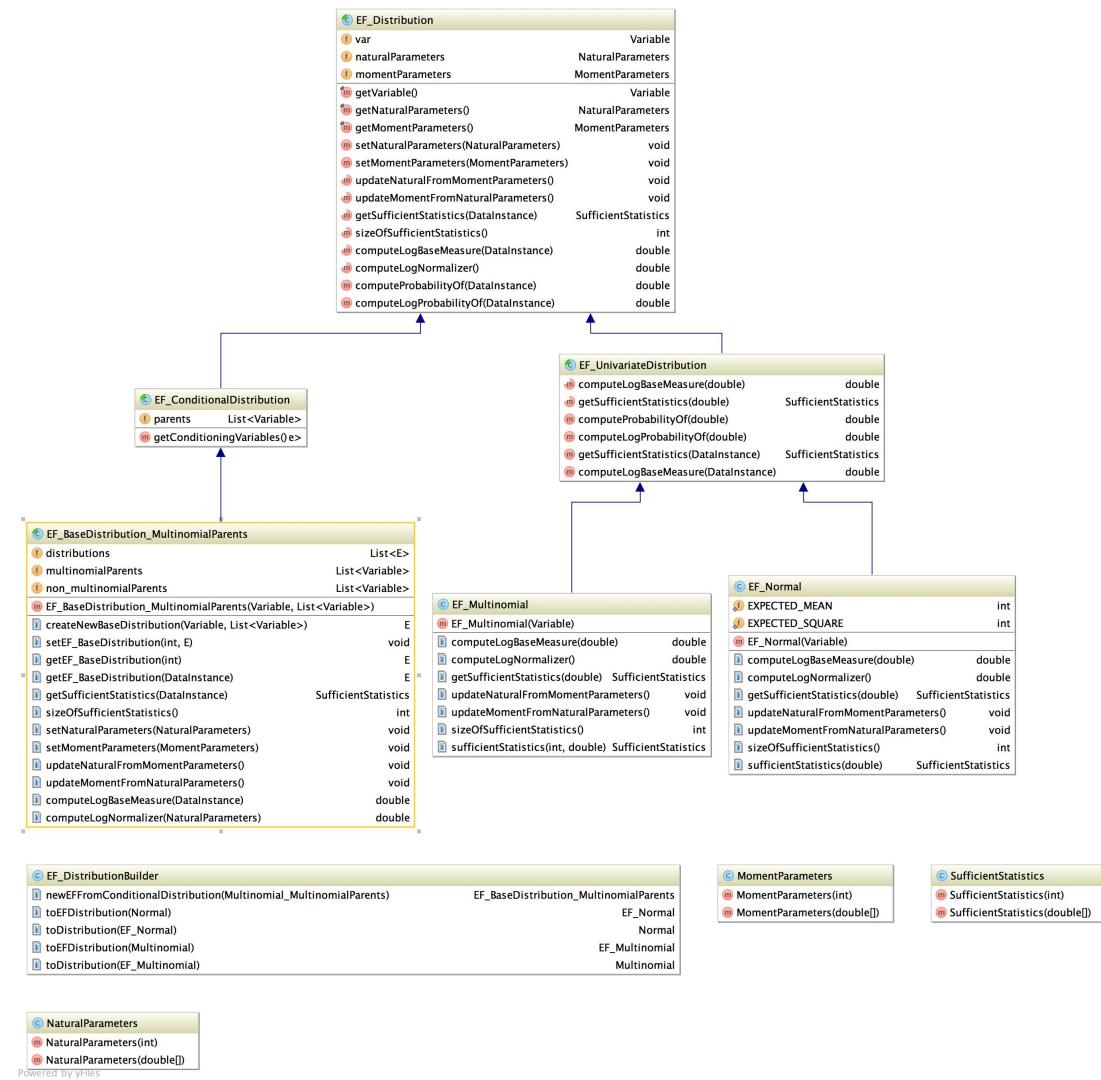
## 15.7 Package core.database.arffWekaReader



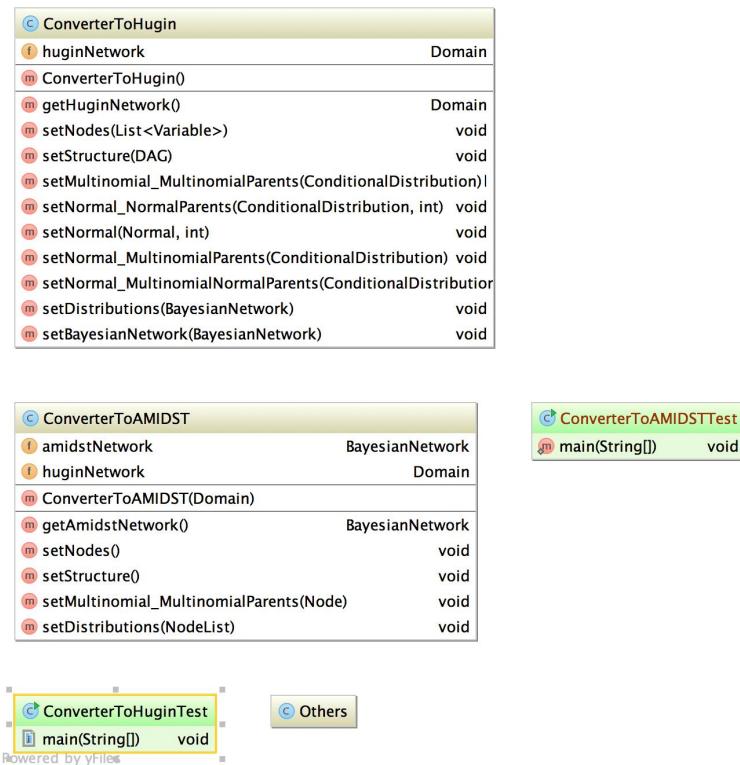
## 15.8 Package core.distribution



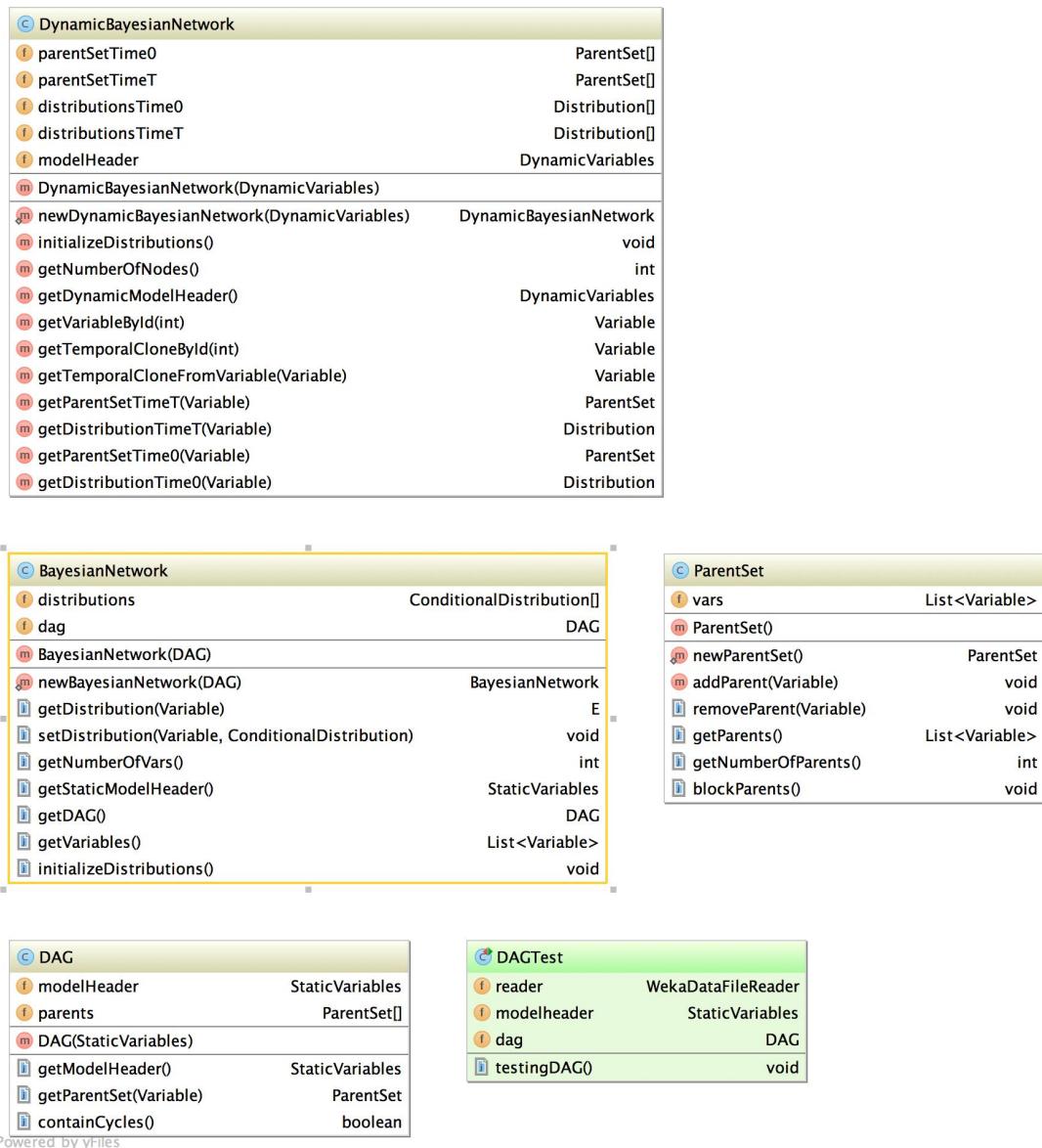
## 15.9 Package core.exponentialfamily



## 15.10 Package core.exponentialfamily

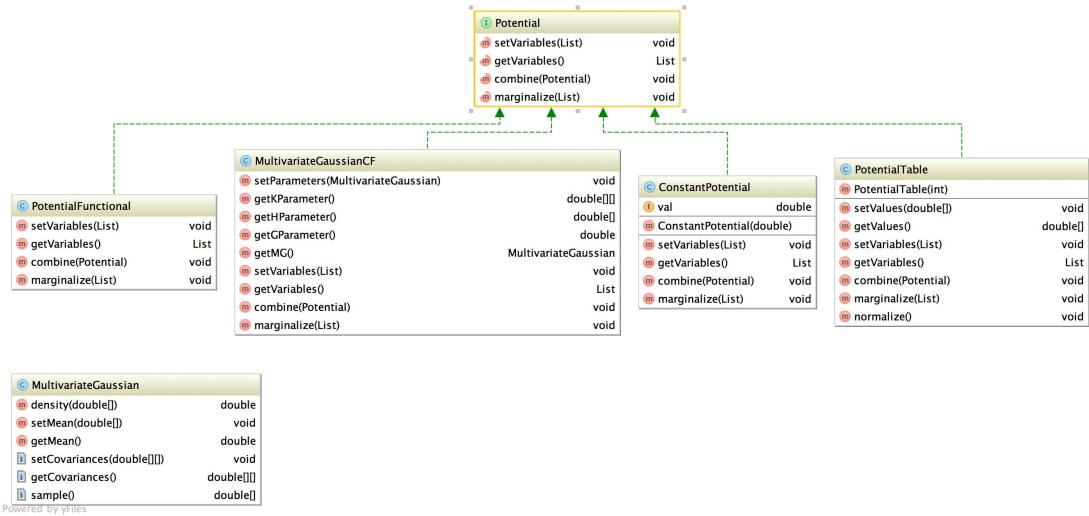


## 15.11 Package core.modelstructure

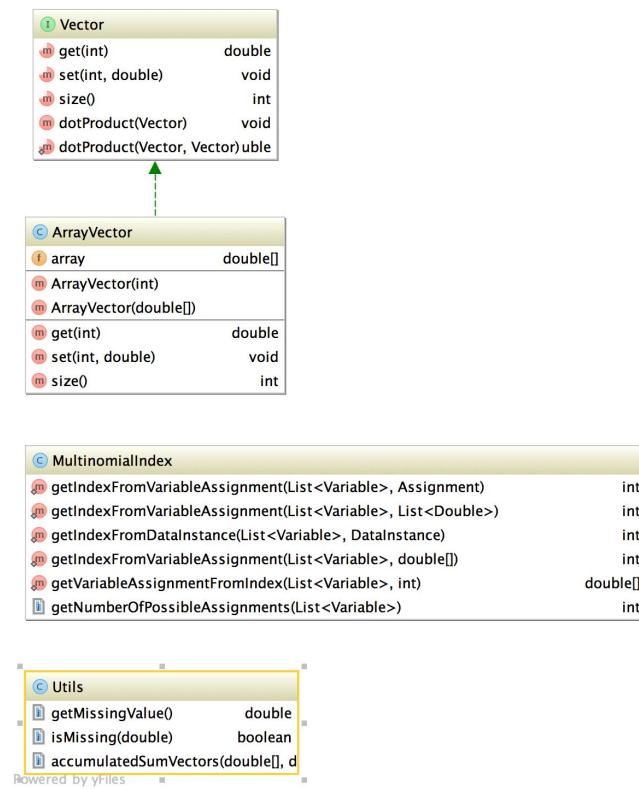


## 15.12 Package core.potential

Figure 1: Class diagram of the package: core.potential

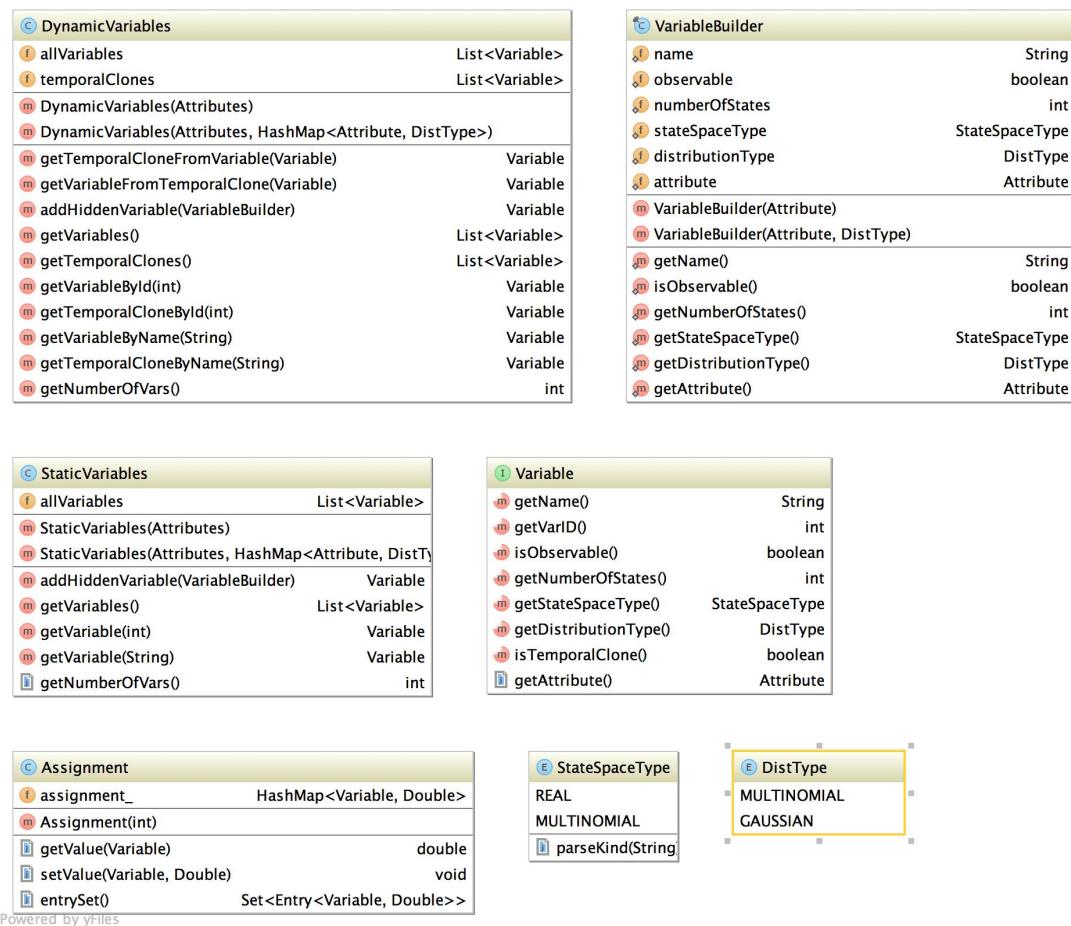


## 15.13 Package core.utils



## 15.14 Package core.variables

Figure 2: Class diagram of the package: `core.variables`



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# AMIDSTtoolbox

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Thu Nov 20 2014 15:24:30

## A Code Description (Doxygen Document)

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## AMIDSTtoolbox

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Thu Nov 20 2014 15:24:30

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# Contents

<b>1 Namespace Index</b>	<b>1</b>
1.1 Packages . . . . .	1
<b>2 Hierarchical Index</b>	<b>3</b>
2.1 Class Hierarchy . . . . .	3
<b>3 Class Index</b>	<b>5</b>
3.1 Class List . . . . .	5
<b>4 Namespace Documentation</b>	<b>7</b>
4.1 Package eu.amidst.core.database . . . . .	7
4.1.1 Detailed Description . . . . .	7
4.2 Package eu.amidst.core.database.filereaders . . . . .	7
4.2.1 Detailed Description . . . . .	8
4.3 Package eu.amidst.core.distribution . . . . .	8
4.3.1 Detailed Description . . . . .	8
4.4 Package eu.amidst.core.exponentialfamily . . . . .	9
4.4.1 Detailed Description . . . . .	9
4.5 Package eu.amidst.core.variables . . . . .	9
4.5.1 Detailed Description . . . . .	10
<b>5 Class Documentation</b>	<b>11</b>
5.1 eu.amidst.core.database.filereaders.arffFileReader.ArffDataStream Class Reference . . . . .	11
5.1.1 Detailed Description . . . . .	11
5.2 eu.amidst.core.database.filereaders.arffFileReader.ArffParserException Class Reference . . . . .	11
5.2.1 Detailed Description . . . . .	11
5.3 eu.amidst.core.utils.ArrayVector Class Reference . . . . .	12
5.3.1 Detailed Description . . . . .	12
5.4 eu.amidst.core.variables.Assignment Class Reference . . . . .	12
5.4.1 Detailed Description . . . . .	12
5.5 eu.amidst.core.database.Attribute Class Reference . . . . .	12
5.5.1 Detailed Description . . . . .	13
5.6 eu.amidst.core.database.Attributes Class Reference . . . . .	13

---

5.6.1	Detailed Description	13
5.7	eu.amidst.core.modelstructure.BayesianNetwork Class Reference	13
5.7.1	Detailed Description	14
5.8	eu.amidst.core.database.dynamics.BucketSequenceData Interface Reference	14
5.8.1	Detailed Description	14
5.9	eu.amidst.core.database.dynamics.BucketSequenceStream Interface Reference	14
5.9.1	Detailed Description	14
5.10	eu.amidst.staticmodelling.models.Classifier Interface Reference	15
5.10.1	Detailed Description	15
5.11	eu.amidst.core.distribution.ConditionalDistribution Class Reference	15
5.11.1	Detailed Description	15
5.11.2	Member Function Documentation	16
5.11.2.1	getConditionalProbability	16
5.11.2.2	getConditioningVariables	17
5.11.2.3	getLogConditionalProbability	17
5.11.3	Member Data Documentation	17
5.11.3.1	parents	17
5.12	eu.amidst.core.potential.ConstantPotential Class Reference	17
5.12.1	Detailed Description	18
5.13	eu.amidst.core.huginlink.ConverterToAMIDST Class Reference	18
5.13.1	Detailed Description	18
5.14	eu.amidst.core.huginlink.ConverterToHugin Class Reference	18
5.15	eu.amidst.core.modelstructure.DAG Class Reference	18
5.15.1	Detailed Description	19
5.16	eu.amidst.core.database.filereaders.DataFileReader Interface Reference	19
5.16.1	Detailed Description	19
5.17	eu.amidst.core.database.DataInstance Interface Reference	19
5.17.1	Detailed Description	20
5.18	eu.amidst.core.database.DataOnDisk Interface Reference	20
5.18.1	Detailed Description	20
5.19	eu.amidst.core.database.DataOnMemory Interface Reference	20
5.19.1	Detailed Description	20
5.20	eu.amidst.core.database.DataOnStream Interface Reference	21
5.20.1	Detailed Description	21
5.21	eu.amidst.core.database.filereaders.DataRow Interface Reference	21
5.21.1	Detailed Description	21
5.22	eu.amidst.core.database.filereaders.DataRowMissing Class Reference	21
5.22.1	Detailed Description	22
5.23	eu.amidst.core.database.filereaders.arffWekaReader.DataRowWeka Class Reference	22
5.23.1	Detailed Description	22

5.24 eu.amidst.core.distribution.Distribution Class Reference . . . . .	22
5.24.1 Detailed Description . . . . .	23
5.24.2 Member Function Documentation . . . . .	23
5.24.2.1 getVariable . . . . .	23
5.24.3 Member Data Documentation . . . . .	23
5.24.3.1 var . . . . .	23
5.25 eu.amidst.core.distribution.DistributionBuilder Class Reference . . . . .	23
5.25.1 Detailed Description . . . . .	23
5.26 eu.amidst.core.variables.DistType Enum Reference . . . . .	23
5.26.1 Detailed Description . . . . .	24
5.27 eu.amidst.core.database.filereaders.arffFileReader.DrillingAttributes Class Reference . . . . .	24
5.27.1 Detailed Description . . . . .	24
5.28 eu.amidst.core.modelstructure.DynamicBayesianNetwork Class Reference . . . . .	24
5.28.1 Detailed Description . . . . .	25
5.28.2 Member Function Documentation . . . . .	25
5.28.2.1 initializeDistributions . . . . .	25
5.28.2.2 newDynamicBayesianNetwork . . . . .	25
5.29 eu.amidst.core.database.filereaders.DynamicDataInstance Class Reference . . . . .	25
5.29.1 Detailed Description . . . . .	26
5.30 eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile Class Reference . . . . .	26
5.30.1 Detailed Description . . . . .	26
5.30.2 Constructor & Destructor Documentation . . . . .	26
5.30.2.1 DynamicDataOnDiskFromFile . . . . .	26
5.31 eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile Class Reference . . . . .	27
5.31.1 Detailed Description . . . . .	27
5.32 eu.amidst.core.variables.DynamicVariables Class Reference . . . . .	27
5.32.1 Detailed Description . . . . .	27
5.32.2 Constructor & Destructor Documentation . . . . .	28
5.32.2.1 DynamicVariables . . . . .	28
5.33 eu.amidst.core.exponentialfamily.EF_BaseDistribution_MultinomialParents< E extends EF_<> Distribution > Class Reference . . . . .	28
5.34 eu.amidst.core.exponentialfamily.EF_ConditionalDistribution Class Reference . . . . .	28
5.35 eu.amidst.core.exponentialfamily.EF_Distribution Class Reference . . . . .	29
5.35.1 Detailed Description . . . . .	30
5.35.2 Member Function Documentation . . . . .	30
5.35.2.1 getVariable . . . . .	30
5.35.3 Member Data Documentation . . . . .	30
5.35.3.1 var . . . . .	30
5.36 eu.amidst.core.exponentialfamily.EF_DistributionBuilder Class Reference . . . . .	30
5.36.1 Detailed Description . . . . .	30

5.37 eu.amidst.core.exponentialfamily.EF_Multinomial Class Reference . . . . .	30
5.37.1 Detailed Description . . . . .	31
5.37.2 Constructor & Destructor Documentation . . . . .	31
5.37.2.1 EF_Multinomial . . . . .	31
5.38 eu.amidst.core.exponentialfamily.EF_Normal Class Reference . . . . .	31
5.38.1 Detailed Description . . . . .	32
5.39 eu.amidst.core.exponentialfamily.EF_UnivariateDistribution Class Reference . . . . .	32
5.39.1 Detailed Description . . . . .	33
5.40 eu.amidst.core.database.filereaders.arffFileReader.Keys Class Reference . . . . .	33
5.40.1 Detailed Description . . . . .	33
5.41 eu.amidst.Main Class Reference . . . . .	33
5.42 eu.amidst.core.exponentialfamily.MomentParameters Class Reference . . . . .	33
5.42.1 Detailed Description . . . . .	34
5.43 eu.amidst.core.distribution.Multinomial Class Reference . . . . .	34
5.43.1 Detailed Description . . . . .	34
5.43.2 Constructor & Destructor Documentation . . . . .	34
5.43.2.1 Multinomial . . . . .	34
5.43.3 Member Function Documentation . . . . .	35
5.43.3.1 getLogProbability . . . . .	35
5.43.3.2 getProbabilities . . . . .	35
5.43.3.3 getProbabilityOfState . . . . .	35
5.43.3.4 setProbabilities . . . . .	35
5.43.3.5 setProbabilityOfState . . . . .	35
5.44 eu.amidst.core.distribution.Multinomial_MultinomialParents Class Reference . . . . .	36
5.44.1 Detailed Description . . . . .	36
5.44.2 Constructor & Destructor Documentation . . . . .	36
5.44.2.1 Multinomial_MultinomialParents . . . . .	36
5.44.3 Member Function Documentation . . . . .	37
5.44.3.1 getLogConditionalProbability . . . . .	37
5.44.3.2 getMultinomial . . . . .	37
5.44.3.3 setMultinomial . . . . .	37
5.44.3.4 setMultinomial . . . . .	37
5.45 eu.amidst.core.utils.MultinomialIndex Class Reference . . . . .	38
5.45.1 Detailed Description . . . . .	38
5.45.2 Member Function Documentation . . . . .	38
5.45.2.1 getIndexFromVariableAssignment . . . . .	38
5.45.2.2 getIndexFromVariableAssignment . . . . .	40
5.45.2.3 getIndexFromVariableAssignment . . . . .	40
5.45.2.4 getNumberOfPossibleAssignments . . . . .	40
5.45.2.5 getVariableAssignmentFromIndex . . . . .	40

5.46 eu.amidst.core.potential.MultivariateGaussian Class Reference . . . . .	41
5.46.1 Detailed Description . . . . .	41
5.47 eu.amidst.core.potential.MultivariateGaussianCF Class Reference . . . . .	41
5.47.1 Detailed Description . . . . .	42
5.48 eu.amidst.core.exponentialfamily.NaturalParameters Class Reference . . . . .	42
5.48.1 Detailed Description . . . . .	42
5.49 eu.amidst.core.database.filereaders.NextDynamicDataInstance Class Reference . . . . .	42
5.49.1 Detailed Description . . . . .	42
5.50 eu.amidst.core.distribution.Normal Class Reference . . . . .	43
5.50.1 Detailed Description . . . . .	43
5.50.2 Constructor & Destructor Documentation . . . . .	43
5.50.2.1 Normal . . . . .	43
5.50.3 Member Function Documentation . . . . .	44
5.50.3.1 getLogProbability . . . . .	44
5.50.3.2 getMean . . . . .	44
5.50.3.3 getProbability . . . . .	44
5.50.3.4 getSd . . . . .	44
5.50.3.5 setMean . . . . .	44
5.50.3.6 setSd . . . . .	45
5.51 eu.amidst.core.distribution.Normal_MultinomialNormalParents Class Reference . . . . .	45
5.51.1 Detailed Description . . . . .	45
5.51.2 Constructor & Destructor Documentation . . . . .	46
5.51.2.1 Normal_MultinomialNormalParents . . . . .	46
5.51.3 Member Function Documentation . . . . .	46
5.51.3.1 getLogConditionalProbability . . . . .	46
5.51.3.2 getNormal_NormalParentsDistribution . . . . .	46
5.51.3.3 setNormal_NormalParentsDistribution . . . . .	46
5.51.3.4 setNormal_NormalParentsDistribution . . . . .	47
5.52 eu.amidst.core.distribution.Normal_MultinomialParents Class Reference . . . . .	47
5.52.1 Detailed Description . . . . .	47
5.52.2 Constructor & Destructor Documentation . . . . .	48
5.52.2.1 Normal_MultinomialParents . . . . .	48
5.52.3 Member Function Documentation . . . . .	48
5.52.3.1 getLogConditionalProbability . . . . .	48
5.52.3.2 getNormal . . . . .	48
5.52.3.3 setNormal . . . . .	48
5.52.3.4 setNormal . . . . .	49
5.53 eu.amidst.core.distribution.Normal_NormalParents Class Reference . . . . .	49
5.53.1 Detailed Description . . . . .	49
5.53.2 Constructor & Destructor Documentation . . . . .	50

5.53.2.1	Normal_NormalParents	50
5.53.3	Member Function Documentation	50
5.53.3.1	getCoeffParents	50
5.53.3.2	getIntercept	50
5.53.3.3	getLogConditionalProbability	50
5.53.3.4	getSd	51
5.53.3.5	getUnivariateNormal	51
5.53.3.6	setCoeffParents	51
5.53.3.7	setIntercept	51
5.53.3.8	setSd	51
5.54	eu.amidst.core.huginlink.Others Class Reference	51
5.54.1	Detailed Description	51
5.55	eu.amidst.core.modelstructure.ParentSet Class Reference	52
5.55.1	Detailed Description	52
5.55.2	Member Function Documentation	52
5.55.2.1	blockParents	52
5.56	eu.amidst.core.potential.Potential Interface Reference	52
5.56.1	Detailed Description	52
5.57	eu.amidst.core.potential.PotentialFunctional Class Reference	53
5.57.1	Detailed Description	53
5.58	eu.amidst.core.potential.PotentialTable Class Reference	53
5.58.1	Detailed Description	53
5.59	eu.amidst.core.database.dynamics.SequenceDataStream Interface Reference	54
5.59.1	Detailed Description	54
5.60	eu.amidst.core.database.dynamics.readers.SequenceDataStreamReaderFromFile Class Reference	54
5.60.1	Detailed Description	54
5.61	eu.amidst.core.database.dynamics.SequenceStreamWindow Interface Reference	54
5.61.1	Detailed Description	55
5.62	eu.amidst.core.variables.StateSpaceType Enum Reference	55
5.62.1	Detailed Description	55
5.63	eu.amidst.core.database.filereaders.StaticDataInstance Class Reference	55
5.63.1	Detailed Description	55
5.64	eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile Class Reference	56
5.64.1	Detailed Description	56
5.65	eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile Class Reference	56
5.65.1	Detailed Description	56
5.66	eu.amidst.core.variables.StaticVariables Class Reference	57
5.66.1	Detailed Description	57
5.66.2	Constructor & Destructor Documentation	57
5.66.2.1	StaticVariables	57

5.66.2.2	StaticVariables	57
5.67	eu.amidst.core.exponentialfamily.SufficientStatistics Class Reference	57
5.67.1	Detailed Description	58
5.68	eu.amidst.core.distribution.UnivariateDistribution Class Reference	58
5.68.1	Detailed Description	58
5.68.2	Member Function Documentation	58
5.68.2.1	getLogProbability	58
5.68.2.2	getProbability	59
5.69	eu.amidst.core.utils.Utils Class Reference	59
5.69.1	Detailed Description	59
5.70	eu.amidst.core.variables.Variable Interface Reference	59
5.70.1	Detailed Description	60
5.71	eu.amidst.core.variables.VariableBuilder Class Reference	60
5.71.1	Detailed Description	60
5.72	eu.amidst.core.utils.Vector Interface Reference	60
5.72.1	Detailed Description	61
5.73	eu.amidst.core.database.filereaders.arffWekaReader.WekaDataFileReader Class Reference	61
5.73.1	Detailed Description	61



## Chapter 1

# Namespace Index

### 1.1 Packages

Here are the packages with brief descriptions (if available):

<a href="#">eu.amidst.core.database</a>	7
<a href="#">eu.amidst.core.database.filereaders</a>	7
<a href="#">eu.amidst.core.distribution</a>	8
<a href="#">eu.amidst.core.exponentialfamily</a>	9
<a href="#">eu.amidst.core.variables</a>	9



## Chapter 2

# Hierarchical Index

### 2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

eu.amidst.core.database.filereaders.arffFileReader.ArffDataStream . . . . .	11
eu.amidst.core.variables.Assignment . . . . .	12
eu.amidst.core.database.Attribute . . . . .	12
eu.amidst.core.database.Attributes . . . . .	13
eu.amidst.core.database.filereaders.arffFileReader.DrillingAttributes . . . . .	24
eu.amidst.core.modelstructure.BayesianNetwork . . . . .	13
eu.amidst.core.database.dynamics.BucketSequenceData . . . . .	14
eu.amidst.core.database.dynamics.BucketSequenceStream . . . . .	14
eu.amidst.staticmodelling.models.Classifier . . . . .	15
eu.amidst.core.huginlink.ConverterToAMIDST . . . . .	18
eu.amidst.core.huginlink.ConverterToHugin . . . . .	18
eu.amidst.core.modelstructure.DAG . . . . .	18
eu.amidst.core.database.filereaders.DataFileReader . . . . .	19
eu.amidst.core.database.filereaders.arffWekaReader.WekaDataFileReader . . . . .	61
eu.amidst.core.database.DataInstance . . . . .	19
eu.amidst.core.database.filereaders.DynamicDataInstance . . . . .	25
eu.amidst.core.database.filereaders.StaticDataInstance . . . . .	55
eu.amidst.core.database.DataOnDisk . . . . .	20
eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile . . . . .	26
eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile . . . . .	27
eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile . . . . .	56
eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile . . . . .	56
eu.amidst.core.database.DataOnMemory . . . . .	20
eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile . . . . .	27
eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile . . . . .	56
eu.amidst.core.database.DataOnStream . . . . .	21
eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile . . . . .	26
eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile . . . . .	27
eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile . . . . .	56
eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile . . . . .	56
eu.amidst.core.database.filereaders.DataRow . . . . .	21
eu.amidst.core.database.filereaders.arffWekaReader.DataRowWeka . . . . .	22
eu.amidst.core.database.filereaders.DataRowMissing . . . . .	21
eu.amidst.core.distribution.Distribution . . . . .	22
eu.amidst.core.distribution.ConditionalDistribution . . . . .	15
eu.amidst.core.distribution.Multinomial_MultinomialParents . . . . .	36

eu.amidst.core.distribution.Normal_MultinomialNormalParents . . . . .	45
eu.amidst.core.distribution.Normal_MultinomialParents . . . . .	47
eu.amidst.core.distribution.Normal_NormalParents . . . . .	49
eu.amidst.core.distribution.UnivariateDistribution . . . . .	58
eu.amidst.core.distribution.Multinomial . . . . .	34
eu.amidst.core.distribution.Normal . . . . .	43
eu.amidst.core.distribution.DistributionBuilder . . . . .	23
eu.amidst.core.variables.DistType . . . . .	23
eu.amidst.core.modelstructure.DynamicBayesianNetwork . . . . .	24
eu.amidst.core.variables.DynamicVariables . . . . .	27
eu.amidst.core.exponentialfamily.EF_Distribution . . . . .	29
eu.amidst.core.exponentialfamily.EF_ConditionalDistribution . . . . .	28
eu.amidst.core.exponentialfamily.EF_BaseDistribution_MultinomialParents< E extends EF_< Distribution > . . . . .	28
eu.amidst.core.exponentialfamily.EF_UnivariateDistribution . . . . .	32
eu.amidst.core.exponentialfamily.EF_Multinomial . . . . .	30
eu.amidst.core.exponentialfamily.EF_Normal . . . . .	31
eu.amidst.core.exponentialfamily.EF_DistributionBuilder . . . . .	30
eu.amidst.core.database.filereaders.arffFileReader.Keys . . . . .	33
eu.amidst.Main . . . . .	33
eu.amidst.core.utils.MultinomialIndex . . . . .	38
eu.amidst.core.potential.MultivariateGaussian . . . . .	41
eu.amidst.core.database.filereaders.NextDynamicDataInstance . . . . .	42
eu.amidst.core.huginlink.Others . . . . .	51
eu.amidst.core.modelstructure.ParentSet . . . . .	52
eu.amidst.core.potential.Potential . . . . .	52
eu.amidst.core.potential.ConstantPotential . . . . .	17
eu.amidst.core.potential.MultivariateGaussianCF . . . . .	41
eu.amidst.core.potential.PotentialFunctional . . . . .	53
eu.amidst.core.potential.PotentialTable . . . . .	53
eu.amidst.core.database.dynamics.SequenceDataStream . . . . .	54
eu.amidst.core.database.dynamics.readers.SequenceDataStreamReaderFromFile . . . . .	54
eu.amidst.core.database.dynamics.SequenceStreamWindow . . . . .	54
eu.amidst.core.variables.StateSpaceType . . . . .	55
eu.amidst.core.variables.StaticVariables . . . . .	57
eu.amidst.core.utils.Utils . . . . .	59
eu.amidst.core.variables.Variable . . . . .	59
eu.amidst.core.variables.VariableBuilder . . . . .	60
eu.amidst.core.utils.Vector . . . . .	60
eu.amidst.core.utils.ArrayVector . . . . .	12
eu.amidst.core.exponentialfamily.MomentParameters . . . . .	33
eu.amidst.core.exponentialfamily.NaturalParameters . . . . .	42
eu.amidst.core.exponentialfamily.SufficientStatistics . . . . .	57
IOException . . . . .	
eu.amidst.core.database.filereaders.arffFileReader.ArffParserException . . . . .	11

## Chapter 3

### Class Index

#### 3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

eu.amidst.core.database.filereaders.arffFileReader.ArffDataStream . . . . .	11
eu.amidst.core.database.filereaders.arffFileReader.ArffParserException . . . . .	11
eu.amidst.core.utils.ArrayVector . . . . .	12
eu.amidst.core.variables.Assignment . . . . .	12
eu.amidst.core.database.Attribute . . . . .	12
eu.amidst.core.database.Attributes . . . . .	13
eu.amidst.core.modelstructure.BayesianNetwork . . . . .	13
eu.amidst.core.database.dynamics.BucketSequenceData . . . . .	14
eu.amidst.core.database.dynamics.BucketSequenceStream . . . . .	14
eu.amidst.staticmodelling.models.Classifier . . . . .	15
eu.amidst.core.distribution.ConditionalDistribution . . . . .	15
eu.amidst.core.potential.ConstantPotential . . . . .	17
eu.amidst.core.huginlink.ConverterToAMIDST . . . . .	18
eu.amidst.core.huginlink.ConverterToHugin . . . . .	18
eu.amidst.core.modelstructure.DAG . . . . .	18
eu.amidst.core.database.filereaders.DataFileReader . . . . .	19
eu.amidst.core.database.DataInstance . . . . .	19
eu.amidst.core.database.DataOnDisk . . . . .	20
eu.amidst.core.database.DataOnMemory . . . . .	20
eu.amidst.core.database.DataOnStream . . . . .	21
eu.amidst.core.database.filereaders.DataRow . . . . .	21
eu.amidst.core.database.filereaders.DataRowMissing . . . . .	21
eu.amidst.core.database.filereaders.arffWekaReader.DataRowWeka . . . . .	22
eu.amidst.core.distribution.Distribution . . . . .	22
eu.amidst.core.distribution.DistributionBuilder . . . . .	23
eu.amidst.core.variables.DistType . . . . .	23
eu.amidst.core.database.filereaders.arffFileReader.DrillingAttributes . . . . .	24
eu.amidst.core.modelstructure.DynamicBayesianNetwork . . . . .	24
eu.amidst.core.database.filereaders.DynamicDataInstance . . . . .	25
eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile . . . . .	26
eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile . . . . .	27
eu.amidst.core.variables.DynamicVariables . . . . .	27
eu.amidst.core.exponentialfamily.EF_BaseDistribution_MultinomialParents< E extends EF_Distribution > . . . . .	28
eu.amidst.core.exponentialfamily.EF_ConditionalDistribution . . . . .	28
eu.amidst.core.exponentialfamily.EF_Distribution . . . . .	29
eu.amidst.core.exponentialfamily.EF_DistributionBuilder . . . . .	30
eu.amidst.core.exponentialfamily.EF_Multinomial . . . . .	30
eu.amidst.core.exponentialfamily.EF_Normal . . . . .	31

eu.amidst.core.exponentialfamily.EF_UnivariateDistribution . . . . .	32
eu.amidst.core.database.filereaders.arffFileReader.Keys . . . . .	33
eu.amidst.Main . . . . .	33
eu.amidst.core.exponentialfamily.MomentParameters . . . . .	33
eu.amidst.core.distribution.Multinomial . . . . .	34
eu.amidst.core.distribution.Multinomial_MultinomialParents . . . . .	36
eu.amidst.core.utils.MultinomialIndex . . . . .	38
eu.amidst.core.potential.MultivariateGaussian . . . . .	41
eu.amidst.core.potential.MultivariateGaussianCF . . . . .	41
eu.amidst.core.exponentialfamily.NaturalParameters . . . . .	42
eu.amidst.core.database.filereaders.NextDynamicDataInstance . . . . .	42
eu.amidst.core.distribution.Normal . . . . .	43
eu.amidst.core.distribution.Normal_MultinomialNormalParents . . . . .	45
eu.amidst.core.distribution.Normal_MultinomialParents . . . . .	47
eu.amidst.core.distribution.Normal_NormalParents . . . . .	49
eu.amidst.core.huginlink.Others . . . . .	51
eu.amidst.core.modelstructure.ParentSet . . . . .	52
eu.amidst.core.potential.Potential . . . . .	52
eu.amidst.core.potential.PotentialFunctional . . . . .	53
eu.amidst.core.potential.PotentialTable . . . . .	53
eu.amidst.core.database.dynamics.SequenceDataStream . . . . .	54
eu.amidst.core.database.dynamics.readers.SequenceDataStreamReaderFromFile . . . . .	54
eu.amidst.core.database.dynamics.SequenceStreamWindow . . . . .	54
eu.amidst.core.variables.StateSpaceType . . . . .	55
eu.amidst.core.database.filereaders.StaticDataInstance . . . . .	55
eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile . . . . .	56
eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile . . . . .	56
eu.amidst.core.variables.StaticVariables . . . . .	57
eu.amidst.core.exponentialfamily.SufficientStatistics . . . . .	57
eu.amidst.core.distribution.UnivariateDistribution . . . . .	58
eu.amidst.core.utils.Utils . . . . .	59
eu.amidst.core.variables.Variable . . . . .	59
eu.amidst.core.variables.VariableBuilder . . . . .	60
eu.amidst.core.utils.Vector . . . . .	60
eu.amidst.core.database.filereaders.arffWekaReader.WekaDataFileReader . . . . .	61

## Chapter 4

# Namespace Documentation

### 4.1 Package eu.amidst.core.database

#### Packages

- package [filereaders](#)

#### Classes

- class [Attribute](#)
- class [Attributes](#)
- interface [DataInstance](#)
- interface [DataOnDisk](#)
- interface [DataOnMemory](#)
- interface [DataOnStream](#)

#### 4.1.1 Detailed Description

ISSUE LIST \*\*\*\*\*

1. The number of states should be parsed and stored.

\*\*\*\*\* ISSUE LIST \*\*\*\*\*

1. (Andres) Add a "close" method to close the possible linked file or whatever.

### 4.2 Package eu.amidst.core.database.filereaders

#### Classes

- interface [DataFileReader](#)
  - interface [DataRow](#)
  - class [DataRowMissing](#)
  - class [DynamicDataInstance](#)
  - class [DynamicDataOnDiskFromFile](#)
  - class [DynamicDataOnMemoryFromFile](#)
  - class [NextDynamicDataInstance](#)
-

- class [StaticDataInstance](#)
- class [StaticDataOnDiskFromFile](#)
- class [StaticDataOnMemoryFromFile](#)

#### 4.2.1 Detailed Description

ISSUE LIST \*\*\*\*\*

1. We could eliminate the if(timerIDcounter == 1) in nextDataInstance\_NoTimeID\_NoSeq if we maintain a future [DataRow](#) (we read an extra row in advance). Then we would need the method public boolean isNull(){ return (present==null || past==null); }

### 4.3 Package eu.amidst.core.distribution

#### Classes

- class [ConditionalDistribution](#)
- class [Distribution](#)
- class [DistributionBuilder](#)
- class [Multinomial](#)
- class [Multinomial\\_MultinomialParents](#)
- class [Normal](#)
- class [Normal\\_MultinomialNormalParents](#)
- class [Normal\\_MultinomialParents](#)
- class [Normal\\_NormalParents](#)
- class [UnivariateDistribution](#)

#### 4.3.1 Detailed Description

ISSUE LIST \*\*\*\*\*

1. In general, should we clone attributes in the constructor to avoid bad uses of input variables later on?
2. How are we going to update the probabilities? Value by value? Or directly with the whole set of probabilities? or both? Two methods are included: `setProbabilities(double[] probabilities)` and `setProbabilityOfState(int index, double value)`
3. Is needed the method `setProbabilityOfState` ?

\*\*\*\*\* ISSUE LIST \*\*\*\*\*

1. `getConditioningVariables` change to `getParentsVariables()`

ISSUE LIST \*\*\*\*\*

1. Do we need here the min and max of the variable, for instance, to check that the input value in `computeProbabilityOf(value)` is in the range [min,max]?

ISSUES \*\*\*\*\*

1. CODING: - `this.multinomialParents` or `multinomialParents`? Common criteria.  
- methods are ordered? alphabetically?

**ISSUE LIST \*\*\*\*\***

1. In the constructor, should we initialize the CLG attributes in this way?
2. The name of the method computeProbabilityOf(..) is a bit confusing for continuous domains. It does not compute probabilities but the value for the density function which is not a probability. However as this class implements this method of [ConditionalDistribution](#), we could leave like this.
3. QAPlug gives a warning when using the same name for a attribute and a given argument, e.g. this.var = var

## **4.4 Package eu.amidst.core.exponentialfamily**

### **Classes**

- class [EF\\_BaseDistribution\\_MultinomialParents< E extends EF\\_Distribution >](#)
- class [EF\\_ConditionalDistribution](#)
- class [EF\\_Distribution](#)
- class [EF\\_DistributionBuilder](#)
- class [EF\\_Multinomial](#)
- class [EF\\_Normal](#)
- class [EF\\_UnivariateDistribution](#)
- class [MomentParameters](#)
- class [NaturalParameters](#)
- class [SufficientStatistics](#)

### **4.4.1 Detailed Description**

**\*\*\*\*\* ISSUE LIST \*\*\*\*\***

1. getConditioningVariables change to getParentsVariables()

**ISSUE LIST \*\*\*\*\***

1. Make SufficientStatics an static class to avoid the creation of an object in each call to getSuffStatistics();
2. Make naturalParameters and momentParameters statics?

## **4.5 Package eu.amidst.core.variables**

### **Classes**

- class [Assignment](#)
- enum [DistType](#)
- class [DynamicVariables](#)
- enum [StateSpaceType](#)
- class [StaticVariables](#)
- interface [Variable](#)
- class [VariableBuilder](#)

#### 4.5.1 Detailed Description

ISSUE LIST \*\*\*\*\*

1. Rename to [DynamicVariables](#)
2. We can/should remove all setters from VariableImplementation right?
3. Is there any need for the field atts? It is only used in the constructor.
4. If the fields in VariableImplementation are all objects then the TemporalClone only contains pointers, which would ensure consistency, although we are not planing to modify these values.

## Chapter 5

# Class Documentation

## 5.1 eu.amidst.core.database.filereaders.arffFileReader.ArffDataStream Class Reference

### 5.1.1 Detailed Description

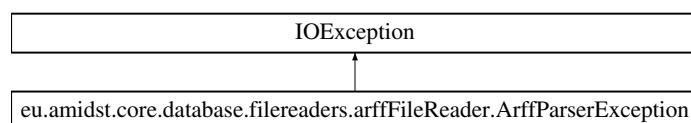
Created by sigveh on 10/7/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffFileReader/ArffDataStream.java

## 5.2 eu.amidst.core.database.filereaders.arffFileReader.ArffParserException Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.arffFileReader.ArffParserException:



### Public Member Functions

- **ArffParserException** (String message)

### 5.2.1 Detailed Description

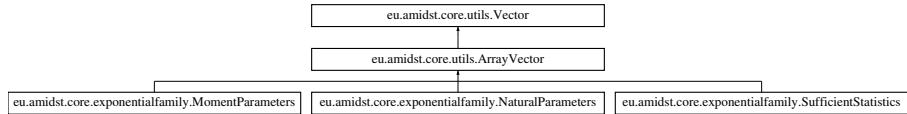
Created by sigveh on 10/8/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffFileReader/ArffParserException.java

### 5.3 eu.amidst.core.utils.ArrayVector Class Reference

Inheritance diagram for eu.amidst.core.utils.ArrayVector:



#### Public Member Functions

- **ArrayVector** (int size)
- **ArrayVector** (double[] vec)
- double **get** (int i)
- void **set** (int i, double val)
- int **size** ()

#### Additional Inherited Members

##### 5.3.1 Detailed Description

Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/utils/ArrayVector.java

### 5.4 eu.amidst.core.variables.Assignment Class Reference

#### Public Member Functions

- **Assignment** (int nOfVars)
- double **getValue** ([Variable](#) key)
- void **setValue** ([Variable](#) var, Double value)
- Set< Map.Entry< [Variable](#),  
Double > > **entrySet** ()

##### 5.4.1 Detailed Description

Created by [ana@cs.aau.dk](mailto:ana@cs.aau.dk) on 03/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/Assignment.java

### 5.5 eu.amidst.core.database.Attribute Class Reference

#### Public Member Functions

- **Attribute** (int index, String name, String unit, [StateSpaceType](#) stateSpaceType, int number\_of\_states)

- **Attribute** (int index, String name, [StateSpaceType](#) stateSpaceType, int numberofStates)
- **Attribute** (String name, [StateSpaceType](#) stateSpaceType, int numberofStates)
- int **getIndex** ()
- String **getUnit** ()
- String **getName** ()
- [StateSpaceType](#) **getStateSpaceType** ()
- int **getNumberofStates** ()
- boolean **equals** (Object o)
- int **hashCode** ()

### 5.5.1 Detailed Description

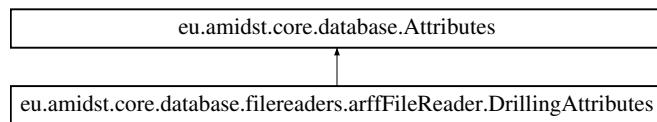
Created by sigveh on 10/20/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/Attribute.java

## 5.6 eu.amidst.core.database.Attributes Class Reference

Inheritance diagram for eu.amidst.core.database.Attributes:



### Public Member Functions

- **Attributes** (List<> [Attribute](#) attributes)
- List<> [Attribute](#) > **getList** ()
- List<> [Attribute](#) > **getListExceptTimeAndSeq** ()
- void **print** ()
- [Attribute](#) **getAttributeByName** (String name)

### 5.6.1 Detailed Description

Created by sigveh on 10/16/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/Attributes.java

## 5.7 eu.amidst.core.modelstructure.BayesianNetwork Class Reference

### Public Member Functions

- void **setDistribution** ([Variable](#) var, [ConditionalDistribution](#) distribution)
- int **getNumberOfVars** ()
- [StaticVariables](#) **getStaticVariables** ()
- [DAG](#) **getDAG** ()
- List<> [Variable](#) > **getVariables** ()

## Static Public Member Functions

- static [BayesianNetwork](#) **newBayesianNetwork** ([DAG](#) dag)

### 5.7.1 Detailed Description

Created by afa on 02/07/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/modelstructure/BayesianNetwork.java

## 5.8 eu.amidst.core.database.dynamics.BucketSequenceData Interface Reference

### Public Member Functions

- int **getMarkovOrder** ()
- boolean **hasMoreData** ()
- [DynamicDataInstance](#) **nextSequenceData** ()
- boolean **isResetable** ()
- void **reset** ()

### 5.8.1 Detailed Description

Created by afa on 03/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/dynamics/BucketSequenceData.java

## 5.9 eu.amidst.core.database.dynamics.BucketSequenceStream Interface Reference

### Public Member Functions

- [Attributes](#) **getDynamicAttributes** ()
- int **getMarkovOrder** ()
- boolean **hasMoreData** ()
- [BucketSequenceData](#) **nextBucketSequenceData** ()
- boolean **isResetable** ()
- void **reset** ()

### 5.9.1 Detailed Description

Created by afa on 03/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/dynamics/BucketSequenceStream.java

## 5.10 eu.amidst.staticmodelling.models.Classifier Interface Reference

### Public Member Functions

- double[] **predict** ([DataInstance](#) instance)
- int **getClassVarID** ()
- void **setClassVarID** (int varID)

#### 5.10.1 Detailed Description

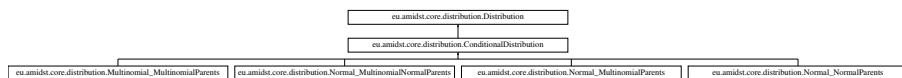
Created by afa on 02/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/staticmodelling/models/Classifier.java

## 5.11 eu.amidst.core.distribution.ConditionalDistribution Class Reference

Inheritance diagram for eu.amidst.core.distribution.ConditionalDistribution:



### Public Member Functions

- List< [Variable](#) > **getConditioningVariables** ()
- double **getConditionalProbability** ([Assignment](#) assignment)
- abstract double **getLogConditionalProbability** ([Assignment](#) assignment)

### Protected Attributes

- List< [Variable](#) > parents

#### 5.11.1 Detailed Description

This interface generalizes the set of possible conditional distributions.

#### Author

Antonio Fernández

#### Version

1.0

#### Since

2014-11-3

## 5.11.2 Member Function Documentation

### 5.11.2.1 double eu.amidst.core.distribution.ConditionalDistribution.getConditionalProbability ( *Assignment assignment* )

Evaluates the conditional distribution given a value of the variable and an assignment of the parents.

**Parameters**

<code>assignment</code>	An Assignment for the parents.
-------------------------	--------------------------------

**Returns**

A double value with the evaluated distribution.

**5.11.2.2 List<Variable> eu.amidst.core.distribution.ConditionalDistribution.getConditioningVariables( )**

Gets the set of conditioning variables

**Returns**

An unmodifiable List object with the set of conditioning variables.

**5.11.2.3 abstract double eu.amidst.core.distribution.ConditionalDistribution.getLogConditionalProbability( Assignment assignment ) [abstract]**

Evaluates the conditional distribution given a value of the variable and an assignment of the parents.

**Parameters**

<code>assignment</code>	An Assignment for the parents.
-------------------------	--------------------------------

**Returns**

A double value with the logarithm of the evaluated distribution.

**5.11.3 Member Data Documentation****5.11.3.1 List<Variable> eu.amidst.core.distribution.ConditionalDistribution.parents [protected]**

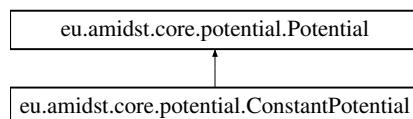
The list of parents of the variable

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/ConditionalDistribution.java

**5.12 eu.amidst.core.potential.ConstantPotential Class Reference**

Inheritance diagram for eu.amidst.core.potential.ConstantPotential:

**Public Member Functions**

- **ConstantPotential** (double val)
- void **setVariables** (List variables)
- List **getVariables** ()
- void **combine** (Potential pot)
- void **marginalize** (List variables)

### 5.12.1 Detailed Description

Created by andresmasegosa on 28/08/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/ConstantPotential.java

## 5.13 eu.amidst.core.huginlink.ConverterToAMIDST Class Reference

### Public Member Functions

- **ConverterToAMIDST** (Domain huginNetwork)
- **BayesianNetwork getAmidstNetwork ()**
- void **setNodes ()**
- void **setStructure ()**
- void **setMultinomial\_MultinomialParents** (Node huginVar)
- void **setDistributions** (NodeList huginNodes)

### 5.13.1 Detailed Description

Created by afa on 14/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/huginlink/ConverterToAMIDST.java

## 5.14 eu.amidst.core.huginlink.ConverterToHugin Class Reference

### Public Member Functions

- Domain **getHuginNetwork ()**
- void **setNodes** (List< Variable > amidstVars)
- void **setStructure** (DAG dag)
- void **setMultinomial\_MultinomialParents** (ConditionalDistribution dist)
- void **setNormal\_NormalParents** (ConditionalDistribution dist, int assign\_i)
- void **setNormal** (Normal dist, int i)
- void **setNormal\_MultinomialParents** (ConditionalDistribution dist)
- void **setNormal\_MultinomialNormalParents** (ConditionalDistribution dist)
- void **setDistributions** (BayesianNetwork bn)
- void **setBayesianNetwork** (BayesianNetwork bn)

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/huginlink/ConverterToHugin.java

## 5.15 eu.amidst.core.modelstructure.DAG Class Reference

### Public Member Functions

- **DAG** (**StaticVariables** variables)
- **StaticVariables getVariables ()**
- **ParentSet getParentSet** (Variable var)
- boolean **containCycles ()**

### 5.15.1 Detailed Description

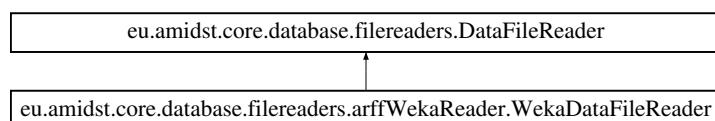
Created by Hanen on 13/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/modelstructure/DAG.java

## 5.16 eu.amidst.core.database.filereaders.DataFileReader Interface Reference

Inheritance diagram for eu.amidst.core.database.filereaders.DataFileReader:



### Public Member Functions

- **Attributes** `getAttributes ()`
- **DataRow** `nextDataRow ()`
- boolean `hasMoreDataRows ()`
- void `reset ()`
- boolean `doesItReadThisFileExtension` (String fileExtension)

### 5.16.1 Detailed Description

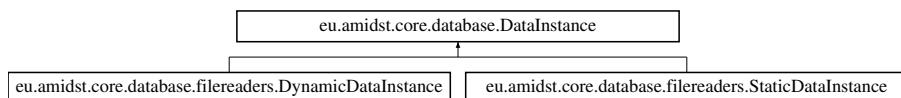
Created by andresmasegosa on 11/11/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DataFileReader.java

## 5.17 eu.amidst.core.database.DataInstance Interface Reference

Inheritance diagram for eu.amidst.core.database.DataInstance:



### Public Member Functions

- double `getValue` (**Variable** var)
- int `getSequenceID ()`
- int `getTimeID ()`

### 5.17.1 Detailed Description

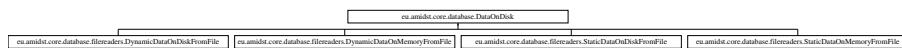
Created by [ana@cs.aau.dk](mailto:ana@cs.aau.dk) on 10/11/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/DataInstance.java

## 5.18 eu.amidst.core.database.DataOnDisk Interface Reference

Inheritance diagram for eu.amidst.core.database.DataOnDisk:



### Public Member Functions

- **DataInstance** `nextDataInstance ()`
- boolean `hasMoreDataInstances ()`
- **Attributes** `getAttributes ()`
- void `restart ()`

### 5.18.1 Detailed Description

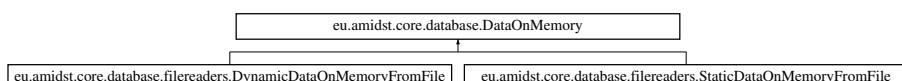
Created by afa on 02/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/DataOnDisk.java

## 5.19 eu.amidst.core.database.DataOnMemory Interface Reference

Inheritance diagram for eu.amidst.core.database.DataOnMemory:



### Public Member Functions

- int `getNumberOfDataInstances ()`
- **DataInstance** `getDataInstance (int i)`
- **Attributes** `getAttributes ()`

### 5.19.1 Detailed Description

Created by andresmasegosa on 11/11/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/DataOnMemory.java

## 5.20 eu.amidst.core.database.DataOnStream Interface Reference

Inheritance diagram for eu.amidst.core.database.DataOnStream:



### Public Member Functions

- **DataInstance** `nextDataInstance ()`
- boolean `hasMoreDataInstances ()`
- **Attributes** `getAttributes ()`

#### 5.20.1 Detailed Description

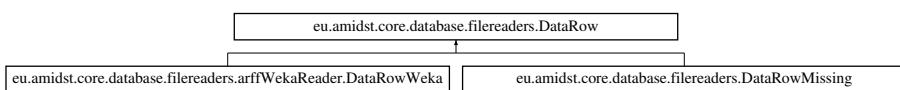
Created by afa on 02/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/DataOnStream.java

## 5.21 eu.amidst.core.database.filereaders.DataRow Interface Reference

Inheritance diagram for eu.amidst.core.database.filereaders.DataRow:



### Public Member Functions

- double `getValue (Attribute att)`

#### 5.21.1 Detailed Description

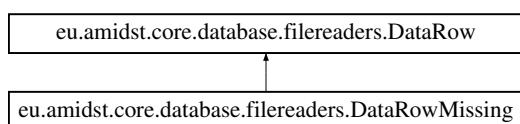
Created by andresmasegosa on 11/11/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DataRow.java

## 5.22 eu.amidst.core.database.filereaders.DataRowMissing Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.DataRowMissing:



## Public Member Functions

- double **getValue** ([Attribute](#) att)

### 5.22.1 Detailed Description

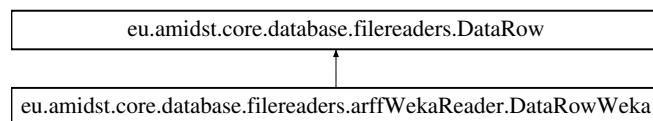
Created by [ana@cs.aau.dk](#) on 13/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DataRowMissing.java

## 5.23 eu.amidst.core.database.filereaders.arffWekaReader.DataRowWeka Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.arffWekaReader.DataRowWeka:



## Public Member Functions

- **DataRowWeka** (Instance `dataRow`)
- double **getValue** ([Attribute](#) att)

### 5.23.1 Detailed Description

Created by [ana@cs.aau.dk](#) on 14/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffWekaReader/DataRowWeka.java

## 5.24 eu.amidst.core.distribution.Distribution Class Reference

Inheritance diagram for eu.amidst.core.distribution.Distribution:



## Public Member Functions

- **Variable getVariable ()**

### Protected Attributes

- [Variable var](#)

#### 5.24.1 Detailed Description

Created by afa on 12/11/14.

#### 5.24.2 Member Function Documentation

##### 5.24.2.1 Variable eu.amidst.core.distribution.Distribution.getVariable( )

Gets the variable of the distribution

Returns

A Variable object.

#### 5.24.3 Member Data Documentation

##### 5.24.3.1 Variable eu.amidst.core.distribution.Distribution.var [protected]

The variable of the distribution

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Distribution.java

## 5.25 eu.amidst.core.distribution.DistributionBuilder Class Reference

### Static Public Member Functions

- static [ConditionalDistribution newDistribution](#) ([Variable](#) mainVar, List<[Variable](#)> conditioningVars)

#### 5.25.1 Detailed Description

Created by andresmasegosa on 11/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/DistributionBuilder.java

## 5.26 eu.amidst.core.variables.DistType Enum Reference

### Public Attributes

- **MULTINOMIAL**

### 5.26.1 Detailed Description

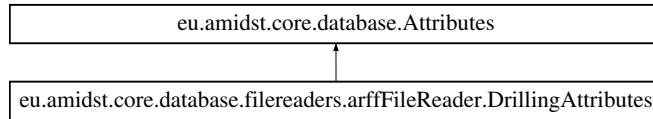
Created by Hanen on 05/11/14.

The documentation for this enum was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/DistType.java

## 5.27 eu.amidst.core.database.filereaders.arffFileReader.DrillingAttributes Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.arffFileReader.DrillingAttributes:



### Public Member Functions

- Attribute **getMFI** ()
- Attribute **getRPM** ()
- Attribute **getSPP** ()
- List< Attribute > **getList** ()
- void **print** ()
- Attribute **getAttributeByName** (String name)

### 5.27.1 Detailed Description

Created by sigveh on 10/16/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffFileReader/DrillingAttributes.java

## 5.28 eu.amidst.core.modelstructure.DynamicBayesianNetwork Class Reference

### Public Member Functions

- void **initializeDistributions** ()
- int **getNumberOfNodes** ()
- DynamicVariables **getDynamicVariables** ()
- Variable **getVariableById** (int varID)
- Variable **getTemporalCloneById** (int varID)
- Variable **getTemporalCloneFromVariable** (Variable variable)
- ParentSet **getParentSetTimeT** (Variable var)
- Distribution **getDistributionTimeT** (Variable var)
- ParentSet **getParentSetTime0** (Variable var)
- Distribution **getDistributionTime0** (Variable var)

**Static Public Member Functions**

- static [DynamicBayesianNetwork newDynamicBayesianNetwork \(DynamicVariables variables\)](#)

**5.28.1 Detailed Description**

This class implements a dynamic Bayesian network.

**Author**

[a.alvarez@ual.es](mailto:a.alvarez@ual.es), [andres@cs.aau.dk](mailto:andres@cs.aau.dk) & [ana@cs.aau.dk](mailto:ana@cs.aau.dk)

**Version**

1.0

**Since**

2014-07-3

**5.28.2 Member Function Documentation****5.28.2.1 void eu.amidst.core.modelstructure.DynamicBayesianNetwork.initializeDistributions ( )**

Initialize the Distributions of the variables based on their StateSpaceType

**5.28.2.2 static DynamicBayesianNetwork eu.amidst.core.modelstructure.DynamicBayesianNetwork.newDynamicBayesianNetwork ( DynamicVariables variables ) [static]**

The class public constructor, as a factory pattern

**Parameters**

<code>variables</code>	The variables or list of variables
------------------------	------------------------------------

**Returns**

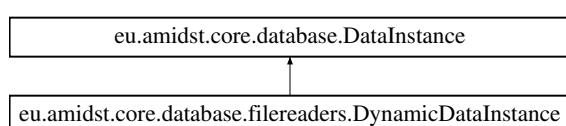
A [DynamicBayesianNetwork](#) with the given list of variables

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/modelstructure/DynamicBayesianNetwork.java

**5.29 eu.amidst.core.database.filereaders.DynamicDataInstance Class Reference**

Inheritance diagram for eu.amidst.core.database.filereaders.DynamicDataInstance:



### Public Member Functions

- **DynamicDataInstance** (`DataRow` `dataRowPast_`, `DataRow` `dataRowPresent_`, int `sequenceID_`, int `timeID_`)
- double **getValue** (`Variable` `var`)
- int **getSequenceID** ()
- int **getTimeID** ()

#### 5.29.1 Detailed Description

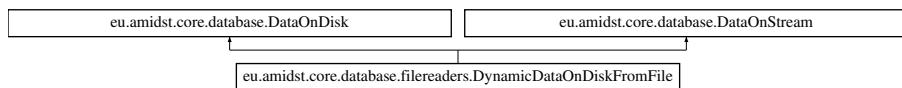
Created by andresmasegosa on 11/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DynamicDataInstance.java

## 5.30 eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile:



### Public Member Functions

- **DynamicDataOnDiskFromFile** (`DataFileReader` `reader`)
- **DataInstance** **nextDataInstance** ()
- boolean **hasMoreDataInstances** ()
- **Attributes** **getAttributes** ()
- void **restart** ()

#### 5.30.1 Detailed Description

Created by `ana@cs.aau.dk` on 12/11/14.

#### 5.30.2 Constructor & Destructor Documentation

##### 5.30.2.1 eu.amidst.core.database.filereaders.DynamicDataOnDiskFromFile.DynamicDataOnDiskFromFile ( `DataFileReader` `reader` )

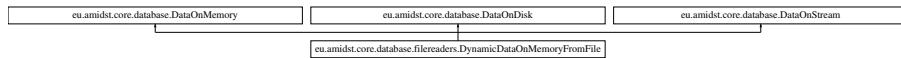
We read the two first rows now, to create the first couple in nextDataInstance

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DynamicDataOnDiskFromFile.java

## 5.31 eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.DynamicDataOnMemoryFromFile:



### Public Member Functions

- **DynamicDataOnMemoryFromFile** ([DataFileReader](#) reader)
- int **getNumberOfDataInstances** ()
- **DataInstance getDataInstance** (int i)
- **Attributes getAttributes** ()
- **DataInstance nextDataInstance** ()
- boolean **hasMoreDataInstances** ()
- void **restart** ()

#### 5.31.1 Detailed Description

Created by [ana@cs.aau.dk](#) on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/DynamicDataOnMemoryFromFile.java

## 5.32 eu.amidst.core.variables.DynamicVariables Class Reference

### Public Member Functions

- **DynamicVariables** ([Attributes](#) atts)
- **DynamicVariables** ([Attributes](#) atts, [HashMap<Attribute, DistType>](#) typeDists)
- **Variable getTemporalCloneFromVariable** ([Variable](#) var)
- **Variable getVariableFromTemporalClone** ([Variable](#) var)
- **Variable addHiddenVariable** ([VariableBuilder](#) builder)
- [List<Variable>](#) **getVariables** ()
- [List<Variable>](#) **getTemporalClones** ()
- **Variable getVariableById** (int varID)
- **Variable getTemporalCloneById** (int varID)
- **Variable getVariableByName** (String name)
- **Variable getTemporalCloneByName** (String name)
- int **getNumberOfVars** ()

#### 5.32.1 Detailed Description

Created by afa on 02/07/14.

### 5.32.2 Constructor & Destructor Documentation

5.32.2.1 eu.amidst.core.variables.DynamicVariables.DynamicVariables ( Attributes *atts*, HashMap< Attribute, DistType > *typeDists* )

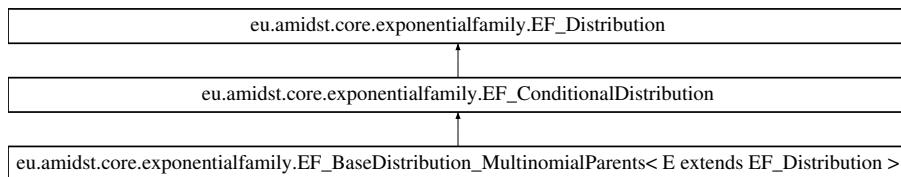
Constructor where the distribution type of random variables is provided as an argument.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/DynamicVariables.java

### 5.33 eu.amidst.core.exponentialfamily.EF\_BaseDistribution\_MultinomialParents< E extends EF\_Distribution > Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.EF\_BaseDistribution\_MultinomialParents< E extends EF\_Distribution >:



#### Public Member Functions

- **EF\_BaseDistribution\_MultinomialParents** (*Variable var*, List< *Variable* > *parents*)
- abstract *E* **createNewBaseDistribution** (*Variable var*, List< *Variable* > *non\_multinomialParents*)
- void **setEF\_BaseDistribution** (int *indexMultinomial*, *E baseDist*)
- *E* **getEF\_BaseDistribution** (int *indexMultinomial*)
- *E* **getEF\_BaseDistribution** (*DataInstance dataInstance*)
- **SufficientStatistics getSufficientStatistics** (*DataInstance instance*)
- int **sizeOfSufficientStatistics** ()
- void **setNaturalParameters** (*NaturalParameters parameters*)
- void **setMomentParameters** (*MomentParameters parameters*)
- void **updateNaturalFromMomentParameters** ()
- void **updateMomentFromNaturalParameters** ()
- double **computeLogBaseMeasure** (*DataInstance dataInstance*)
- double **computeLogNormalizer** (*NaturalParameters parameters*)

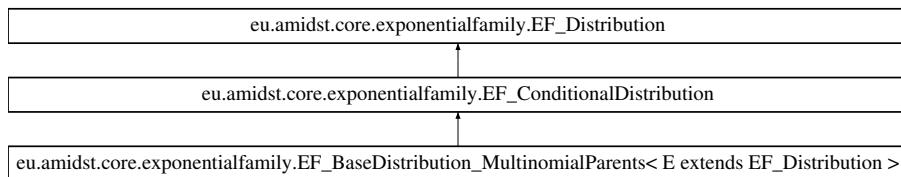
#### Additional Inherited Members

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_BaseDistribution\_MultinomialParents.java

### 5.34 eu.amidst.core.exponentialfamily.EF\_ConditionalDistribution Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.EF\_ConditionalDistribution:



## Public Member Functions

- List< [Variable](#) > **getConditioningVariables** ()

## Protected Attributes

- List< [Variable](#) > **parents**

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_ConditionalDistribution.java

## 5.35 eu.amidst.core.exponentialfamily.EF\_Distribution Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.EF\_Distribution:



## Public Member Functions

- final [Variable](#) **getVariable** ()
- final [NaturalParameters](#) **getNaturalParameters** ()
- final [MomentParameters](#) **getMomentParameters** ()
- void **setNaturalParameters** ([NaturalParameters](#) parameters)
- void **setMomentParameters** ([MomentParameters](#) parameters)
- abstract void **updateNaturalFromMomentParameters** ()
- abstract void **updateMomentFromNaturalParameters** ()
- abstract [SufficientStatistics](#) **getSufficientStatistics** ([DataInstance](#) data)
- abstract int **sizeOfSufficientStatistics** ()
- abstract double **computeLogBaseMeasure** ([DataInstance](#) datainstance)
- abstract double **computeLogNormalizer** ()
- double **computeProbabilityOf** ([DataInstance](#) datainstance)
- double **computeLogProbabilityOf** ([DataInstance](#) datainstance)

## Protected Attributes

- [Variable](#) var
- [NaturalParameters](#) **naturalParameters**
- [MomentParameters](#) **momentParameters**

### 5.35.1 Detailed Description

Created by andresmasegosa on 13/11/14.

### 5.35.2 Member Function Documentation

#### 5.35.2.1 final Variable eu.amidst.core.exponentialfamily.EF\_Distribution.getVariable( )

Gets the variable of the distribution

Returns

A `Variable` object.

### 5.35.3 Member Data Documentation

#### 5.35.3.1 Variable eu.amidst.core.exponentialfamily.EF\_Distribution.var [protected]

The variable of the distribution

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_Distribution.java

## 5.36 eu.amidst.core.exponentialfamily.EF\_DistributionBuilder Class Reference

### Static Public Member Functions

- static `EF_BaseDistribution_MultinomialParents newEFFromConditionalDistribution (Multinomial_MultinomialParents dist)`
- static `EF_Normal toEFDistribution (Normal dist)`
- static `Normal toDistribution (EF_Normal ef_normal)`
- static `EF_Multinomial toEFDistribution (Multinomial dist)`
- static `Multinomial toDistribution (EF_Multinomial ef_multinomial)`

### 5.36.1 Detailed Description

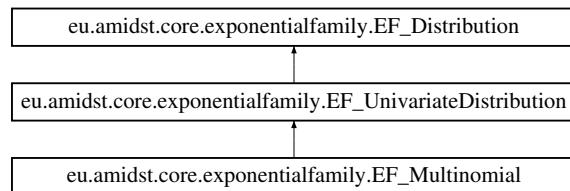
Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_DistributionBuilder.java

## 5.37 eu.amidst.core.exponentialfamily.EF\_Multinomial Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.EF\_Multinomial:



## Public Member Functions

- `EF_Multinomial (Variable var_)`
- `double computeLogBaseMeasure (double val)`
- `double computeLogNormalizer ()`
- `SufficientStatistics getSufficientStatistics (double val)`
- `void updateNaturalFromMomentParameters ()`
- `void updateMomentFromNaturalParameters ()`
- `int sizeOfSufficientStatistics ()`

## Static Public Member Functions

- static `SufficientStatistics sufficientStatistics (int nstates, double val)`

## Additional Inherited Members

### 5.37.1 Detailed Description

Created by andresmasegosa on 13/11/14.

### 5.37.2 Constructor & Destructor Documentation

#### 5.37.2.1 `eu.amidst.core.exponentialfamily.EF_Multinomial.EF_Multinomial ( Variable var_ )`

The class constructor.

##### Parameters

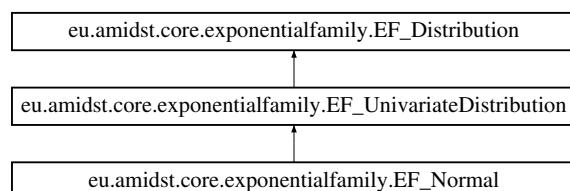
<code>var_</code>	The variable of the distribution.
-------------------	-----------------------------------

The documentation for this class was generated from the following file:

- `/Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF_Multinomial.java`

## 5.38 eu.amidst.core.exponentialfamily.EF\_Normal Class Reference

Inheritance diagram for `eu.amidst.core.exponentialfamily.EF_Normal`:



## Public Member Functions

- **EF\_Normal (Variable var\_)**
- double **computeLogBaseMeasure** (double val)
- double **computeLogNormalizer** ()
- **SufficientStatistics getSufficientStatistics** (double val)
- void **updateNaturalFromMomentParameters** ()
- void **updateMomentFromNaturalParameters** ()
- int **sizeOfSufficientStatistics** ()

## Static Public Member Functions

- static **SufficientStatistics sufficientStatistics** (double val)

## Static Public Attributes

- static int **EXPECTED\_MEAN** = 0
- static int **EXPECTED\_SQUARE** = 1

## Additional Inherited Members

### 5.38.1 Detailed Description

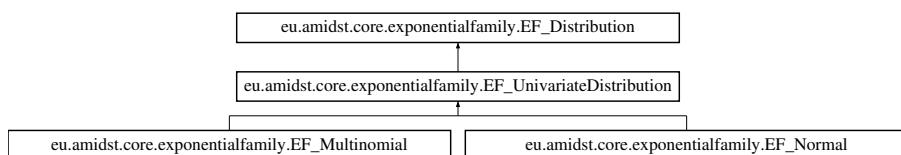
Created by andresmasegosa on 13/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_Normal.java

## 5.39 eu.amidst.core.exponentialfamily.EF\_UnivariateDistribution Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.EF\_UnivariateDistribution:



## Public Member Functions

- abstract double **computeLogBaseMeasure** (double val)
- abstract **SufficientStatistics getSufficientStatistics** (double val)
- double **computeProbabilityOf** (double val)
- double **computeLogProbabilityOf** (double val)
- **SufficientStatistics getSufficientStatistics** (`DataInstance` data)
- double **computeLogBaseMeasure** (`DataInstance` dataInstance)

## Additional Inherited Members

### 5.39.1 Detailed Description

Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/EF\_UnivariateDistribution.java

## 5.40 eu.amidst.core.database.filereaders.arffFileReader.Keys Class Reference

### Public Member Functions

- **Keys** (int[] doubleKeys, int[] intKeys)
- int[] **getDoubleKeys** ()
- int[] **getIntKeys** ()

### 5.40.1 Detailed Description

Created by sigveh on 10/20/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffFileReader/Keys.java

## 5.41 eu.amidst.Main Class Reference

### Static Public Member Functions

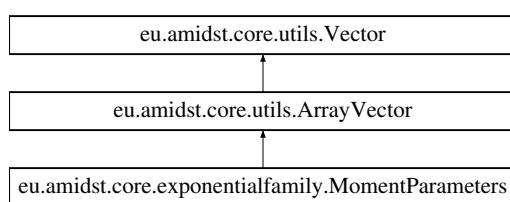
- static void **main** (String[] args)

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/Main.java

## 5.42 eu.amidst.core.exponentialfamily.MomentParameters Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.MomentParameters:



### Public Member Functions

- **MomentParameters** (int size)
- **MomentParameters** (double[] vec)

## Additional Inherited Members

### 5.42.1 Detailed Description

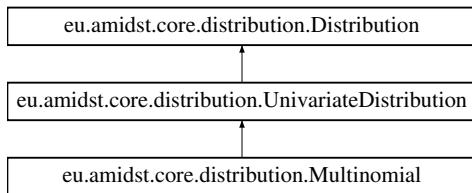
Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/MomentParameters.java

## 5.43 eu.amidst.core.distribution.Multinomial Class Reference

Inheritance diagram for eu.amidst.core.distribution.Multinomial:



## Public Member Functions

- **Multinomial (Variable var)**
- void **setProbabilities** (double[] probabilities)
- void **setProbabilityOfState** (int state, double prob)
- double **getProbabilityOfState** (int state)
- double[] **getProbabilities** ()
- double **getLogProbability** (double value)

## Additional Inherited Members

### 5.43.1 Detailed Description

This class implements a univariate multinomial distribution.

#### Author

Antonio Fernández

#### Version

1.0

#### Since

2014-11-3

## 5.43.2 Constructor & Destructor Documentation

### 5.43.2.1 eu.amidst.core.distribution.Multinomial.Multinomial ( Variable var )

The class constructor.

**Parameters**

<i>var</i>	The variable of the distribution.
------------	-----------------------------------

**5.43.3 Member Function Documentation****5.43.3.1 double eu.amidst.core.distribution.Multinomial.getLogProbability ( double *value* )**

Computes the logarithm of the probability for a given variable state.

**Parameters**

<i>value</i>	The position of the variable state in the array of probabilities (represented as a double for generality reasons).
--------------	--

**Returns**

A double value with the logarithm of the probability.

**5.43.3.2 double [] eu.amidst.core.distribution.Multinomial.getProbabilities ( )**

Gets the array of probabilities for the different states of the variable.

**Returns**

An array of double with the probabilities.

**5.43.3.3 double eu.amidst.core.distribution.Multinomial.getProbabilityOfState ( int *state* )****Parameters**

<i>state</i>
--------------

**Returns****5.43.3.4 void eu.amidst.core.distribution.Multinomial.setProbabilities ( double[] *probabilities* )**

Sets the probability values to the distribution.

**Parameters**

<i>probabilities</i>	An array of probabilities in the same order as the variable states.
----------------------	---

**5.43.3.5 void eu.amidst.core.distribution.Multinomial.setProbabilityOfState ( int *state*, double *prob* )**

Set a probability value in a given position in the array of probabilities.

**Parameters**

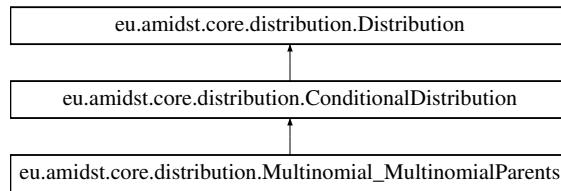
<i>state</i>	The position in which the probability is set.
<i>prob</i>	A probability value.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Multinomial.java

## 5.44 eu.amidst.core.distribution.Multinomial\_MultinomialParents Class Reference

Inheritance diagram for eu.amidst.core.distribution.Multinomial\_MultinomialParents:



### Public Member Functions

- [Multinomial\\_MultinomialParents \(Variable var, List< Variable > parents\)](#)
- [Multinomial\[\] getProbabilities \(\)](#)
- void [setMultinomial \(int position, Multinomial multinomialDistribution\)](#)
- void [setMultinomial \(Assignment parentAssignment, Multinomial multinomialDistribution\)](#)
- [Multinomial getMultinomial \(Assignment parentAssignment\)](#)
- [Multinomial getMultinomial \(int position\)](#)
- double [getLogConditionalProbability \(Assignment parentAssignment\)](#)

### Additional Inherited Members

#### 5.44.1 Detailed Description

This class implements a conditional distribution of a multinomial variable given a set of multinomial parents.

#### Author

Antonio Fernández

#### Version

1.0

#### Since

2014-11-4

#### 5.44.2 Constructor & Destructor Documentation

##### 5.44.2.1 eu.amidst.core.distribution.Multinomial\_MultinomialParents ( Variable var, List< Variable > parents )

The class constructor.

**Parameters**

<i>var</i>	The variable of the distribution.
<i>parents</i>	The set of parents of the variable.

**5.44.3 Member Function Documentation**

**5.44.3.1 double eu.amidst.core.distribution.Multinomial\_MultinomialParents.getLogConditionalProbability ( Assignment *parentAssignment* )**

Computes the logarithm of the probability of the variable for a given state and a parent assignment.

**Parameters**

<i>parentAssignment</i>	An Assignment for the parents.
-------------------------	--------------------------------

**Returns**

A double value with the logarithm of the probability.

**5.44.3.2 Multinomial eu.amidst.core.distribution.Multinomial\_MultinomialParents.getMultinomial ( Assignment *parentAssignment* )**

Gets the [Multinomial](#) distribution for given a parents assignment.

**Parameters**

<i>parentAssignment</i>	An Assignment for the parents.
-------------------------	--------------------------------

**Returns**

A [Multinomial](#) object.

**5.44.3.3 void eu.amidst.core.distribution.Multinomial\_MultinomialParents.setMultinomial ( int *position*, [Multinomial](#) *multinomialDistribution* )**

Sets a [Multinomial](#) distribution in a given position in the array of probabilities.

**Parameters**

<i>position</i>	The position in which the distribution is set.
<i>multinomialDistribution</i>	A <a href="#">Multinomial</a> object.

**5.44.3.4 void eu.amidst.core.distribution.Multinomial\_MultinomialParents.setMultinomial ( Assignment *parentAssignment*, [Multinomial](#) *multinomialDistribution* )**

Sets a [Multinomial](#) distribution in a position in the array of probabilities determined by a given parents assignment.

**Parameters**

<i>parent</i> ↪ <i>Assignment</i>	An <a href="#">Assignment</a> for the parents.
<i>multinomial</i> ↪ <i>Distribution</i>	A <a href="#">Multinomial</a> object.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Multinomial\_MultinomialParents.java

## 5.45 eu.amidst.core.utils.MultinomialIndex Class Reference

### Static Public Member Functions

- static int [getIndexFromVariableAssignment](#) (List< Variable > vars, [Assignment](#) assignment)
- static int [getIndexFromVariableAssignment](#) (List< Variable > vars, List< Double > assignment)
- static int [getIndexFromDataInstance](#) (List< Variable > vars, [DataInstance](#) dataInstance)
- static int [getIndexFromVariableAssignment](#) (List< Variable > vars, double[] assignment)
- static double[] [getVariableAssignmentFromIndex](#) (List< Variable > vars, int index)
- static int [getNumberOfPossibleAssignments](#) (List< Variable > vars)

#### 5.45.1 Detailed Description

This class implements various static methods useful when indexing arrays of distributions involving multinomial variables.

##### Author

Antonio Fernández

##### Version

1.0

##### Since

2014-11-4

#### 5.45.2 Member Function Documentation

##### 5.45.2.1 static int eu.amidst.core.utils.MultinomialIndex.getIndexFromVariableAssignment ( List< Variable > vars, Assignment assignment ) [static]

Computes the order of an assignment when indexing the set of possible values for a set of multinomial variables.

Example: Let X, Y and Z three multinomial variables with states {0,1}, {0,1} and {0,1,2} respectively. Then, they are indexed as:

```
X Y Z Index
0 0 0 0
1 0 0 1
0 1 0 2
1 1 0 3
0 0 1 4
1 0 1 5
0 1 1 6
1 1 1 7
0 0 2 8
1 0 2 9
0 1 2 10
1 1 2 11
```

So, for instance  $\text{Index}(0,0,2) = 8$ .

**Parameters**

<i>vars</i>	A List of variables.
<i>assignment</i>	A Assignment for a set of variables.

**Returns**

The index of the corresponding assignment among the possible ones.

5.45.2.2 static int eu.amidst.core.utils.MultinomialIndex.getIndexFromVariableAssignment ( List< Variable > *vars*, List< Double > *assignment* ) [static]

Computes the order of an assignment when indexing the set of possible values for a set of multinomial variables.

**Parameters**

<i>vars</i>	A List of variables.
<i>assignment</i>	A List of double values for the variables in the same order.

**Returns**

The index of the corresponding assignment among the possible ones.

5.45.2.3 static int eu.amidst.core.utils.MultinomialIndex.getIndexFromVariableAssignment ( List< Variable > *vars*, double[] *assignment* ) [static]

Computes the order of an assignment when indexing the set of possible values for a set of multinomial variables.

**Parameters**

<i>vars</i>	A List of variables.
<i>assignment</i>	An array of double with the values of variables in the same order.

**Returns**

The index of the corresponding assignment among the possible ones.

5.45.2.4 static int eu.amidst.core.utils.MultinomialIndex.getNumberOfPossibleAssignments ( List< Variable > *vars* ) [static]

Computes the number of possible assignments for a list of variables

**Parameters**

<i>vars</i>	The List of variables.
-------------	------------------------

**Returns**

A integer indicating the number of possible assignments.

5.45.2.5 static double [] eu.amidst.core.utils.MultinomialIndex.getVariableAssignmentFromIndex ( List< Variable > *vars*, int *index* ) [static]

Computes the variable assignment located in a given position.

**Parameters**

<i>vars</i>	A List of variables.
<i>index</i>	The position of the Assignment.

**Returns**

An array of double with the values of the variables representing the assignment.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/utils/MultinomialIndex.java

## 5.46 eu.amidst.core.potential.MultivariateGaussian Class Reference

### Public Member Functions

- double **density** (double[] values)
- void **setMean** (double[] values)
- double **getMean** ()
- void **setCovariances** (double[][] values)
- double[][] **getCovariances** ()
- double[] **sample** ()

#### 5.46.1 Detailed Description

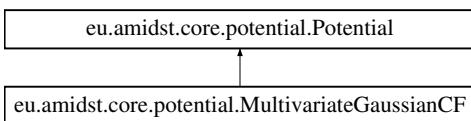
Created by afa on 03/07/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/MultivariateGaussian.java

## 5.47 eu.amidst.core.potential.MultivariateGaussianCF Class Reference

Inheritance diagram for eu.amidst.core.potential.MultivariateGaussianCF:



### Public Member Functions

- void **setParameters** (MultivariateGaussian prob)
- double[][] **getKParameter** ()
- double[] **getHParameter** ()
- double **getGParameter** ()
- MultivariateGaussian **getMG** ()
- void **setVariables** (List variables)
- List **getVariables** ()
- void **combine** (Potential pot)
- void **marginalize** (List variables)

### 5.47.1 Detailed Description

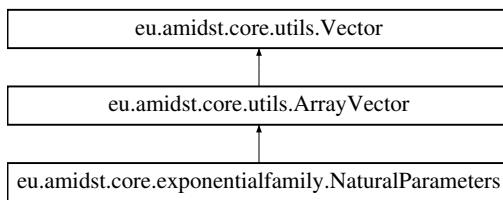
Created by afa on 03/07/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/MultivariateGaussianCF.java

## 5.48 eu.amidst.core.exponentialfamily.NaturalParameters Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.NaturalParameters:



### Public Member Functions

- **NaturalParameters** (int size)
- **NaturalParameters** (double[] vec)

### Additional Inherited Members

#### 5.48.1 Detailed Description

Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/NaturalParameters.java

## 5.49 eu.amidst.core.database.filereaders.NextDynamicDataInstance Class Reference

### Public Member Functions

- **NextDynamicDataInstance** (DataRow past, DataRow present, int sequenceID, int timeIDcounter)
- **DynamicDataInstance nextDataInstance\_NoTimeID\_NoSeq** (DataFileReader reader)
- **DynamicDataInstance nextDataInstance\_NoSeq** (DataFileReader reader, Attribute attTimeID)
- **DynamicDataInstance nextDataInstance\_NoTimeID** (DataFileReader reader, Attribute attSequenceID)
- **DynamicDataInstance nextDataInstance** (DataFileReader reader, Attribute attSequenceID, Attribute attTimeID)

#### 5.49.1 Detailed Description

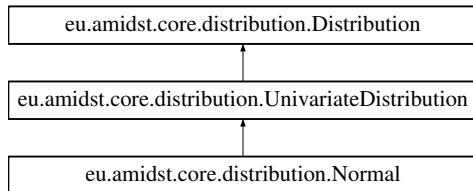
Created by ana@cs.aau.dk on 13/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/NextDynamicDataInstance.java

## 5.50 eu.amidst.core.distribution.Normal Class Reference

Inheritance diagram for eu.amidst.core.distribution.Normal:



### Public Member Functions

- [Normal \(Variable var\)](#)
- double [getMean \(\)](#)
- void [setMean \(double mean\)](#)
- double [getSd \(\)](#)
- void [setSd \(double sd\)](#)
- double [getProbability \(double value\)](#)
- double [getLogProbability \(double value\)](#)

### Additional Inherited Members

#### 5.50.1 Detailed Description

This class implements a univariate [Normal](#) distribution.

##### Author

Antonio Fernández

##### Version

1.0

##### Since

2014-11-3

#### 5.50.2 Constructor & Destructor Documentation

##### 5.50.2.1 eu.amidst.core.distribution.Normal.Normal ( Variable var )

The class constructor.

**Parameters**

<i>var</i>	The variable of the distribution.
------------	-----------------------------------

**5.50.3 Member Function Documentation****5.50.3.1 double eu.amidst.core.distribution.Normal.getLogProbability ( double *value* )**

Computes the logarithm of the density function in a given point.

**Parameters**

<i>value</i>	An value for the variable.
--------------	----------------------------

**Returns**

A double with the logarithm of the density value.

**5.50.3.2 double eu.amidst.core.distribution.Normal.getMean ( )**

Gets the mean of the distribution.

**Returns**

A double value with the mean.

**5.50.3.3 double eu.amidst.core.distribution.Normal.getProbability ( double *value* )**

Evaluates the density function in a given point.

**Parameters**

<i>value</i>	An value for the variable.
--------------	----------------------------

**Returns**

A double with the value of the density.

**5.50.3.4 double eu.amidst.core.distribution.Normal.getSd ( )**

Gets the standard deviation of the distribution.

**Returns**

A double value with the standar deviation.

**5.50.3.5 void eu.amidst.core.distribution.Normal.setMean ( double *mean* )**

Sets the mean of the distribution.

**Parameters**

<code>mean</code>	A value for the mean.
-------------------	-----------------------

**5.50.3.6 void eu.amidst.core.distribution.Normal.setSd ( double sd )**

Sets the standard deviation of the distribution.

**Parameters**

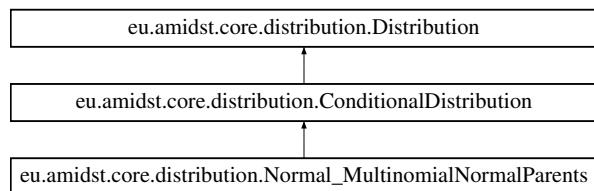
<code>sd</code>	A value for the standard deviation.
-----------------	-------------------------------------

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Normal.java

## 5.51 eu.amidst.core.distribution.Normal\_MultinomialNormalParents Class Reference

Inheritance diagram for eu.amidst.core.distribution.Normal\_MultinomialNormalParents:



### Public Member Functions

- `Normal_MultinomialNormalParents (Variable var, List< Variable > parents)`
- `Normal_NormalParents getNormal_NormalParentsDistribution (Assignment assignment)`
- `Normal_NormalParents getNormal_NormalParentsDistribution (int i)`
- `void setNormal_NormalParentsDistribution (int position, Normal_NormalParents distribution)`
- `void setNormal_NormalParentsDistribution (Assignment assignment, Normal_NormalParents distribution)`
- `double getLogConditionalProbability (Assignment assignment)`
- `List< Variable > getMultinomialParents ()`
- `List< Variable > getNormalParents ()`
- `Normal_NormalParents[] getDistribution ()`

### Additional Inherited Members

#### 5.51.1 Detailed Description

This class implements a conditional distribution of a normal variable given a set of multinomial and normal parents.

#### Author

Antonio Fernández

#### Version

1.0

Since

2014-11-4

### 5.51.2 Constructor & Destructor Documentation

5.51.2.1 `eu.amidst.core.distribution.Normal_MultinomialNormalParents.Normal_MultinomialNormalParents ( Variable var, List< Variable > parents )`

The class constructor.

Parameters

<code>var</code>	The variable of the distribution.
<code>parents</code>	The set of parent variables.

### 5.51.3 Member Function Documentation

5.51.3.1 `double eu.amidst.core.distribution.Normal_MultinomialNormalParents.getLogConditionalProbability ( Assignment assignment )`

Computes the logarithm of the evaluated density function in a point after restricting the distribution to a given parent Assignment.

Parameters

<code>assignment</code>	An Assignment
-------------------------	---------------

Returns

A double with the logarithm of the corresponding density value.

5.51.3.2 `Normal_NormalParents eu.amidst.core.distribution.Normal_MultinomialNormalParents.getNormal_NormalParentsDistribution ( Assignment assignment )`

Gets a `Normal_NormalParentsDistribution` distribution conditioned to an assignment over a set of `Multinomial` parents. Let X and Y two sets of `Normal` variables, and Z a set of `Multinomial`. Then this method computes  $f(X|Y, Z=z)$ .

Parameters

<code>assignment</code>	An assignment over a set of parents. For generality reasons, apart from the <code>Multinomial</code> parents, the assignment contains values for the <code>Normal</code> parents as well (although they are not used in this case).
-------------------------	---

Returns

a `Normal_NormalParentsDistribution` distribution conditioned to the assignment given as argument.

5.51.3.3 `void eu.amidst.core.distribution.Normal_MultinomialNormalParents.setNormal_NormalParentsDistribution ( int position, Normal_NormalParents distribution )`

Sets a `Normal_NormalParents` distribution to a given position in the array of distributions.

**Parameters**

<i>position</i>	The position in which the distribution is set.
<i>distribution</i>	A <a href="#">Normal_NormalParents</a> distribution.

**5.51.3.4 void eu.amidst.core.distribution.Normal\_MultinomialNormalParents.setNormal\_NormalParentsDistribution ( Assignment *assignment*, Normal\_NormalParents *distribution* )**

Sets a [Normal\\_NormalParents](#) distribution to the array of distributions in a position determined by an given Assignment. Note that this assignment contains values for the [Normal](#) parents as well (although they are not used in this case).

**Parameters**

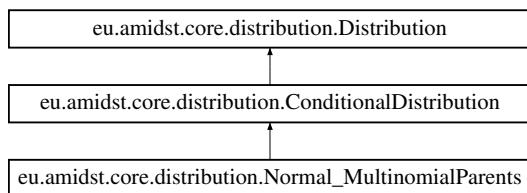
<i>assignment</i>	An Assignment for the parents variables.
<i>distribution</i>	A <a href="#">Normal_NormalParents</a> distribution.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Normal\_MultinomialNormalParents.java

## 5.52 eu.amidst.core.distribution.Normal\_MultinomialParents Class Reference

Inheritance diagram for eu.amidst.core.distribution.Normal\_MultinomialParents:



### Public Member Functions

- [Normal\\_MultinomialParents \(Variable var, List< Variable > parents\)](#)
- [Normal getNormal \(int position\)](#)
- [Normal getNormal \(Assignment parentsAssignment\)](#)
- [void setNormal \(int position, Normal normalDistribution\)](#)
- [void setNormal \(Assignment parentsAssignment, Normal normalDistribution\)](#)
- [double getLogConditionalProbability \(Assignment assignment\)](#)

### Additional Inherited Members

#### 5.52.1 Detailed Description

This class implements a conditional distribution of a normal variable given a set of multinomial parents.

#### Author

Antonio Fernández

**Version**

1.0

**Since**

2014-11-4

**5.52.2 Constructor & Destructor Documentation**

5.52.2.1 `eu.amidst.core.distribution.Normal_MultinomialParents.Normal_MultinomialParents ( Variable var, List< Variable > parents )`

The class constructor.

**Parameters**

<code>var</code>	The variable of the distribution.
<code>parents</code>	The set of parent variables.

**5.52.3 Member Function Documentation**

5.52.3.1 `double eu.amidst.core.distribution.Normal_MultinomialParents.getLogConditionalProbability ( Assignment assignment )`

Computes the logarithm of the evaluated density function in a point after conditioning the distribution to a given parent Assignment.

**Parameters**

<code>assignment</code>	An Assignment for the parents.
-------------------------	--------------------------------

**Returns**

A double with the logarithm of the corresponding density value.

5.52.3.2 `Normal eu.amidst.core.distribution.Normal_MultinomialParents.getNormal ( Assignment parentsAssignment )`

Gets the corresponding univariate normal distribution after conditioning the distribution to a multinomial parent assignment.

**Parameters**

<code>parentsAssignment</code>	An Assignment for the parents.
--------------------------------	--------------------------------

**Returns**

A `Normal` object with the univariate distribution.

5.52.3.3 `void eu.amidst.core.distribution.Normal_MultinomialParents.setNormal ( int position, Normal normalDistribution )`

Sets a `Normal` distribution in a given position in the array of distributions.

**Parameters**

<i>position</i>	The position in which the distribution is set.
<i>normal<math>\leftarrow</math> Distribution</i>	The <a href="#">Normal</a> distribution to be set.

5.52.3.4 void eu.amidst.core.distribution.Normal\_MultinomialParents.setNormal ( [Assignment parentsAssignment](#), [Normal normalDistribution](#) )

Sets a [Multinomial](#) distribution in a position in the array of distributions determined by a given parents assignment.

**Parameters**

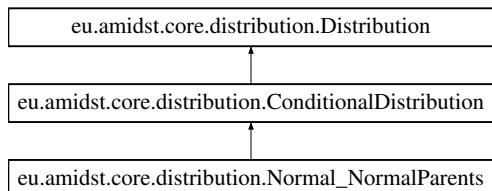
<i>parents<math>\leftarrow</math> Assignment</i>	An <a href="#">Assignment</a> for the parents.
<i>normal<math>\leftarrow</math> Distribution</i>	The <a href="#">Normal</a> distribution to be set.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Normal\_MultinomialParents.java

## 5.53 eu.amidst.core.distribution.Normal\_NormalParents Class Reference

Inheritance diagram for eu.amidst.core.distribution.Normal\_NormalParents:



### Public Member Functions

- [Normal\\_NormalParents \(Variable var, List< Variable > parents\)](#)
- double [getIntercept \(\)](#)
- void [setIntercept \(double intercept\)](#)
- double[] [getCoeffParents \(\)](#)
- void [setCoeffParents \(double\[\] coeffParents\)](#)
- double [getSd \(\)](#)
- void [setSd \(double sd\)](#)
- [Normal getUnivariateNormal \(Assignment parentsAssignment\)](#)
- double [getLogConditionalProbability \(Assignment assignment\)](#)

### Additional Inherited Members

#### 5.53.1 Detailed Description

This class implements a Conditional Linear Gaussian distribution, i.e. a distribution of a normal variable with continuous normal parents.

**Author**

Antonio Fernández

**Version**

1.0

**Since**

2014-11-4

### 5.53.2 Constructor & Destructor Documentation

5.53.2.1 `eu.amidst.core.distribution.Normal_NormalParents.Normal_NormalParents ( Variable var, List<Variable> parents )`

The class constructor.

**Parameters**

<code>var</code>	The variable of the distribution.
<code>parents</code>	The set of parents of the variable.

### 5.53.3 Member Function Documentation

5.53.3.1 `double [] eu.amidst.core.distribution.Normal_NormalParents.getCoeffParents ( )`

Gets the coefficients for the parent variables.

**Returns**

An array of `double` with the coefficients.

5.53.3.2 `double eu.amidst.core.distribution.Normal_NormalParents.getIntercept ( )`

Gets the intercept of the distribution.

**Returns**

A `double` value with the intercept.

5.53.3.3 `double eu.amidst.core.distribution.Normal_NormalParents.getLogConditionalProbability ( Assignment assignment )`

Computes the logarithm of the evaluated density function in a point after conditioning the distribution to a given parent Assignment.

**Parameters**

<code>assignment</code>	An Assignment
-------------------------	---------------

**Returns**

A `double` with the logarithm of the corresponding density value.

5.53.3.4 double eu.amidst.core.distribution.Normal\_NormalParents.getSd( )

Gets the standard deviation of the variable.

**Returns**

A double value with the standard deviation.

5.53.3.5 Normal eu.amidst.core.distribution.Normal\_NormalParents.getUnivariateNormal( Assignment parentsAssignment )

Gets the corresponding univariate normal distribution after conditioning the distribution to a parent assignment.

**Parameters**

<i>parents</i> ↪ Assignment	An Assignment for the parents.
--------------------------------	--------------------------------

**Returns**

A [Normal](#) object with the univariate distribution.

5.53.3.6 void eu.amidst.core.distribution.Normal\_NormalParents.setCoeffParents( double[] coeffParents )

Sets the coefficients of the distribution

**Parameters**

<i>coeffParents</i>	An array of double with the coefficients, one for each parent.
---------------------	--

5.53.3.7 void eu.amidst.core.distribution.Normal\_NormalParents.setIntercept( double intercept )

Sets the intercept of the distribution.

**Parameters**

<i>intercept</i>	A double value with the intercept.
------------------	------------------------------------

5.53.3.8 void eu.amidst.core.distribution.Normal\_NormalParents.setSd( double sd )

Sets the standard deviation of the variable.

**Parameters**

<i>sd</i>	A double value with the standard deviation.
-----------	---

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/Normal\_NormalParents.java

## 5.54 eu.amidst.core.huginlink.Others Class Reference

### 5.54.1 Detailed Description

Created by afa on 18/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/huginlink/Others.java

## 5.55 eu.amidst.core.modelstructure.ParentSet Class Reference

### Public Member Functions

- void **addParent** ([Variable](#) var)
- void **removeParent** ([Variable](#) var)
- List< [Variable](#) > **getParents** ()
- int **getNumberOfParents** ()
- void **blockParents** ()

### Static Public Member Functions

- static [ParentSet](#) **newParentSet** ()

#### 5.55.1 Detailed Description

Created by afa on 02/07/14.

#### 5.55.2 Member Function Documentation

##### 5.55.2.1 void eu.amidst.core.modelstructure.ParentSet.blockParents ( )

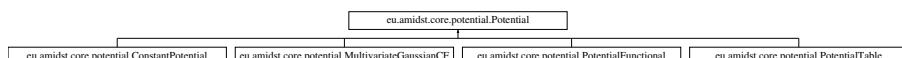
Is an ArrayList pointer to an ArrayList unmodifiable object still unmodifiable? I guess so right?

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/modelstructure/ParentSet.java

## 5.56 eu.amidst.core.potential.Potential Interface Reference

Inheritance diagram for eu.amidst.core.potential.Potential:



### Public Member Functions

- void **setVariables** (List variables)
- List **getVariables** ()
- void **combine** ([Potential](#) pot)
- void **marginalize** (List variables)

#### 5.56.1 Detailed Description

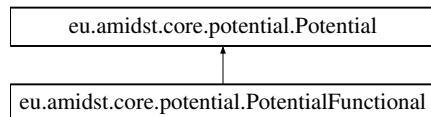
Created by afa on 03/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/Potential.java

## 5.57 eu.amidst.core.potential.PotentialFunctional Class Reference

Inheritance diagram for eu.amidst.core.potential.PotentialFunctional:



### Public Member Functions

- void **setVariables** (List variables)
- List **getVariables** ()
- void **combine** (Potential pot)
- void **marginalize** (List variables)

#### 5.57.1 Detailed Description

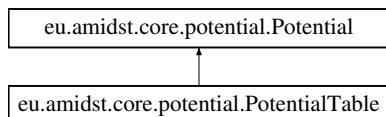
Created by afa on 03/07/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/PotentialFunctional.java

## 5.58 eu.amidst.core.potential.PotentialTable Class Reference

Inheritance diagram for eu.amidst.core.potential.PotentialTable:



### Public Member Functions

- PotentialTable (int nstates)
- void **setValues** (double[] values)
- double[] **getValues** ()
- void **setVariables** (List variables)
- List **getVariables** ()
- void **combine** (Potential pot)
- void **marginalize** (List variables)
- void **normalize** ()

#### 5.58.1 Detailed Description

Created by afa on 03/07/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/potential/PotentialTable.java

## 5.59 eu.amidst.core.database.dynamics.SequenceDataStream Interface Reference

### Public Member Functions

- **Attributes** `getDynamicAttributes ()`
- int `getNumTimeStepsBack ()`
- boolean `hasMoreData ()`
- **DynamicDataInstance** `nextSequenceData ()`
- void `reset ()`
- boolean `isResetable ()`

#### 5.59.1 Detailed Description

Created by afa on 03/07/14.

The documentation for this interface was generated from the following file:

- `/Users/ana/Documents/core/src/main/java/eu/amidst/core/database/dynamics/SequenceDataStream.java`

## 5.60 eu.amidst.core.database.dynamics.readers.SequenceDataStreamReaderFromFile Class Reference

### Public Member Functions

- **SequenceDataStreamReaderFromFile** (`String fileName`)
- **SequenceDataStream** `getDataStream ()`

#### 5.60.1 Detailed Description

Created by andresmasegosa on 27/08/14.

The documentation for this class was generated from the following file:

- `/Users/ana/Documents/core/src/main/java/eu/amidst/core/database/dynamics/readers/SequenceDataStreamReaderFromFile.java`

## 5.61 eu.amidst.core.database.dynamics.SequenceStreamWindow Interface Reference

### Public Member Functions

- **Attributes** `getDynamicAttributes ()`
- int `getWindowSize ()`
- boolean `hasMoreData ()`
- void `loadNextWindow ()`
- **DynamicDataInstance** `getSequenceData (int indexInWindow)`
- boolean `isResetable ()`
- void `reset ()`

### 5.61.1 Detailed Description

Created by afa on 03/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/dynamics/SequenceStreamWindow.java

## 5.62 eu.amidst.core.variables.StateSpaceType Enum Reference

### Static Public Member Functions

- static [StateSpaceType parseKind](#) (String s)

### Public Attributes

- **REAL**

### 5.62.1 Detailed Description

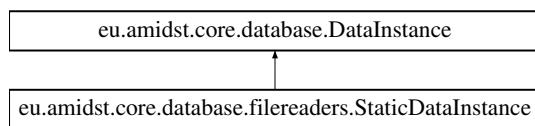
Created by sigveh on 10/20/14.

The documentation for this enum was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/StateSpaceType.java

## 5.63 eu.amidst.core.database.filereaders.StaticDataInstance Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.StaticDataInstance:



### Public Member Functions

- **StaticDataInstance** ([DataRow](#) dataRow\_)
- double **getValue** ([Variable](#) var)
- int **getSequenceID** ()
- int **getTimeID** ()

### 5.63.1 Detailed Description

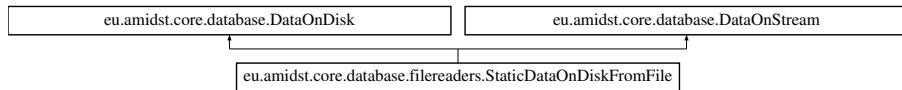
Created by andresmasegosa on 11/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/StaticDataInstance.java

## 5.64 eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.StaticDataOnDiskFromFile:



### Public Member Functions

- **StaticDataOnDiskFromFile** ([DataFileReader](#) reader)
- **DataInstance** [nextDataInstance](#) ()
- boolean [hasMoreDataInstances](#) ()
- [Attributes](#) [getAttributes](#) ()
- void [restart](#) ()

#### 5.64.1 Detailed Description

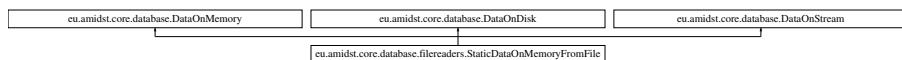
Created by andresmasegosa on 11/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/StaticDataOnDiskFromFile.java

## 5.65 eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.StaticDataOnMemoryFromFile:



### Public Member Functions

- **StaticDataOnMemoryFromFile** ([DataFileReader](#) reader)
- int [getNumberOfDataInstances](#) ()
- **DataInstance** [getDataInstance](#) (int i)
- **DataInstance** [nextDataInstance](#) ()
- boolean [hasMoreDataInstances](#) ()
- void [restart](#) ()
- [Attributes](#) [getAttributes](#) ()

#### 5.65.1 Detailed Description

Created by andresmasegosa on 11/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/StaticDataOnMemoryFromfile.java

## 5.66 eu.amidst.core.variables.StaticVariables Class Reference

### Public Member Functions

- **StaticVariables** (**Attributes** atts)
- **StaticVariables** (**Attributes** atts, **HashMap< Attribute, DistType >** typeDists)
- **Variable addHiddenVariable** (**VariableBuilder** builder)
- **List< Variable > getVariables ()**
- **Variable getVariable** (int varID)
- **Variable getVariable** (String name)
- **int getNumberOfVars ()**

### 5.66.1 Detailed Description

Created by afa on 02/07/14.

### 5.66.2 Constructor & Destructor Documentation

#### 5.66.2.1 eu.amidst.core.variables.StaticVariables ( Attributes atts )

Constructor where the distribution type of random variables is initialized by default.

#### 5.66.2.2 eu.amidst.core.variables.StaticVariables ( Attributes atts, **HashMap< Attribute, DistType >** typeDists )

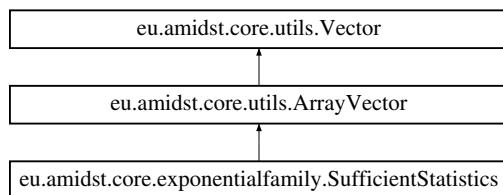
Constructor where the distribution type of random variables is provided as an argument.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/StaticVariables.java

## 5.67 eu.amidst.core.exponentialfamily.SufficientStatistics Class Reference

Inheritance diagram for eu.amidst.core.exponentialfamily.SufficientStatistics:



### Public Member Functions

- **SufficientStatistics** (int size)
- **SufficientStatistics** (double[] vec)

## Additional Inherited Members

### 5.67.1 Detailed Description

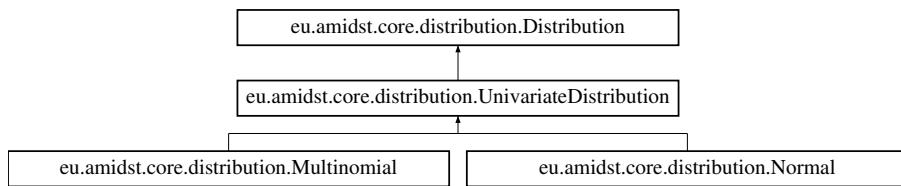
Created by andresmasegosa on 12/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/exponentialfamily/SufficientStatistics.java

## 5.68 eu.amidst.core.distribution.UnivariateDistribution Class Reference

Inheritance diagram for eu.amidst.core.distribution.UnivariateDistribution:



## Public Member Functions

- double `getProbability` (double value)
- abstract double `getLogProbability` (double value)

## Additional Inherited Members

### 5.68.1 Detailed Description

This interface generalizes the set of univariate distributions.

#### Author

Antonio Fernández

#### Version

1.0

#### Since

2014-11-3

## 5.68.2 Member Function Documentation

### 5.68.2.1 abstract double eu.amidst.core.distribution.UnivariateDistribution.getLogProbability ( double value ) [abstract]

Evaluates the distribution in a given point.

**Parameters**

<code>value</code>	The point to be evaluated.
--------------------	----------------------------

**Returns**

A double value with the logarithm of the evaluated distribution.

**5.68.2.2 double eu.amidst.core.distribution.UnivariateDistribution.getProbability ( double value )**

Evaluates the distribution in a given point.

**Parameters**

<code>value</code>	The point to be evaluated.
--------------------	----------------------------

**Returns**

A double value with the evaluated distribution.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/distribution/UnivariateDistribution.java

**5.69 eu.amidst.core.utils.Utils Class Reference****Static Public Member Functions**

- static double **getMissingValue** ()
- static boolean **isMissing** (double val)
- static void **accumulatedSumVectors** (double[] a, double[] b)

**5.69.1 Detailed Description**

Created by andresmasegosa on 28/08/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/utils/Utils.java

**5.70 eu.amidst.core.variables.Variable Interface Reference****Public Member Functions**

- String **getName** ()
- int **getVarID** ()
- boolean **isObservable** ()
- int **getNumberOfStates** ()
- **StateSpaceType** **getStateSpaceType** ()
- **DistType** **getDistributionType** ()
- boolean **isTemporalClone** ()
- **Attribute** **getAttribute** ()

### 5.70.1 Detailed Description

Created by afa on 02/07/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/Variable.java

## 5.71 eu.amidst.core.variables.VariableBuilder Class Reference

### Public Member Functions

- **VariableBuilder** ([Attribute](#) att)
- **VariableBuilder** ([Attribute](#) att, [DistType](#) typeDist)

### Static Public Member Functions

- static String **getName** ()
- static boolean **isObservable** ()
- static int **getNumberOfStates** ()
- static [StateSpaceType](#) **getStateSpaceType** ()
- static [DistType](#) **getDistributionType** ()
- static [Attribute](#) **getAttribute** ()

### 5.71.1 Detailed Description

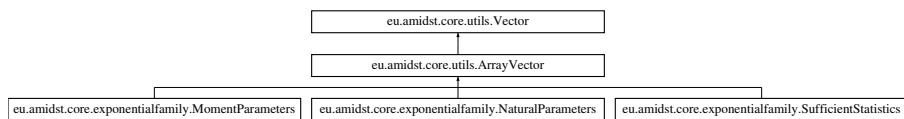
Created by andresmasegosa on 04/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/variables/VariableBuilder.java

## 5.72 eu.amidst.core.utils.Vector Interface Reference

Inheritance diagram for eu.amidst.core.utils.Vector:



### Public Member Functions

- double **get** (int i)
- void **set** (int i, double val)
- int **size** ()
- default void **dotProduct** ([Vector](#) vec)

### Static Public Member Functions

- static double **dotProduct** ([Vector](#) vec1, [Vector](#) vec2)

### 5.72.1 Detailed Description

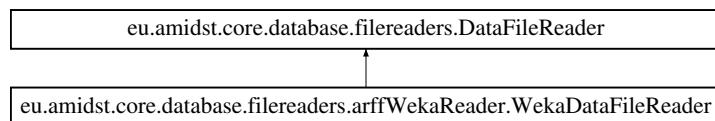
Created by andresmasegosa on 12/11/14.

The documentation for this interface was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/utils/Vector.java

## 5.73 eu.amidst.core.database.filereaders.arffWekaReader.WekaDataFileReader Class Reference

Inheritance diagram for eu.amidst.core.database.filereaders.arffWekaReader.WekaDataFileReader:



### Public Member Functions

- **WekaDataFileReader** (String s)
- **Attributes** **getAttributes** ()
- **DataRow** **nextDataRow** ()
- boolean **hasMoreDataRows** ()
- void **reset** ()
- boolean **doesItReadThisFileExtension** (String fileExtension)

### 5.73.1 Detailed Description

Created by [ana@cs.aau.dk](mailto:ana@cs.aau.dk) on 14/11/14.

The documentation for this class was generated from the following file:

- /Users/ana/Documents/core/src/main/java/eu/amidst/core/database/filereaders/arffWekaReader/WekaDataFileReader.java