AMORE++

pre-alpha (active development aiming to release a beta version this summer (2011))

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Contents

Chapter 1

The AMORE++ package

1.1 Introduction

Here you will find the documentation of the C++ component of the AMORE++ R package. The AMORE++ package is a new version of the publicly available AMORE package for neural network training and simulation under R

1.2 Motivation

Since the release of the previous version of the AMORE many things have changed in the R programming world. The advent of the Reference Classes and of packages like Rcpp, inline and RUnit compel us to write a better version of the package in order to provide a more useful framework for neural network training and simulation.

1.3 Road Map

This project is currently very active and the development team intends to provide a beta version as soon as this summer (2011)

Chapter 2

Class Index

2.1 Class Hierarchy

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

Chapter 3

Class Index

3.1 Class List

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

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

Class Documentation

5.1 CompareId Struct Reference

Public Member Functions

- bool operator() (const ConPtr a, const ConPtr b)
- bool operator() (const ConPtr a, const int b)
- bool operator() (const int a, const ConPtr b)
- bool operator() (const int a, const int b)

5.1.1 Detailed Description

Definition at line 352 of file ConContainer.cpp.

5.1.2 Member Function Documentation

5.1.2.1 bool CompareId::operator() (const ConPtr *a*, const ConPtr *b*) `[inline]`

Definition at line 356 of file ConContainer.cpp.

```
{
  return a->getId() < b->getId();
}
```

5.1.2.2 bool CompareId::operator() (const int *a*, const int *b*) `[inline]`

Definition at line 377 of file ConContainer.cpp.

```
{
  return a < b;
}
```

5.1.2.3 bool CompareId::operator() (const int *a*, const ConPtr *b*) `[inline]`

Definition at line 370 of file ConContainer.cpp.

```
{
  return a < b->getId();
}
```

5.1.2.4 bool CompareId::operator() (const ConPtr *a*, const int *b*) `[inline]`

Definition at line 363 of file ConContainer.cpp.

```
{
  return a->getId() < b;
}
```

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

- pkg/AMORE/src/ConContainer.cpp

5.2 Con Class Reference

A class to handle the information needed to describe an input connection.

`#include <Con.h>`

Public Member Functions

- Con ()

  Default Constructor.
- Con (NeuronPtr neuronPtr)

  Constructor.
- Con (NeuronPtr neuronPtr, double value)

  Constructor.
- ∼Con ()

  Default Destructor.
- NeuronPtr getFrom ()

  from field accessor.
- void setFrom (NeuronPtr neuronPtr)

  from field accessor.
- int getId ()

  A getter of the Id of the Neuron pointed by the from field.
- double getWeight ()

  weight field accessor.

- void setWeight (double value)

  weight field accessor.
- bool show ()

  Pretty print of the Con information.
- bool validate ()

  Object validator.

Private Attributes

- NeuronWeakPtr from

  A smart pointer to the Neuron used as input during simulation or training.
- double weight

  A double variable that contains the weight of the connection.

5.2.1 Detailed Description

A class to handle the information needed to describe an input connection.

The Con class provides a simple class for a connection described by a pair of values: a pointer to a Neuron object used as the from field and the weight used to propagate the value of that Neuron object.

Definition at line 16 of file Con.h.

5.2.2 Constructor & Destructor Documentation

5.2.2.1 Con::Con ( )

Default Constructor.

Definition at line 17 of file Con.cpp.

```
                :
  weight(0), from()
{
}
```

5.2.2.2 Con::Con (NeuronPtr *neuronPtr*)

Constructor.

Definition at line 40 of file Con.cpp.

```
                                :
  from(neuronPtr), weight(0)
{
}
```

5.2.2.3 Con::Con (NeuronPtr *neuronPtr*, double *value*)

Constructor.

Definition at line 29 of file Con.cpp.

```
                                          :
  from(neuronPtr), weight(value)
{
}
```

5.2.2.4 Con::∼Con ( )

Default Destructor.

Definition at line 46 of file Con.cpp.

```
{
}
```

5.2.3 Member Function Documentation

5.2.3.1 NeuronPtr Con::getFrom ( )

from field accessor.

This method allows access to the address stored in the private from field (a pointer to a Neuron object).∗

Returns

A pointer to the Neuron object referred to by the from field.

```
        //================
        //Usage example:
        //================
        // Data set up
                        NeuronPtr ptShNeuron ( new Neuron(1) );          // Neuron
       Id is set 1
                        ConPtr ptShCon( new Con(ptShNeuron) );           // from p
      oints to ptShNeuron and weight is set to 0
        // Test
                        ptShNeuron = ptShCon->getFrom() ;
                        int result = ptShNeuron->getId();

        // Now, result is equal to 1.
```

See also

getId and the unit test files, e.g., runit.Cpp.Con.R, for further examples.

Definition at line 71 of file Con.cpp.

References from.

```
{
  return (from.lock());
}
```

5.2.3.2 int Con::getId ( )

A getter of the Id of the Neuron pointed by the from field.

This method gets the Id of the Neuron referred to by the from field

Returns

The value of the Id (an integer).

```
        //================
        //Usage example:
        //================
        // Data set up
                        NeuronPtr ptShNeuron ( new Neuron(16) );         // Neuron
       Id is set to 16
                        ConPtr ptShCon( new Con(ptShNeuron) );           // from p
      oints to ptShNeuron and weight is set to 0
        // Test
                        int result = ptShCon->getId();

        // Now, result is equal to 16.
```

See also

getFrom, setFrom and the unit test files, e.g., runit.Cpp.Con.R, for further examples.

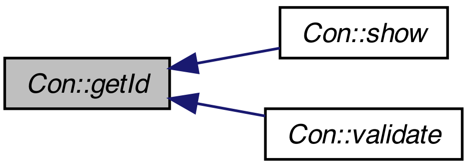
Definition at line 123 of file Con.cpp.

References from.

Referenced by show(), and validate().

```
{
  if (from.use_count() > 0)
    {
      NeuronPtr neuronPtr(from);
      return (neuronPtr->getId());
    }
  else
    {
      return (NA_INTEGER);
    }
}
```

Here is the caller graph for this function:



5.2.3.3 double Con::getWeight ( )

weight field accessor.

This method allows access to the value stored in the private field weight

Returns

The value of weight (double)

```
//================
//Usage example:
//================
// Data set up
                      std::vector<double> result;
                      NeuronPtr ptShNeuron ( new Neuron(16) );                /
    / Neuron Id is set to 16
                      ConPtr ptShCon( new Con(ptShNeuron, 12.4) );  // from poi
    nts to ptShNeuron and weight is set to 12.4
      // Test
                      result.push_back( ptShCon->getWeight() );
                      ptShCon->setWeight(2.2);
                      result.push_back( ptShCon->getWeight() );

      // Now, result is a numeric vector that contains the values 12.4 and 2.2
    .
```

See also

setWeight and the unit test files, e.g., runit.Cpp.Con.R, for further examples.

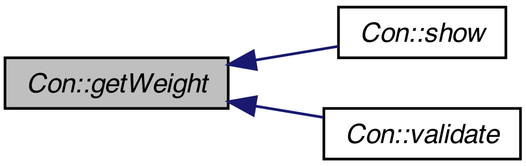
Definition at line 158 of file Con.cpp.

References weight.

Referenced by show(), and validate().

```
{
  return (weight);
}
```

Here is the caller graph for this function:



5.2.3.4 void Con::setFrom (NeuronPtr *neuronPtr*)

from field accessor.

This method sets the value of the from field with the address used as parameter.

Parameters

f	A pointer to the neuron that is to be inserted in the from field.

```
        //================
        //Usage example:
        //================
        // Data set up
                        NeuronPtr ptShNeuron ( new Neuron(1) );          // Neuron
       Id is set to 1
                        ConPtr ptShCon( new Con() );
                        ptShCon->setFrom( ptShNeuron );
        // Test
                        ptShNeuron = ptShCon->getFrom() ;
                        int result = ptShNeuron->getId();

        // Now, result is equal to 1
```

See also

getFrom and getId contain usage examples. For further examples see the unit test files, e.g., runit.Cpp.Con.R

Definition at line 98 of file Con.cpp.

References from.

```
{
  from = neuronPtr;
}
```

5.2.3.5 void Con::setWeight (double *value*)

weight field accessor.

This method sets the value of the weight field.

Parameters

w	The new value (double) to be set in the weight field.

```
//================
//Usage example:
//================
// Data set up
                      std::vector<double> result;
                      NeuronPtr ptShNeuron ( new Neuron(16) );                /
    / Neuron Id is set to 16
                      ConPtr ptShCon( new Con(ptShNeuron, 12.4) );  // from poi
    nts to ptShNeuron and weight is set to 12.4
                      result.push_back(ptShCon->getWeight());
      // Test
                      ptShCon->setWeight(2.2);
                      result.push_back(ptShCon->getWeight());

      // Now, result is a numeric vector that contains the values 12.4 and 2.2
    .
```

See also

getWeight and the unit test files (e.g. runit.Cpp.Con.R)

Definition at line 186 of file Con.cpp.

References weight.

```
{
  weight = value;
}
```

5.2.3.6 bool Con::show ( )

Pretty print of the Con information.

This method outputs in the R terminal the contents of the Con fields.

Returns

true in case everything works without throwing an exception

See also

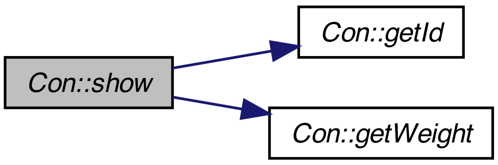
setWeight and the unit test files, e.g., runit.Cpp.Con.R, for usage examples.

Definition at line 197 of file Con.cpp.

References getId(), and getWeight().

```
{
  int id = getId();
  if (id == NA_INTEGER)
    {
      Rprintf("From: NA\t Invalid Connection \n");
    }
  else
    {
      Rprintf("From:\t %d \t Weight= \t %lf \n", id, getWeight());
    }
  return (true);
}
```

Here is the call graph for this function:



5.2.3.7 bool Con::validate ( )

Object validator.

This method checks the object for internal coherence. A try / catch mechanism exits normal execution and returns control to the R terminal in case the contents of the Con object are identified as corrupted.

Returns

true in case the checks are Ok.

Exceptions

An	std::range error if weight or from are not finite.

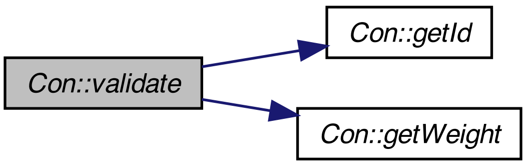
Definition at line 218 of file Con.cpp.

References getId(), and getWeight().

```
{
  BEGIN_RCPP
  if (! R_FINITE(getWeight()) ) throw std::range_error("weight is not finite.");
  if (getId() == NA_INTEGER)
```

```
    throw std::range_error("fromId is not finite.");
  return (true);
END_RCPP}
```

Here is the call graph for this function:



5.2.4 Member Data Documentation

5.2.4.1 NeuronWeakPtr Con::from `[private]`

A smart pointer to the Neuron used as input during simulation or training.

The from field contains the address of the Neuron whose output will be used as input by the Neuron containing the Con object.

Definition at line 22 of file Con.h.

Referenced by getFrom(), getId(), and setFrom().

5.2.4.2 double Con::weight `[private]`

A double variable that contains the weight of the connection.

The weight field contains the factor by which the output value of the Neuron addressed by the from field is multiplied during simulation or training.

Definition at line 27 of file Con.h.

Referenced by getWeight(), and setWeight().

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

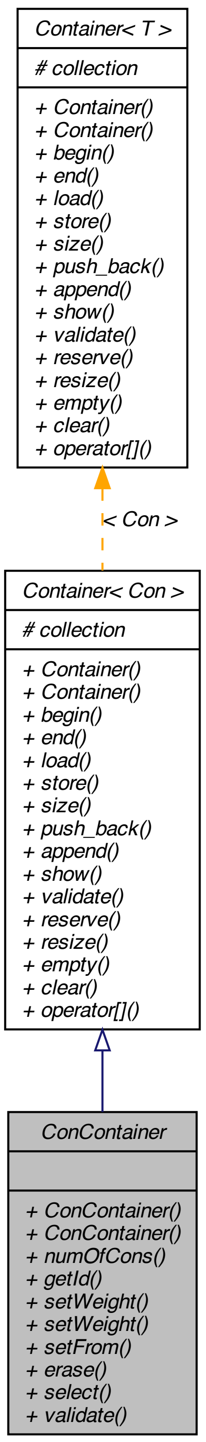
- pkg/AMORE/src/Con.h
- pkg/AMORE/src/Con.cpp

5.3 ConContainer Class Reference

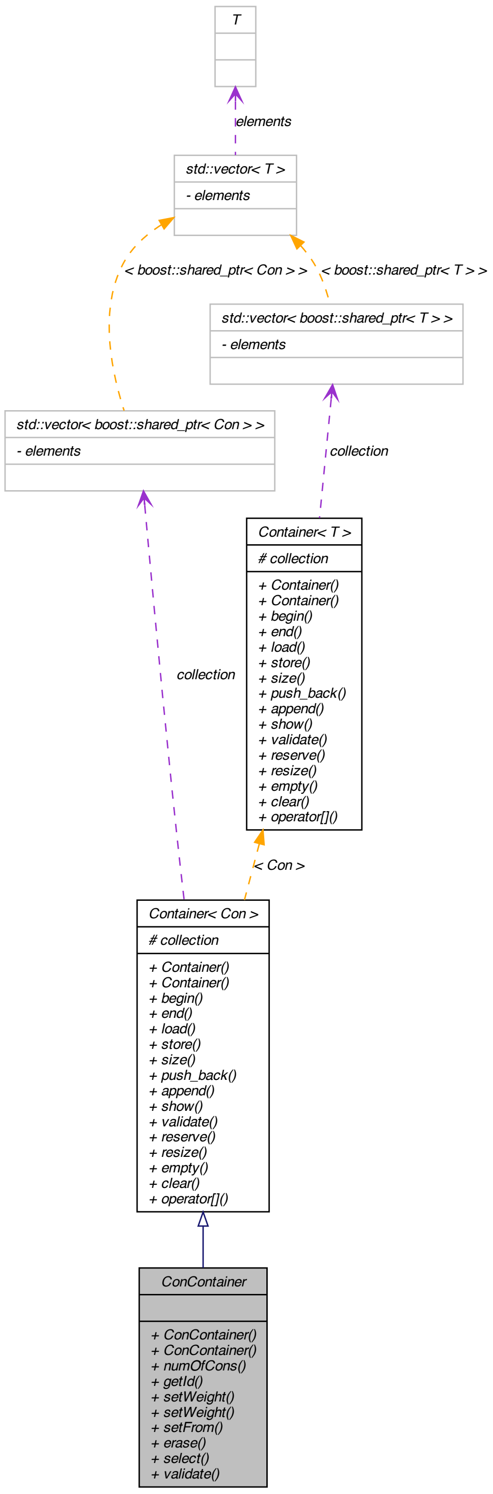
A vector of connections.

```
#include <ConContainer.h>
```

Inheritance diagram for ConContainer:



Collaboration diagram for ConContainer:



Public Types

- typedef std::vector< boost::shared_ptr< Con > >::iterator iterator
- typedef std::vector< boost::shared_ptr< Con > >::const_iterator const_iterator
- typedef boost::shared_ptr< Con > value_type
- typedef value_type const & const_reference

Public Member Functions

- ConContainer ()
- ConContainer (std::vector< ConPtr > collection)
- int numOfCons ()

  Size of the ConContainer object.
- std::vector< int > getId ()

  Getter of the Id values of the vector of Cons.
- bool setWeight (std::vector< double > nWeights)

  Setter of the weight field of the Con objects related to ConContainer.
- bool setWeight (std::vector< double > nWeights, std::vector< int > nIds)

  Setter of the weights of the specified elements from the ConContainer object.
- bool setFrom (NeuronContainer neuronContainer)

  Setter of the from fields of the Con objects related to ConContainer.
- void erase (std::vector< int > nIds)

  Erase the specified elements from the vecCom object.
- ConContainerPtr select (std::vector< int > nIds)

  Selects the specified elements from the vecCom object.
- bool validate ()

  Object validator.

5.3.1 Detailed Description

A vector of connections.

The ConContainer class provides a simple class for a vector of connections. It's named after the R equivalent Reference Class.

Definition at line 16 of file ConContainer.h.

5.3.2 Member Typedef Documentation

5.3.2.1 typedef std::vector<boost::shared_ptr<Con> >::const_iterator ConContainer::const_iterator

Reimplemented from Container< Con >.

Definition at line 23 of file ConContainer.h.

5.3.2.2 typedef value_type const& ConContainer::const_reference

Reimplemented from Container< Con >.

Definition at line 27 of file ConContainer.h.

5.3.2.3 typedef std::vector<boost::shared_ptr<Con> >::iterator ConContainer::iterator

Reimplemented from Container< Con >.

Definition at line 21 of file ConContainer.h.

5.3.2.4 typedef boost::shared_ptr<Con> ConContainer::value_type

Reimplemented from Container< Con >.

Definition at line 25 of file ConContainer.h.

5.3.3 Constructor & Destructor Documentation

5.3.3.1 ConContainer::ConContainer ( )

Definition at line 8 of file ConContainer.cpp.

```
{
}
```

5.3.3.2 ConContainer::ConContainer (std::vector< ConPtr > *collection*)

Definition at line 12 of file ConContainer.cpp.

```
                                                                :
  Container<Con> (collection) // Call to Base constructor
{
}
```

5.3.4 Member Function Documentation

5.3.4.1 void ConContainer::erase (std::vector< int > *nIds*)

Erase the specified elements from the vecCom object.

Provides a convenient way of removing some Con objects from the collection field of the ConContainer object.

Parameters

vFrom	An std::vector<int> with the Ids of the connections to remove.

```
        //================
        //Usage example:
        //================

        // Data set up
                        std::vector<int> result;
                        std::vector<NeuronPtr> neuronContainer;
                        ConContainerPtr conContainerPtr( new ConContainer() );
                        ConContainerPtr vErased;
                        ConPtr  ptC;
                        NeuronPtr ptN;
                        int ids[]= {11, 10, 9, 3, 4, 5, 6, 7, 8, 2, 1};
                        std::vector<double> nWeights;
                        nWeights.push_back(11.32);
                        nWeights.push_back(1.26);
                        nWeights.push_back(2.14);
                        nWeights.push_back(3.16);
                        nWeights.push_back(4.14);
                        nWeights.push_back(5.19);
                        nWeights.push_back(6.18);
                        nWeights.push_back(7.16);
                        nWeights.push_back(8.14);
                        nWeights.push_back(9.12);
                        nWeights.push_back(10.31);

                        for (int i=0; i<nWeights.size() ; i++) {
      / Let's create a vector with three neurons
                                ptN.reset( new Neuron( ids[i] ) );
                                neuronContainer.push_back(ptN);
                        }
                        conContainerPtr->buildAndAppend(neuronContainer, nWeights
      );

                        // Test

                        std::vector<int> toRemove;
                        toRemove.push_back(1);
                        toRemove.push_back(3);
                        toRemove.push_back(5);
                        toRemove.push_back(7);

                        conContainerPtr->erase(toRemove);
                        conContainerPtr->show();
                        result=conContainerPtr->getId();

                // The output at the R terminal would display :
                //
                // From:        2       Weight=         9.120000
                // From:        4       Weight=         4.140000
                // From:        6       Weight=         6.180000
                // From:        8       Weight=         8.140000
                // From:        9       Weight=         2.140000
                // From:        10   Weight=     1.260000
                // From:        11   Weight=     11.320000
```

See also

select and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

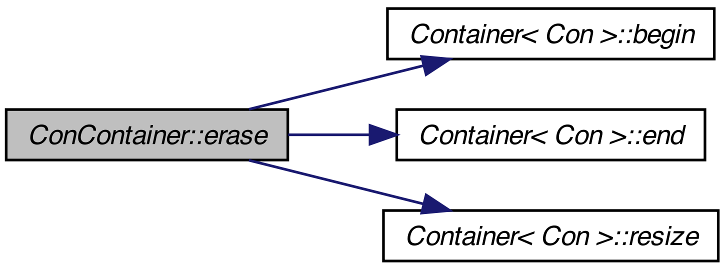
Definition at line 450 of file ConContainer.cpp.

References Container< Con >::begin(), Container< Con >::end(), and Container<

Con >::resize().

```
{
  std::vector<ConPtr>::iterator itr;
  sort(begin(), end(), CompareId());
  sort(nIds.begin(), nIds.end());
  itr = set_difference(begin(), end(), nIds.begin(), nIds.end(), begin(),
      CompareId());
  resize(itr - begin());
}
```

Here is the call graph for this function:



5.3.4.2 std::vector< int > ConContainer::getId ( )

Getter of the Id values of the vector of Cons.

This function returns the Id's of the neurons referred to by the vector of Cons.

Returns

An std::vector<int> that contains the Ids

```
  //================
  //Usage example:
  //================
        // Data set up
                        Neuron N1, N2, N3;
                        ConContainer conContainer;
                        std::vector<int> result;

                        N1.setId(10);
                        N2.setId(20);
                        N3.setId(30);

                        ConPtr ptCon( new Con(&N1, 1.13) );     // Create new Con
```

```
       and initialize ptCon
                        conContainer.push_back(ptCon);                        /
      / push_back
                        ptCon.reset(  new Con(&N2, 2.22) );             // create
       new Con and assign to ptCon
                        conContainer.push_back(ptCon);                        /
      / push_back
                        ptCon.reset(  new Con(&N3, 3.33) );             // create
       new Con and assign to ptCon
                        conContainer.push_back(ptCon);                        /
      / push_back

        // Test
                        conContainer.show() ;
                        conContainer.validate();
                        result=conContainer.getId();

        // Now result is a vector that contains the values 10, 20 and 30.
```

See also

getWeight and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

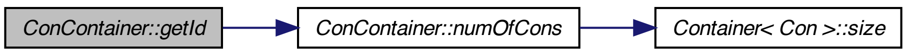
Definition at line 93 of file ConContainer.cpp.

References numOfCons().

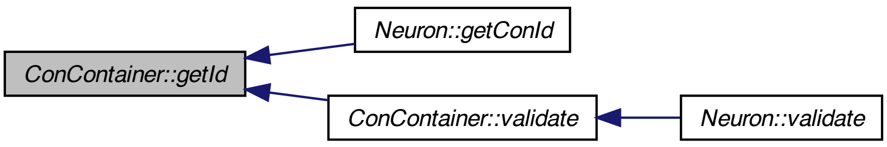
Referenced by Neuron::getConId(), and validate().

```
{
  std::vector<int> result;
  result.reserve(numOfCons());
  foreach (ConPtr itr, *this)
    {
      result.push_back(itr->getId());
    }
  return result;
}
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.3.4.3 int ConContainer::numOfCons ( )

Size of the ConContainer object.

This function returns the size of the ConContainer object, that is to say, the number of Con objects it contains.

Returns

The size of the vector

```
//================
//Usage example:
//================
      // Data set up
                                std::vector<int> result;
                                std::vector<ConPtr> vcA, vcB;
                                ContainerNeuronPtr      neuronContainerPtr( new
    Container<Neuron>() );
                                ConContainerPtr conContainerPtr( new
    ConContainer() );
                                ConPtr  ptC;
                                NeuronPtr ptN;
                                int ids[]= {10, 20, 30};
                                double weights[] = {1.13, 2.22, 3.33 };
                                for (int i=0; i<=2 ; i++) {                     /
    / Let's create a vector with three neurons
                                        ptN.reset( new Neuron( ids[i] ) );
                                        neuronContainerPtr->push_back(ptN);
                                }
      // Test
                                for (int i=0; i<=2 ; i++) {                     /
    / and a vector with three connections
                                        result.push_back(conContainerPtr->numOfCo
    ns());          // Append numOfCons to result, create new Con and push_back into
    conContainer
                                        ptC.reset( new Con( neuronContainerPtr->l
    oad().at(i), weights[i]) );
                                        conContainerPtr->push_back(ptC);
                                }

      // Now, result contains a numeric vector with values 0, 1, 2, and 3.
```

See also

Container::size (alias)

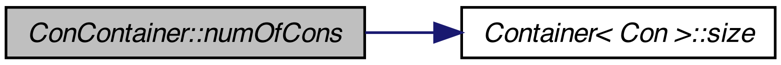
Definition at line 52 of file ConContainer.cpp.

References Container< Con >::size().

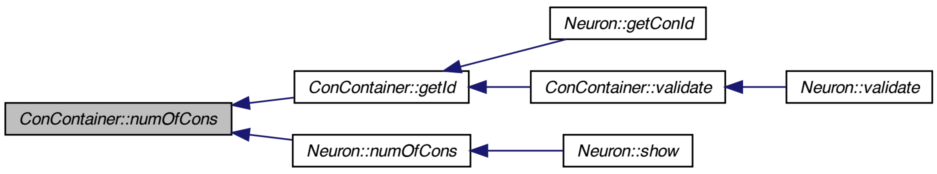
Referenced by getId(), and Neuron::numOfCons().

```
{
  return size();
}
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.3.4.4 ConContainerPtr ConContainer::select (std::vector< int > *nIds*)

Selects the specified elements from the vecCom object.

Provides a convenient way of selecting some Con objects from the collection field of the ConContainer object.

Parameters

vFrom	An std::vector<int> with the Ids of the connections to select.

```
        //================
        //Usage example:
        //================

        // Data set up
                std::vector<int> result;
                std::vector<NeuronPtr> neuronContainer;
                ConContainerPtr conContainerPtr( new ConContainer() );
                ConPtr  ptC;
                NeuronPtr ptN;
                int ids[]= {11, 10, 9, 3, 4, 5, 6, 7, 8, 2, 1};
                double weights[]={11.32, 1.26, 2.14, 3.16, 4.14, 5.19, 6.18, 7.16
      , 8.14, 9.12, 10.31};
                std::vector<double> nWeights;
                for (int i=0; i<11; i++) {
                        nWeights.push_back(weights[i]);
                }
                for (int i=0; i<nWeights.size() ; i++) {                          /
      / Let's create a vector with three neurons
                        ptN.reset( new Neuron( ids[i] ) );
                        neuronContainer.push_back(ptN);
                }
                conContainerPtr->buildAndAppend(neuronContainer, nWeights);
                // Test
                std::vector<int> toSelect;
                toSelect.push_back(1);
                toSelect.push_back(3);
                toSelect.push_back(5);
                toSelect.push_back(7);

                ConContainerPtr  vSelect (  conContainerPtr->select(toSelect)  );

                result=vSelect->getId();

                // Now, result is a numeric vector with the values 1, 3, 5 and 7.
```

See also

erase and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

Definition at line 505 of file ConContainer.cpp.

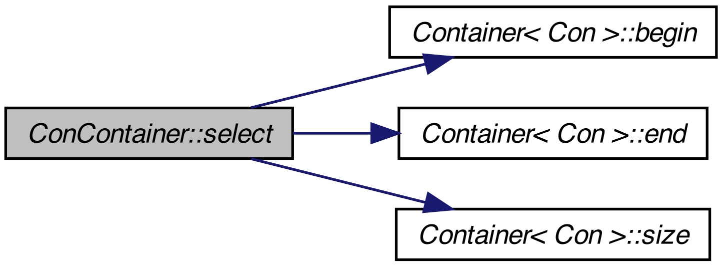
References Container< Con >::begin(), Container< Con >::end(), and Container< Con >::size().

Referenced by setWeight().

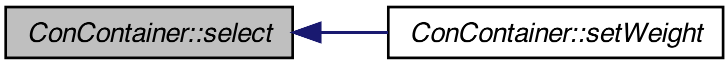
```
{
  ConContainerPtr result(new ConContainer);
  result->reserve(size());
  sort(begin(), end(), CompareId());
  sort(nIds.begin(), nIds.end());
  set_intersection(begin(), end(), nIds.begin(), nIds.end(),
      std::back_inserter(*result), CompareId());

  return result;
}
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.3.4.5 bool ConContainer::setFrom (**NeuronContainer** *neuronContainer*)

Setter of the from fields of the Con objects related to ConContainer.

This function provides a convenient way of getting the values of the weight field of those Con object pointed to by the smart pointer stored in the ConContainer object.

Parameters

vFrom	An std::vector<NeuronPtr> with the pointers to be set in the from fields of the ConContainer object.

Returns

true if not exception is thrown

```
//================
//Usage example:
        //================

        // Data set up
                std::vector<int> result;
                ContainerNeuronPtr      neuronContainerPtr( new
      Container<Neuron>() );
                ConContainerPtr conContainerPtr( new ConContainer() );
                ConPtr  ptC;
                NeuronPtr ptN;

                int ids[]= {10, 20, 30};
                double weights[] = {1.13, 2.22, 3.33 };

                for (int i=0; i<=2 ; i++) {                             // Let's
      create a vector with three neurons
                        ptN.reset( new Neuron( ids[i] ) );
                        neuronContainerPtr->push_back(ptN);
                }
                for (int i=0; i<=2 ; i++) {                             // and a
      vector with three connections
                        ptC.reset( new Con() );
                        conContainerPtr->push_back(ptC);
                }
        // Test
                conContainerPtr->setFrom(neuronContainerPtr->load()) ;
                conContainerPtr->show();
                result=conContainerPtr->getId();

        // Now result is a vector that contains the values 10, 20 and 30.
```

See also

getFrom and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

Definition at line 333 of file ConContainer.cpp.

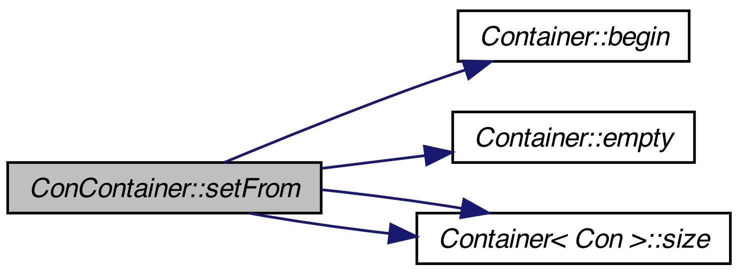
References Container< T >::begin(), Container< T >::empty(), Container< Con >::size(), and Container< T >::size().

Referenced by Neuron::setFrom().

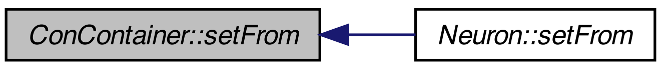
```
{
  BEGIN_RCPP
  if (neuronContainer.empty())
    { throw std::range_error("[ C++ ConContainer::setFrom]: Error, w is empty");}

  if (neuronContainer.size() != size())
    {
      throw std::range_error(
          "[C++ ConContainer::setFrom]: Error, neuronContainer.size() != collecti
      on.size()");
    }
  std::vector<NeuronPtr>::iterator itrNeuron = neuronContainer.begin();
  foreach(ConPtr itr , *this)
    {
      itr->setFrom( *itrNeuron );
      itrNeuron++;
    }
  return true;
END_RCPP}
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.3.4.6 bool ConContainer::setWeight (std::vector< double > *nWeights*, std::vector< int > *nIds*)

Setter of the weights of the specified elements from the ConContainer object.

Provides a convenient way of setting the weights of some Con objects from the collection field of the ConContainer object.

Parameters

nWeights	A numeric (double) vector with the weights to be set in the Con objects contained in the ConContainer object.
vFrom	An std::vector<int> with the Ids of the connections to select

Returns

true in case no exception is thrown

```
  //================
  //Usage example:
  //================

  // Data set up
          std::vector<double> result;
                  std::vector<NeuronPtr> neuronContainer;
                  ConContainerPtr conContainerPtr( new ConContainer() );
                  ConPtr  ptC;
                  NeuronPtr ptN;
                  int ids[]= {11, 10, 9, 3, 4, 5, 6, 7, 8, 2, 1};
                  double weights[]={11.32, 1.26, 2.14, 3.16, 4.14, 5.19, 6.
18, 7.16, 8.14, 9.12, 10.31};
                  std::vector<double> nWeights;
                  for (int i=0; i<11; i++) {
                  nWeights.push_back(weights[i]);
                  }
                  for (int i=0; i<nWeights.size() ; i++) {                  /
/ Let's create a vector with three neurons
                  ptN.reset( new Neuron( ids[i] ) );
                  neuronContainer.push_back(ptN);
                  }
                  conContainerPtr->buildAndAppend(neuronContainer, nWeights
);

                  std::vector<int> toSelect;
                  std::vector<double> vNewWeights;
                  toSelect.push_back(1);
                  toSelect.push_back(3);
                  toSelect.push_back(5);
                  toSelect.push_back(7);
                  vNewWeights.push_back(1000.1);
                  vNewWeights.push_back(3000.3);
                  vNewWeights.push_back(5000.5);
                  vNewWeights.push_back(7000.7);
                  conContainerPtr->setWeight(vNewWeights, toSelect);

  // Test
                  result = conContainerPtr->getWeight();
                  return wrap(result);

  // Now, result is a numeric vector with the values  1000.10, 9.12, 3000.3
0, 4.14, 5000.50, 6.18, 7000.70, 8.14, 2.14, 1.26 and 11.32 .
```

See also

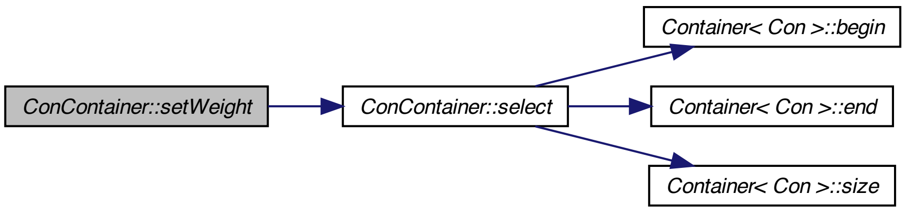
getWeigth and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

Definition at line 627 of file ConContainer.cpp.

References select().

```
{
BEGIN_RCPP return select(nIds)->setWeight(nWeights);
END_RCPP
}
```

Here is the call graph for this function:



5.3.4.7 bool ConContainer::setWeight (std::vector< double > *nWeights*)

Setter of the weight field of the Con objects related to ConContainer.

This function provides a convenient way of setting the values of the weight field of those Con objects pointed to by the smart pointer stored in the ConContainer object.

Parameters

nWeights	A numeric (double) vector with the weights to be set in the Con objects contained in the ConContainer object.

Returns

true in case no exception is thrown

```
        //================
        //Usage example:
        //================
        // Data set up
                std::vector<double> result;
                        int ids[]= {1, 2, 3};
                        double weights[] = {12.3, 1.2, 2.1 };
                        ConContainer conContainer;
                        std::vector<NeuronPtr> neuronContainer;
                        std::vector<double> nWeights;
                        NeuronPtr ptNeuron;

                        for (int i=0; i<=2; i++) {
                        ptNeuron.reset( new Neuron(ids[1]) );
                        neuronContainer.push_back(ptNeuron);
                        nWeights.push_back(0);                                   /
      / weights are set to 0
                        }
                        conContainer.buildAndAppend(neuronContainer, nWeights);
                        conContainer.show();

                        for (int i=0; i<=2; i++) {
                                nWeights.at(i)=weights[i];
                        }
        // Test
                        conContainer.setWeight(nWeights);                        /
      / weights are set to 12.3, 1.2 and 2.1
                        result=conContainer.getWeight();

        // Now result is a vector that contains the values 12.3, 1.2 and 2.1 .
```

See also

getWeight and the unit test files, e.g. runit.Cpp.ConContainer.R, for further examples.

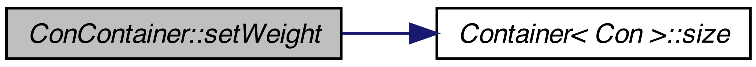
Definition at line 270 of file ConContainer.cpp.

References Container< Con >::size().

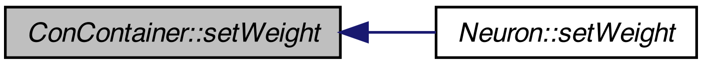
Referenced by Neuron::setWeight().

```
{
  BEGIN_RCPP
  if (nWeights.empty())
    { throw std::range_error("[ C++ ConContainer::setWeight]: Error, nWeights is
      empty");}
  if (nWeights.size() != size())
    {
      throw std::range_error(
          "[C++ ConContainer::setWeight]: Error, nWeights.size() != collection.si
      ze()");
    }
  std::vector<double>::iterator itrWeight = nWeights.begin();
  foreach (ConPtr itr, *this)
    {
      itr->setWeight( *itrWeight );
      itrWeight++;
    }
  return true;
END_RCPP}
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.3.4.8 bool ConContainer::validate ( )

Object validator.

This method checks the object for internal coherence. A try / catch mechanism exits its normal execution and returns control to the R terminal in case the contents of the ConContainer object are identified as corrupted.

Returns

true in case the checks are Ok.

Exceptions

An	std::range error if weight or from are not finite.

See also

The unit test files, e.g., runit.Cpp.ConContainer.R, for usage examples.

Reimplemented from Container< Con >.

Definition at line 645 of file ConContainer.cpp.

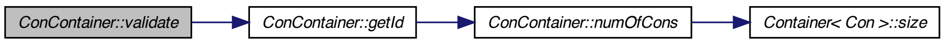
References getId().

Referenced by Neuron::validate().

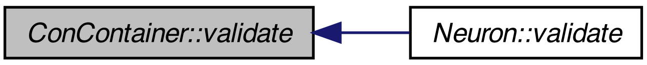
```
{
  BEGIN_RCPP

  std::vector<int>::iterator itr;
  std::vector<int> vIds = getId();
  sort(vIds.begin(), vIds.end());
  itr = adjacent_find(vIds.begin(), vIds.end());
  if (itr != vIds.end())
    throw std::range_error(
        "[C++ ConContainer::validate]: Error, duplicated Id.");
  Container<Con>::validate();
  return (true);
END_RCPP};
```

Here is the call graph for this function:



Here is the caller graph for this function:



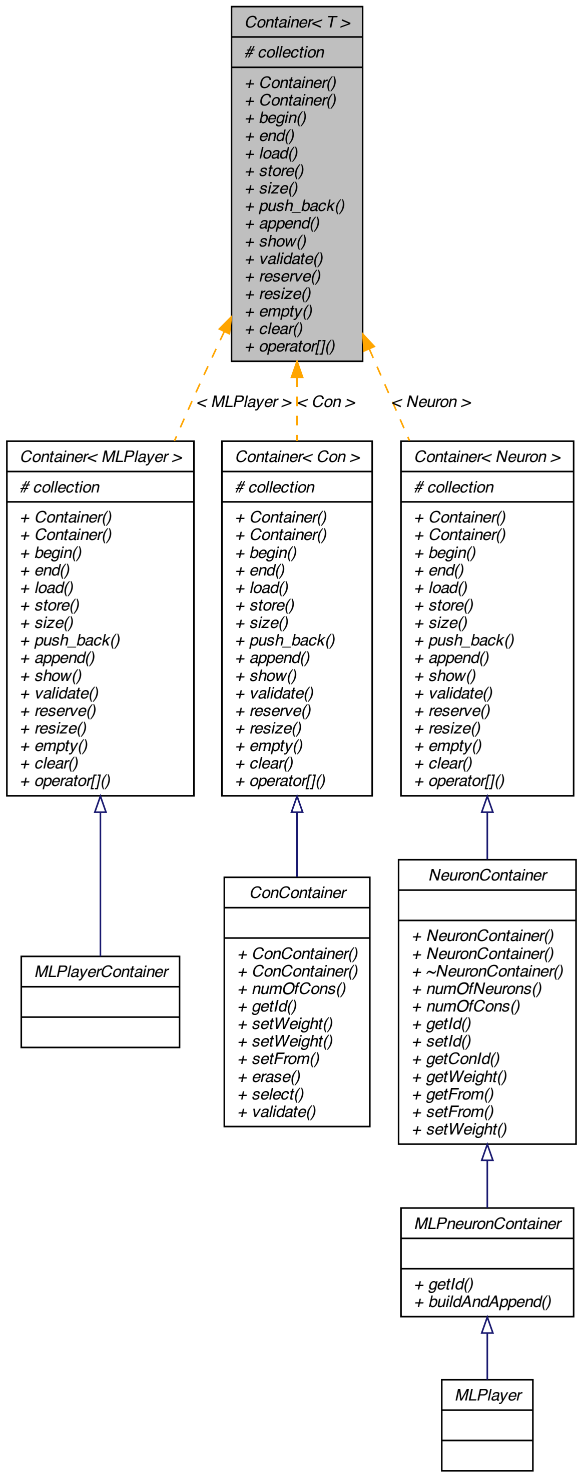
The documentation for this class was generated from the following files:

- pkg/AMORE/src/ConContainer.h
- pkg/AMORE/src/ConContainer.cpp

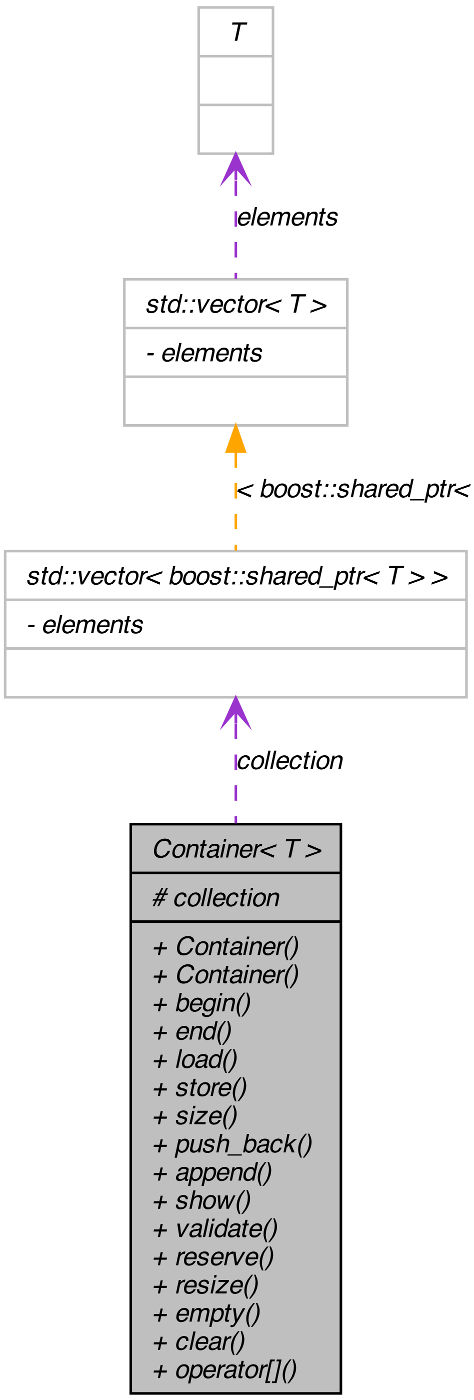
5.4 Container< T > Class Template Reference

```
#include <Container.h>
```

Inheritance diagram for Container< T >:



Collaboration diagram for Container< T >:



Public Types

- typedef std::vector< boost::shared_ptr< T > >::iterator iterator
- typedef std::vector< boost::shared_ptr< T > >::const_iterator const_iterator
- typedef boost::shared_ptr< T > value_type
- typedef value_type const & const_reference

Public Member Functions

- Container ()
- Container (typename std::vector< boost::shared_ptr< T > > collection)
- iterator begin ()
- iterator end ()
- std::vector< boost::shared_ptr< T > > load ()

    collection field accessor function
- void store (typename std::vector< boost::shared_ptr< T > > collectionT)

    collection field accessor function
- size_type size ()

    Returns the size or length of the vector.
- void push_back (boost::shared_ptr< T > const &const_reference)

    Append a shared_ptr at the end of collection.
- void append (Container< T > containerT)

    Appends a Container<T> object.
- bool show ()

    Pretty print of the Container<T>
- bool validate ()

    Object validator.
- void reserve (int n)
- void resize (int n)
- bool empty ()
- void clear ()
- boost::shared_ptr< T > & operator[] (size_type offset)

Protected Attributes

- std::vector< boost::shared_ptr< T > > collection

5.4.1 Detailed Description

template<typename T>class Container< T >

Definition at line 12 of file Container.h.

5.4.2 Member Typedef Documentation

5.4.2.1 template<typename T> typedef std::vector<boost::shared_ptr<T> >::const_iterator Container< T >::const_iterator

Reimplemented in ConContainer, and NeuronContainer.

Definition at line 22 of file Container.h.

5.4.2.2 template<typename T> typedef value_type const& Container< T >::const_reference

Reimplemented in ConContainer, and NeuronContainer.

Definition at line 26 of file Container.h.

5.4.2.3 template<typename T> typedef std::vector<boost::shared_ptr<T> >::iterator Container< T >::iterator

Reimplemented in ConContainer, and NeuronContainer.

Definition at line 19 of file Container.h.

5.4.2.4 template<typename T> typedef boost::shared_ptr<T> Container< T >::value_type

Reimplemented in ConContainer, and NeuronContainer.

Definition at line 24 of file Container.h.

5.4.3 Constructor & Destructor Documentation

5.4.3.1 template<typename T > Container< T >::Container ( )

Definition at line 9 of file Container.cpp.

```
{
}
```

5.4.3.2 template<typename T> Container< T >::Container (typename std::vector< boost::shared_ptr< T > > *collection*)

Definition at line 14 of file Container.cpp.

```
                                                                          :
  collection(collection)
{
}
```

5.4.4 Member Function Documentation

5.4.4.1 template<typename T> void **Container**< T >::append (**Container**< T > *v*)

Appends a Container<T> object.

This method inserts the collection field of a second object at the end of the collection field of the calling object.

Parameters

v	The Container<T> object to be added to the current one

See also

The unit test files, e.g., runit.Cpp.Container.R, for usage examples.

```
  //================
  //Usage example:
  //================
  // Data set up
                          std::vector<int> result;
                          std::vector<ConPtr> vcA, vcB;
                          ContainerNeuronPtr      neuronContainerPtr( new
Container<Neuron>() );
                          ContainerConPtr conContainerPtrA( new
Container<Con>() );
                          ContainerConPtr conContainerPtrB( new
Container<Con>() );
                          ConPtr  ptC;
                          NeuronPtr ptN;
                          int ids[]= {1, 2, 3, 4, 5, 6};
                          double weights[] = {1.13, 2.22, 3.33, 5.6, 4.2, 3
.6 };
                          for (int i=0; i<=5 ; i++) {                    /
/ Let's create a vector with six neurons
                                  ptN.reset( new Neuron( ids[i] ) );
                                  neuronContainerPtr->push_back(ptN);
                          }
                          for (int i=0; i<=2 ; i++) {                    /
/ A vector with three connections
                                  ptC.reset( new Con( neuronContainerPtr->l
oad().at(i), weights[i]) );
                                  conContainerPtrA->push_back(ptC);
                          }
                          for (int i=3; i<=5 ; i++) {                    /
/ Another vector with three connections
                                  ptC.reset( new Con( neuronContainerPtr->l
oad().at(i), weights[i]) );
                                  conContainerPtrB->push_back(ptC);
                          }
  // Test
                          conContainerPtrA->append(*conContainerPtrB);
                          conContainerPtrA->validate();
                          conContainerPtrA->show() ;

  // After execution of the code above, the output at the R terminal would
display:
  //
  //  From:        1       Weight=        1.130000
```

```
        //      From:    2      Weight=        2.220000
        //      From:    3      Weight=        3.330000
        //      From:    4      Weight=        5.600000
        //      From:    5      Weight=        4.200000
        //      From:    6      Weight=        3.600000
```

See also

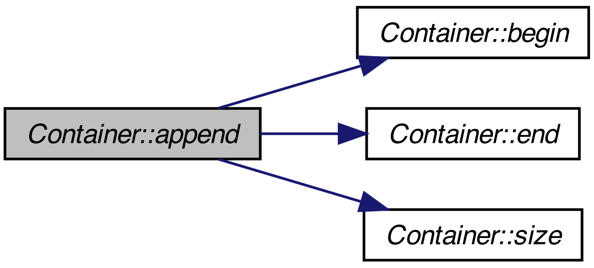
Container::store , Container::push_back and the unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 207 of file Container.cpp.

References Container< T >::begin(), Container< T >::end(), and Container< T >::size().

```
{
  reserve(size() + v.size());
  collection.insert(end(), v.begin(), v.end());
}
```

Here is the call graph for this function:



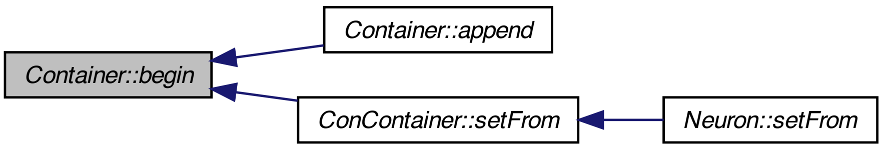
5.4.4.2 template< typename T > std::vector< boost::shared_ptr< T > >::iterator Container< T >::begin ( )

Definition at line 22 of file Container.cpp.

Referenced by Container< T >::append(), and ConContainer::setFrom().

```
{
  return collection.begin();
}
```

Here is the caller graph for this function:



5.4.4.3 template<typename T > void Container< T >::clear ( )

Definition at line 310 of file Container.cpp.

```
{
  collection.clear();
}
```

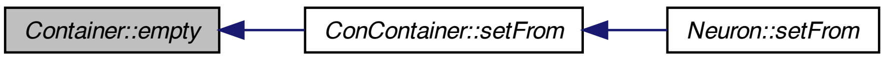
5.4.4.4 template<typename T > bool Container< T >::empty ( )

Definition at line 303 of file Container.cpp.

Referenced by ConContainer::setFrom().

```
{
  return (collection.empty());
}
```

Here is the caller graph for this function:



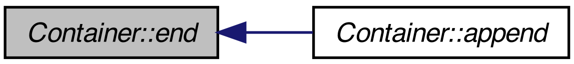
5.4.4.5 template<typename T > std::vector< boost::shared_ptr< T > >::iterator Container< T >::end ( )

Definition at line 29 of file Container.cpp.

Referenced by Container< T >::append().

```
{
  return collection.end();
}
```

Here is the caller graph for this function:



5.4.4.6 template<typename T > std::vector< boost::shared_ptr< T > > Container< T >::load ( )

collection field accessor function

This method allows access to the data stored in the collection field.

Returns

The collection vector.

```
    //================
    //Usage example:
    //================
            // Data set up
                            std::vector<int> result;
                            std::vector<ConPtr> vcA, vcB;
                            ContainerNeuronPtr      neuronContainerPtr( new
  Container<Neuron>() );
                            ContainerConPtr conContainerPtr( new
  Container<Con>() );
                            ConPtr  ptC;
                            NeuronPtr ptN;
                            int ids[]= {10, 20, 30};
                            double weights[] = {1.13, 2.22, 3.33 };
                            for (int i=0; i<=2 ; i++) {                    /
  / Let's create a vector with three neurons
                                    ptN.reset( new Neuron( ids[i] ) );
                                    neuronContainerPtr->push_back(ptN);
                            }
```

```
                                for (int i=0; i<=2 ; i++) {                        /
      / and a vector with three connections
                                        ptC.reset( new Con( neuronContainerPtr->l
      oad().at(i), weights[i]) );
                                        vcA.push_back(ptC);
                                }
                // Test
                        conContainerPtr->store(vcA);
                        vcB = conContainerPtr->load();
                        for (int i=0; i<=2 ; i++) {                                /
      / get Ids. Container does not have getId defined
                                        result.push_back( vcB.at(i)->getId());
                        }

                // Now, result is an integer vector with values 10, 20, 30.
```

See also

store and the unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 254 of file Container.cpp.

```
{
  return collection;
}
```

5.4.4.7 template<typename T > boost::shared_ptr< T > & Container< T >::operator[] (size_type *offset*)

Definition at line 317 of file Container.cpp.

```
{
  return collection[offset];
}
```

5.4.4.8 template<typename T> void Container< T >::push_back (boost::shared_ptr< T > const & *const_reference*)

Append a shared_ptr at the end of collection.

Implements push_back for the Container class

Parameters

TsharedPtr	A shared_ptr pointer to be inserted at the end of collection

```
                //================
                //Usage example:
                //================
                // Data set up
                        Neuron N1, N2, N3;
                        Container<Con> conContainer;
                        std::vector<ConPtr> vc;
```

```
                    std::vector<int> result;
                    N1.setId(10);
                    N2.setId(20);
                    N3.setId(30);
            // Test
                    ConPtr ptCon( new Con(&N1, 1.13) );     // Create new Con
 and initialize ptCon
                    conContainer.push_back(ptCon);                          /
/ push_back
                    ptCon.reset(  new Con(&N2, 2.22) );             // create
 new Con and assign to ptCon
                    conContainer.push_back(ptCon);                          /
/ push_back
                    ptCon.reset(  new Con(&N3, 3.33) );             // create
 new Con and assign to ptCon
                    conContainer.push_back(ptCon);                          /
/ push_back

                    vc = conContainer.load();

                    result.push_back(vc.at(0)->getId());
                    result.push_back(vc.at(1)->getId());
                    result.push_back(vc.at(2)->getId());
  // After execution of this code, result contains a numeric vector with va
lues 10, 20 and 30.
```

See also

C++ documentation for std::vector::push_back and the unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 71 of file Container.cpp.

```
{
  collection.push_back(const_reference);
}
```

5.4.4.9 template<typename T > void Container< T >::reserve (int *n*)

Definition at line 296 of file Container.cpp.

```
{
  collection.reserve(n);
}
```

5.4.4.10 template<typename T > void Container< T >::resize (int *n*)

Definition at line 289 of file Container.cpp.

```
{
  collection.resize(n);
}
```

5.4.4.11 template<typename T > bool Container< T >::show ( )

Pretty print of the Container<T>

This method outputs in the R terminal the contents of Container::collection.

Returns

true in case everything works without throwing an exception

*

```
                //=================
                //Usage example:
                //=================
                // Data set up
                        ContainerNeuronPtr      neuronContainerPtr( new
      Container<Neuron>() );
                        ContainerConPtr conContainerPtr( new Container<Con>() );
                        ConPtr  ptC;
                        NeuronPtr ptN;
                        int ids[]= {10, 20, 30};
                        double weights[] = {1.13, 2.22, 3.33 };

                        for (int i=0; i<=2 ; i++) {                             /
      / Let's create a vector with three neurons
                                ptN.reset( new Neuron( ids[i] ) );
                                neuronContainerPtr->push_back(ptN);
                        }

                        for (int i=0; i<=2 ; i++) {                             /
      / and a vector with three connections
                                ptC.reset( new Con( neuronContainerPtr->load().at
      (i), weights[i]) );
                                conContainerPtr->push_back(ptC);
                        }

                // Test
                        conContainerPtr->show() ;

                // The output at the R terminal would display:
                //
                //      # From:  10      Weight=         1.130000
                //      # From:  20      Weight=         2.220000
                //      # From:  30      Weight=         3.330000
                //
```

See also

The unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 122 of file Container.cpp.

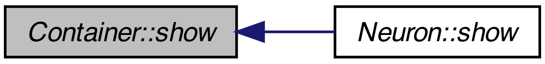
Referenced by Neuron::show().

```
{

  // This is equivalent to:
  // for( auto x : collection)        { x.show(); }
  // Waiting for C++0x
```

```
    foreach (typename boost::shared_ptr<T> itr, *this)
      {
        itr->show();
      }
    return true;
  }
```

Here is the caller graph for this function:



5.4.4.12 template<typename T > size_type Container< T >::size ( )

Returns the size or length of the vector.

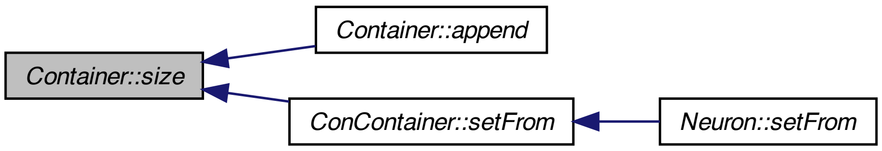
This method returns the size of the vector. In the classes derived from Container<T> this is aliased as numOfCons, numOfNeurons and numOfLayers. The unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 281 of file Container.cpp.

Referenced by Container< T >::append(), and ConContainer::setFrom().

```
  {
    return collection.size();
  }
```

Here is the caller graph for this function:



5.4.4.13 template<typename T> void Container< T >::store (typename std::vector< boost::shared_ptr< T > > *collectionT*)

collection field accessor function

This method sets the value of the data stored in the collection field.

Parameters

v	The vector of smart pointers to be stored in the collection field

See also

load and the unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Definition at line 268 of file Container.cpp.

```
{
  collection = collectionT;
}
```

5.4.4.14 template<typename T > bool Container< T >::validate ( )

Object validator.

This method checks the object for internal coherence. This method calls the validate method for each element in collection,

See also

The unit test files, e.g., runit.Cpp.Container.R, for usage examples.

Reimplemented in ConContainer.

Definition at line 144 of file Container.cpp.

```
{
  foreach (typename boost::shared_ptr<T> itr, *this)
    {
      itr->validate();
    }
  return true;
}
```

5.4.5 Member Data Documentation

5.4.5.1 template<typename T> std::vector<boost::shared_ptr<T> > Container< T >::collection [protected]

Definition at line 15 of file Container.h.

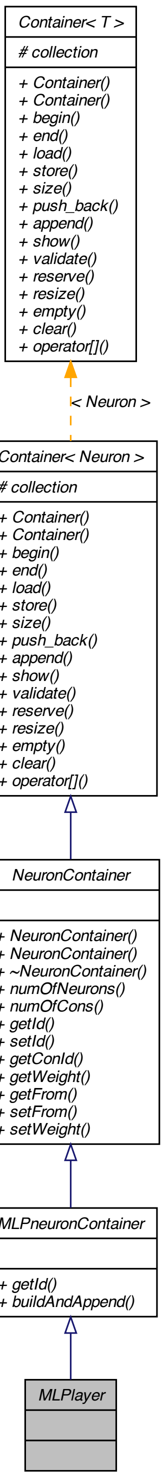
The documentation for this class was generated from the following files:

- pkg/AMORE/src/Container.h
- pkg/AMORE/src/Container.cpp

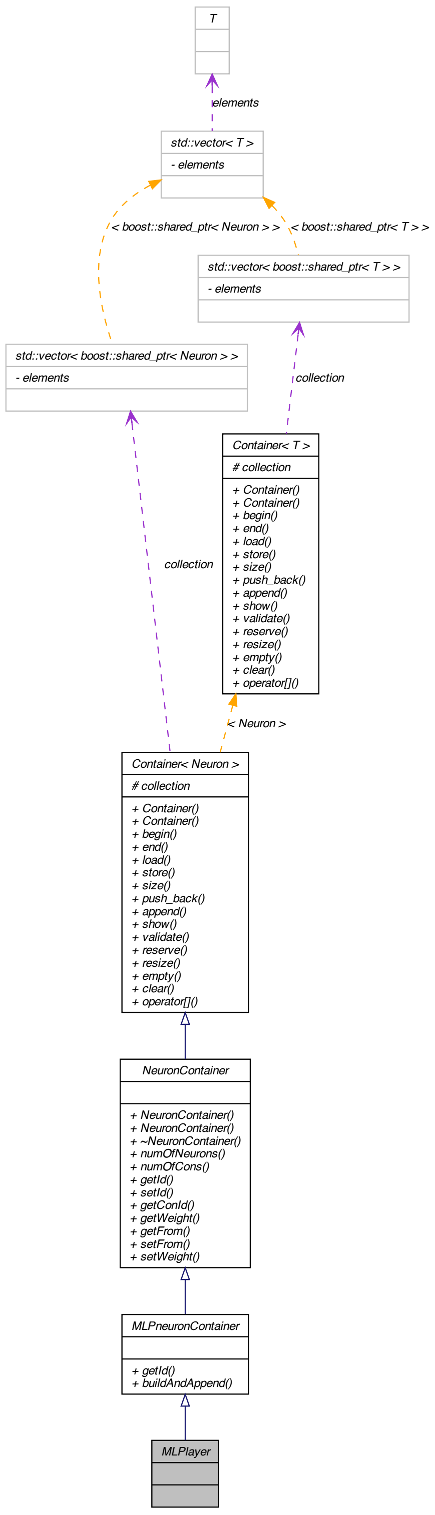
5.5 MLPlayer Class Reference

```
#include <MLPlayer.h>
```

Inheritance diagram for MLPlayer:



Collaboration diagram for MLPlayer:



5.5.1 Detailed Description

Definition at line 1 of file MLPlayer.h.

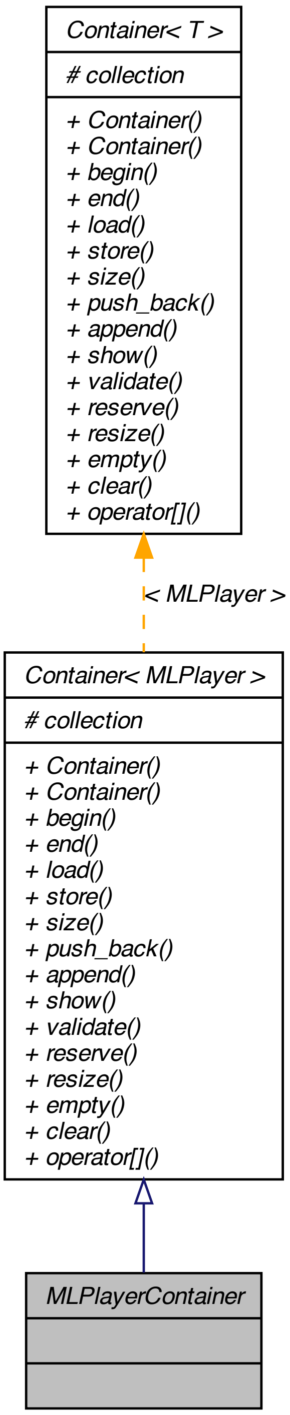
The documentation for this class was generated from the following file:

- pkg/AMORE/src/MLPlayer.h

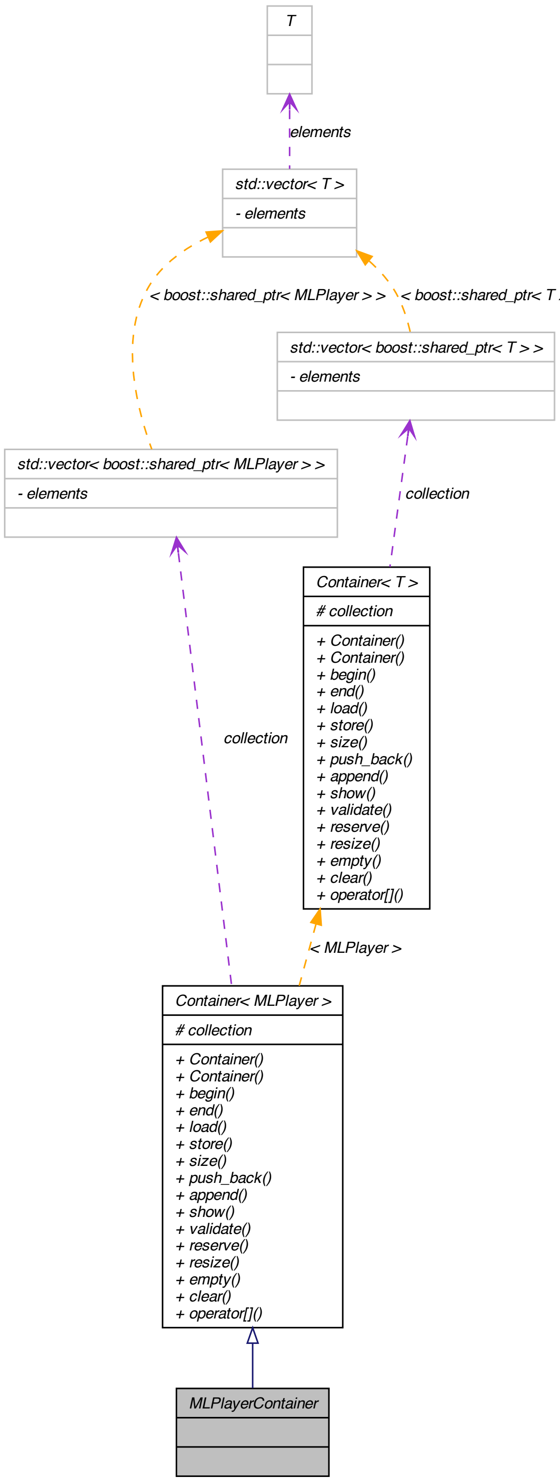
5.6 MLPlayerContainer Class Reference

```
#include <MLPlayerContainer.h>
```

Inheritance diagram for MLPlayerContainer:



Collaboration diagram for MLPlayerContainer:



5.6.1 Detailed Description

Definition at line 1 of file MLPlayerContainer.h.

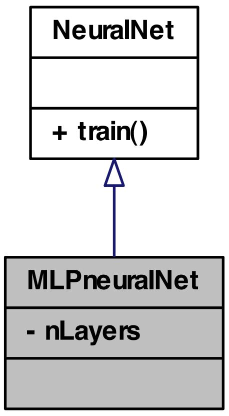
The documentation for this class was generated from the following file:

- pkg/AMORE/src/MLPlayerContainer.h

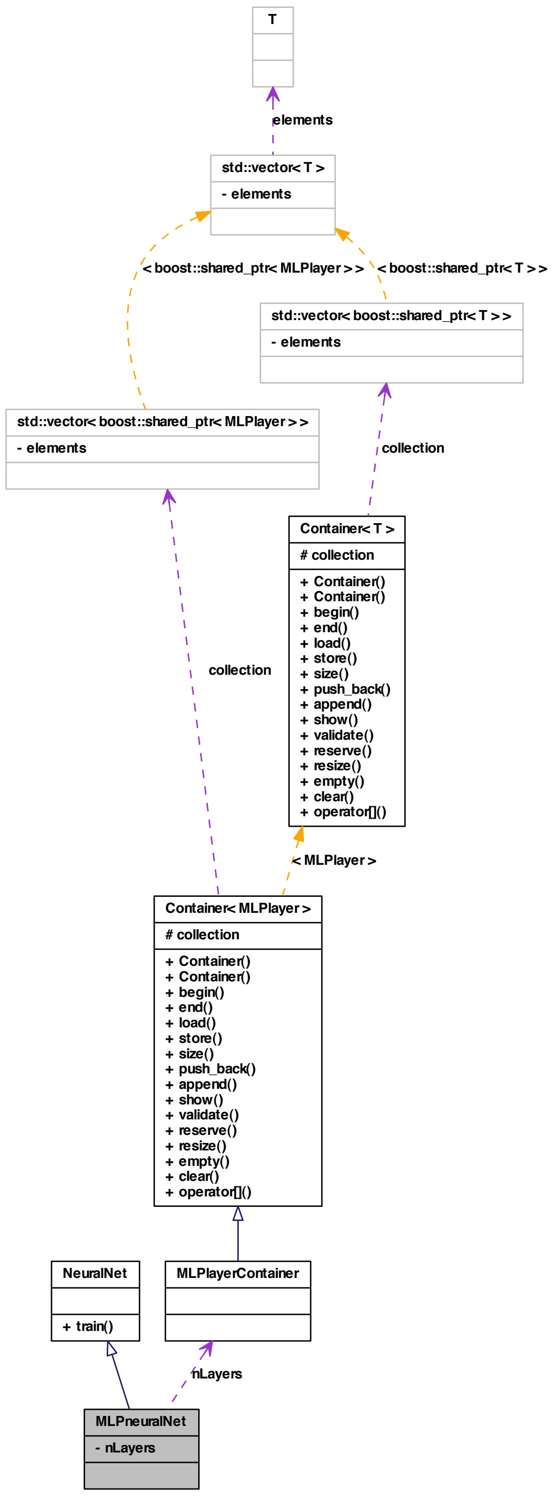
5.7 MLPneuralNet Class Reference

```
#include <MLPneuralNet.h>
```

Inheritance diagram for MLPneuralNet:



Collaboration diagram for MLPneuralNet:



Private Attributes

- MLPlayerContainer nLayers

5.7.1 Detailed Description

Definition at line 1 of file MLPneuralNet.h.

5.7.2 Member Data Documentation

5.7.2.1 MLPlayerContainer MLPneuralNet::nLayers `[private]`

Definition at line 2 of file MLPneuralNet.h.

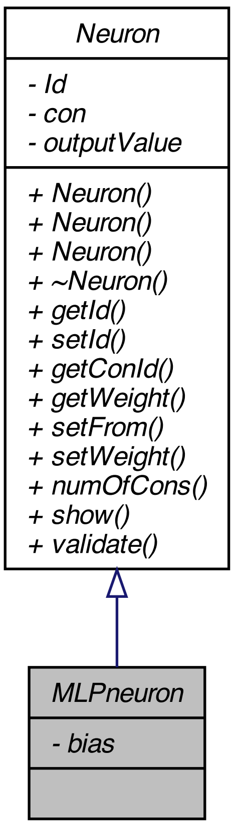
The documentation for this class was generated from the following file:

- pkg/AMORE/src/MLPneuralNet.h

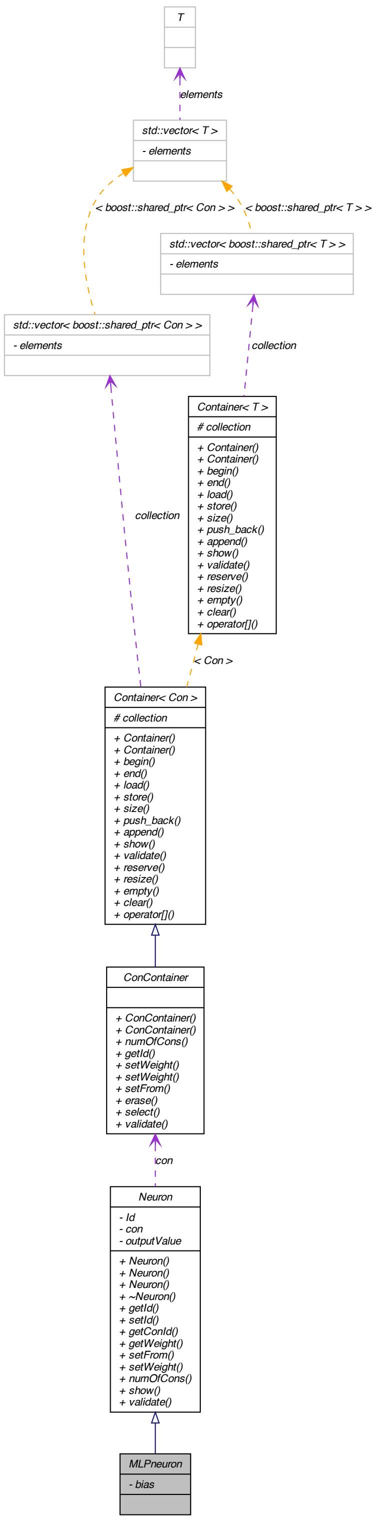
5.8 MLPneuron Class Reference

`#include <MLPneuron.h>`

Inheritance diagram for MLPneuron:



Collaboration diagram for MLPneuron:



Private Attributes

- int bias

5.8.1 Detailed Description

Definition at line 1 of file MLPneuron.h.

5.8.2 Member Data Documentation

5.8.2.1 int MLPneuron::bias `[private]`

Definition at line 2 of file MLPneuron.h.

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

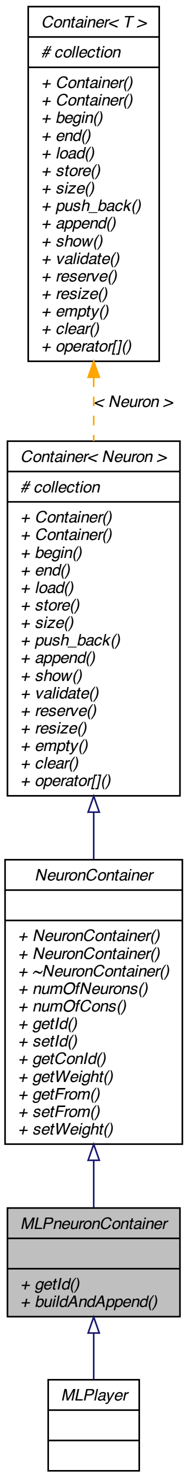
- pkg/AMORE/src/MLPneuron.h

5.9 MLPneuronContainer Class Reference

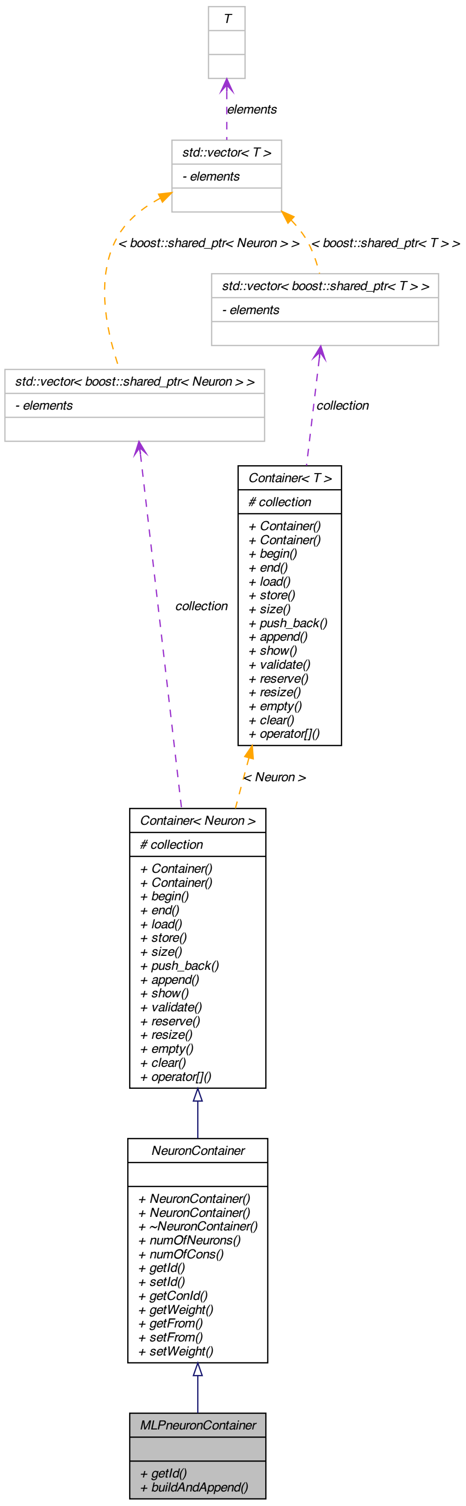
A vector of connections.

`#include <MLPneuronContainer.h>`

Inheritance diagram for MLPneuronContainer:



Collaboration diagram for MLPneuronContainer:



Public Member Functions

- std::vector< int > getId ()
- bool buildAndAppend (std::vector< int > IDS, std::vector< int > BIAS, ConContainer VC)

5.9.1 Detailed Description

A vector of connections.

The ConContainer class provides a simple class for a vector of connections. It's named after the R equivalent Reference Class.

Definition at line 16 of file MLPneuronContainer.h.

5.9.2 Member Function Documentation

5.9.2.1 bool MLPneuronContainer::buildAndAppend (std::vector< int > *IDS*, std::vector< int > *BIAS*, ConContainer *VC*)

5.9.2.2 std::vector<int> MLPneuronContainer::getId ( )

Reimplemented from NeuronContainer.

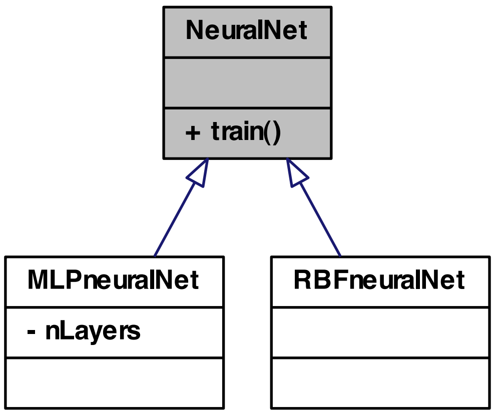
The documentation for this class was generated from the following file:

- pkg/AMORE/src/MLPneuronContainer.h

5.10 NeuralNet Class Reference

```
#include <NeuralNet.h>
```

Inheritance diagram for NeuralNet:



Public Member Functions

- virtual void train ()=0

5.10.1 Detailed Description

Definition at line 1 of file NeuralNet.h.

5.10.2 Member Function Documentation

5.10.2.1 virtual void NeuralNet::train ( ) `[pure virtual]`

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

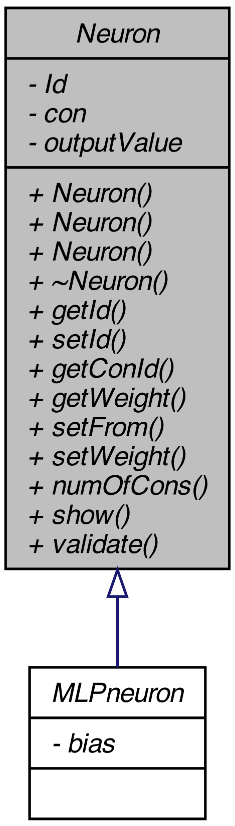
- pkg/AMORE/src/NeuralNet.h

5.11 Neuron Class Reference

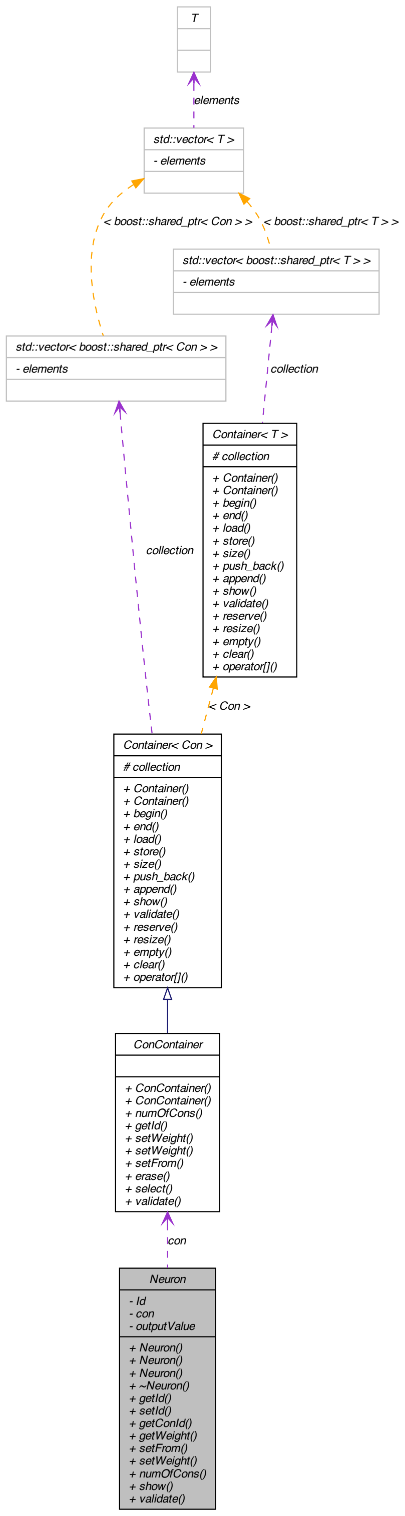
A class to handle the information contained in a general Neuron.

`#include <Neuron.h>`

Inheritance diagram for Neuron:



Collaboration diagram for Neuron:



Public Member Functions

- Neuron ()
- Neuron (int Id)
- Neuron (int Id, ConContainer con)
- ∼Neuron ()
- int getId ()
- void setId (int value)
- std::vector< int > getConId ()
- std::vector< double > getWeight ()
- bool setFrom (NeuronContainer neuronContainer)
- bool setWeight (std::vector< double > nWeights)
- int numOfCons ()
- bool show ()
- bool validate ()

Private Attributes

- int Id

  An integer variable with the Neuron Id.
- ConContainer con

  A vector of input connections.
- double outputValue

5.11.1 Detailed Description

A class to handle the information contained in a general Neuron.

A general class for neurons. The MLPneuron and RBFneuron classes will specialize this general class

Definition at line 16 of file Neuron.h.

5.11.2 Constructor & Destructor Documentation

5.11.2.1 Neuron::Neuron ( )

Definition at line 10 of file Neuron.cpp.

```
                    :
  Id(NA_INTEGER), con()
{
}
```

5.11.2.2 Neuron::Neuron (int *Id*)

Definition at line 15 of file Neuron.cpp.

```
                      :
  Id(Id), outputValue(0.0)
{
}
```

5.11.2.3 Neuron::Neuron (int *Id*, ConContainer *con*)

Definition at line 20 of file Neuron.cpp.

```
                                          :
  Id(Id), con(con), outputValue(0.0)
{
}
```

5.11.2.4 Neuron::∼Neuron ( )

Definition at line 25 of file Neuron.cpp.

```
{
}
```

5.11.3 Member Function Documentation

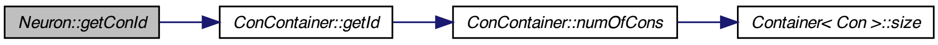
5.11.3.1 std::vector< int > Neuron::getConId ( )

Definition at line 43 of file Neuron.cpp.

References con, and ConContainer::getId().

```
{
  return con.getId();
}
```

Here is the call graph for this function:



5.11.3.2 int Neuron::getId ( )

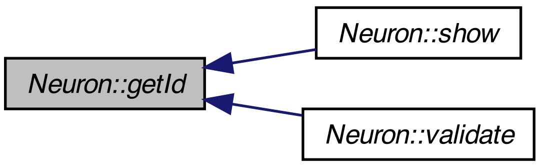
Definition at line 30 of file Neuron.cpp.

References Id.

Referenced by show(), and validate().

```
{
  return Id;
}
```

Here is the caller graph for this function:



5.11.3.3 std::vector< double > Neuron::getWeight ( )

Definition at line 49 of file Neuron.cpp.

References con.

```
{
  return con.getWeight();
}
```

5.11.3.4 int Neuron::numOfCons ( )

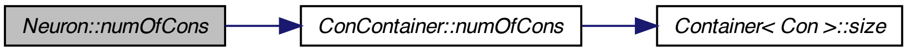
Definition at line 67 of file Neuron.cpp.

References con, and ConContainer::numOfCons().

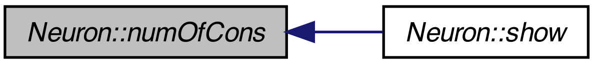
Referenced by show().

```
{
  return con.numOfCons();
}
```

Here is the call graph for this function:



Here is the caller graph for this function:



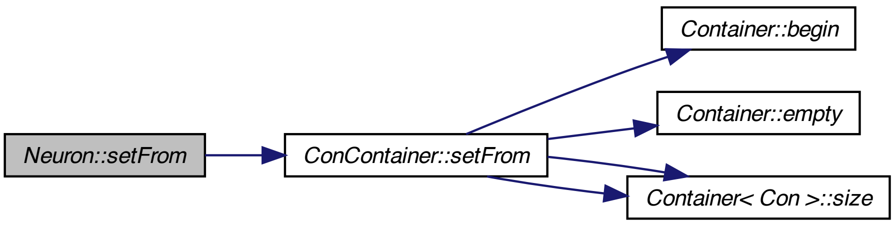
5.11.3.5 bool Neuron::setFrom (**NeuronContainer** *neuronContainer*)

Definition at line 55 of file Neuron.cpp.

References con, and ConContainer::setFrom().

```
{
  con.setFrom(neuronContainer);
}
```

Here is the call graph for this function:



5.11.3.6 void Neuron::setId (int *value*)

Definition at line 36 of file Neuron.cpp.

References Id.

```
{
  Id = value;
}
```

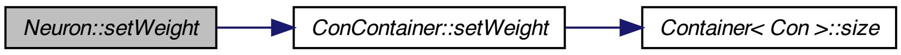
5.11.3.7 bool Neuron::setWeight (std::vector< double > *nWeights*)

Definition at line 61 of file Neuron.cpp.

References con, and ConContainer::setWeight().

```
{
  con.setWeight(nWeights);
}
```

Here is the call graph for this function:



5.11.3.8 bool Neuron::show ( )

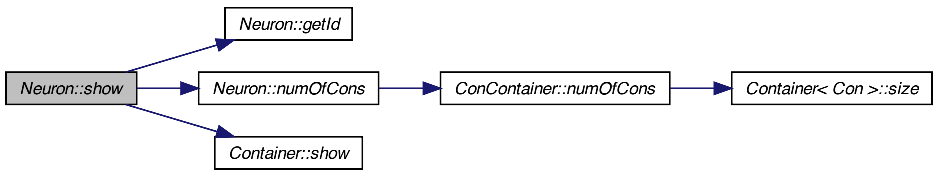
Definition at line 73 of file Neuron.cpp.

References con, getId(), numOfCons(), and Container< T >::show().

```
{
  int id = getId();
  Rprintf("\n------------------------\n");
  if (id == NA_INTEGER)
    {
      Rprintf("\n Id: NA, Invalid neuron Id");
    }
  else
    {
      Rprintf("\n Id: %d", id);
    }
  Rprintf("\n------------------------\n");
  if (numOfCons() == 0)
    {
      Rprintf("\n No connections defined");
    }
  else
    {
      con.show();
    }
  Rprintf("\n------------------------\n");
  return true;

}
```

Here is the call graph for this function:



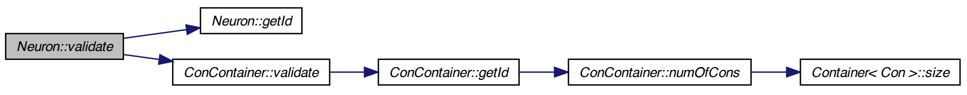
5.11.3.9 bool Neuron::validate ( )

Definition at line 100 of file Neuron.cpp.

References con, getId(), and ConContainer::validate().

```
{
  BEGIN_RCPP
  if (getId() == NA_INTEGER ) throw std::range_error("[C++ Neuron::validate]: Err
      or, Id is NA.");
  con.validate();
  return (TRUE);
  END_RCPP
}
```

Here is the call graph for this function:



5.11.4 Member Data Documentation

5.11.4.1 ConContainer Neuron::con `[private]`

A vector of input connections.

Definition at line 29 of file Neuron.h.

Referenced by getConId(), getWeight(), numOfCons(), setFrom(), setWeight(), show(), and validate().

5.11.4.2 int Neuron::Id `[private]`

An integer variable with the Neuron Id.

The Neuron Id provides a name to the neuron. This value is not expected to be used neither during simulation nor training but it provides an easy reference for human readers.

Definition at line 22 of file Neuron.h.

Referenced by getId(), and setId().

5.11.4.3 double Neuron::outputValue `[private]`

Definition at line 30 of file Neuron.h.

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

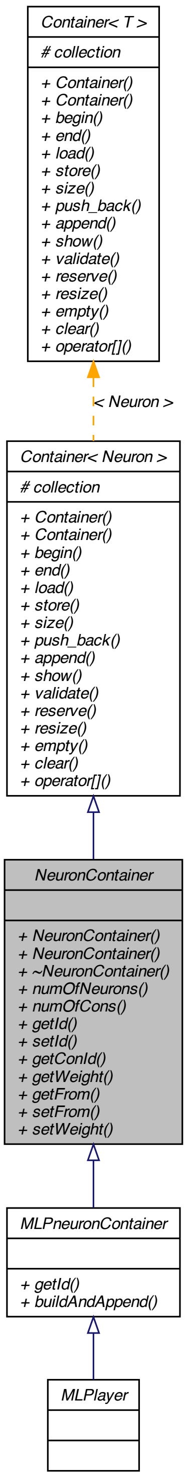
- pkg/AMORE/src/Neuron.h
- pkg/AMORE/src/Neuron.cpp

5.12 NeuronContainer Class Reference

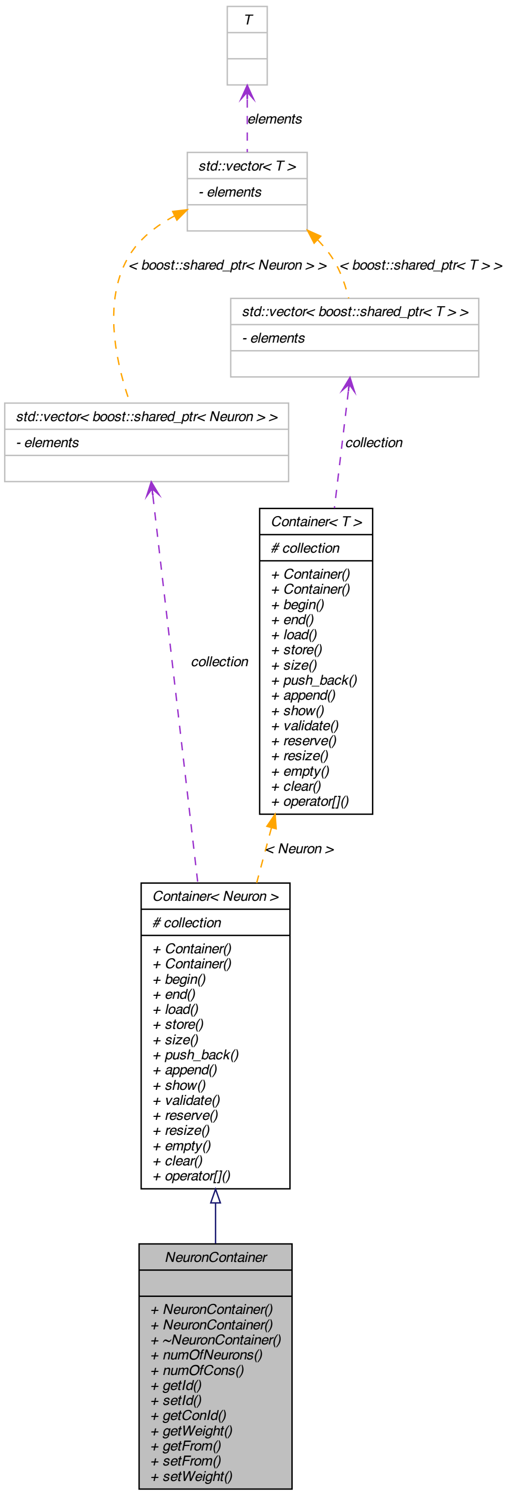
A vector of neurons.

`#include <NeuronContainer.h>`

Inheritance diagram for NeuronContainer:



Collaboration diagram for NeuronContainer:



Public Types

- typedef NeuronContainer_iterator iterator
- typedef NeuronContainer_const_iterator const_iterator
- typedef boost::shared_ptr< Neuron > value_type
- typedef value_type const & const_reference

Public Member Functions

- NeuronContainer ()
- NeuronContainer (std::vector< NeuronPtr > neuronContainer)
- ~NeuronContainer ()
- int numOfNeurons ()
- std::vector< int > numOfCons ()
- std::vector< int > getId ()
- void setId (std::vector< int > nIds)
- std::vector< std::vector< int > > getConId ()
- std::vector< std::vector< double > > getWeight ()
- std::vector< NeuronContainer > getFrom ()
- void setFrom (std::vector< NeuronContainer > neuronArray)
- void setWeight (std::vector< std::vector< double > > value)

5.12.1 Detailed Description

A vector of neurons.

The vecNeuron class provides a simple class for a vector of neurons. It's named after the R equivalent Reference Class.

Definition at line 17 of file NeuronContainer.h.

5.12.2 Member Typedef Documentation

5.12.2.1 typedef NeuronContainer_const_iterator NeuronContainer::const_iterator

Reimplemented from Container< Neuron >.

Definition at line 23 of file NeuronContainer.h.

5.12.2.2 typedef value_type const& NeuronContainer::const_reference

Reimplemented from Container< Neuron >.

Definition at line 27 of file NeuronContainer.h.

5.12.2.3 typedef NeuronContainer_iterator NeuronContainer::iterator

Reimplemented from Container< Neuron >.

Definition at line 21 of file NeuronContainer.h.

5.12.2.4 typedef boost::shared_ptr<Neuron> NeuronContainer::value_type

Reimplemented from Container< Neuron >.

Definition at line 25 of file NeuronContainer.h.

5.12.3 Constructor & Destructor Documentation

5.12.3.1 NeuronContainer::NeuronContainer ( )

Definition at line 8 of file NeuronContainer.cpp.

```
{
}
```

5.12.3.2 NeuronContainer::NeuronContainer (std::vector< NeuronPtr > *neuronContainer*)

Definition at line 12 of file NeuronContainer.cpp.

```
                                                                      :
  Container<Neuron> (collection)
{
}
```

5.12.3.3 NeuronContainer::∼NeuronContainer ( )

Definition at line 17 of file NeuronContainer.cpp.

```
{
}
```

5.12.4 Member Function Documentation

5.12.4.1 std::vector< std::vector< int > > NeuronContainer::getConId ( )

Definition at line 60 of file NeuronContainer.cpp.

```
{
  std::vector < std::vector<int> > result;
  foreach(NeuronPtr itrNeuron, *this)
```

```
    {
      result.push_back( itrNeuron->getConId() );
    }
  return result;
}
```

5.12.4.2 std::vector<NeuronContainer> NeuronContainer::getFrom ( )

5.12.4.3 std::vector< int > NeuronContainer::getId ( )

Reimplemented in MLPneuronContainer.

Definition at line 39 of file NeuronContainer.cpp.

```
{
  std::vector<int> nIds;
  foreach(NeuronPtr itrNeuron, *this)
    {
      nIds.push_back( itrNeuron->getId() );
    }
  return nIds;
}
```

5.12.4.4 std::vector< std::vector< double > > NeuronContainer::getWeight ( )

Definition at line 71 of file NeuronContainer.cpp.

```
{
  std::vector < std::vector<double> > result;
  foreach(NeuronPtr itrNeuron, *this)
    {
      result.push_back( itrNeuron->getWeight() );
    }
  return result;
}
```

5.12.4.5 std::vector< int > NeuronContainer::numOfCons ( )

Definition at line 28 of file NeuronContainer.cpp.

```
{
  std::vector<int> nIds;
  foreach(NeuronPtr itrNeuron, *this)
    {
      nIds.push_back( itrNeuron->numOfCons() );
    }
  return nIds;
}
```

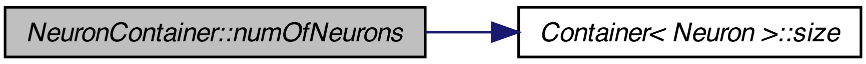
5.12.4.6 int NeuronContainer::numOfNeurons ( )

Definition at line 22 of file NeuronContainer.cpp.

References Container< Neuron >::size().

```
{
  size();
}
```

Here is the call graph for this function:



5.12.4.7 void NeuronContainer::setFrom (std::vector< NeuronContainer > *neuronArray*)

Definition at line 83 of file NeuronContainer.cpp.

```
{
  std::vector<NeuronContainer>::iterator itrArray(neuronArray.begin());
foreach(NeuronPtr itrNeuron, *this)
  {
    itrNeuron->setFrom(*itrArray);
    itrArray++;
  }
}
```

5.12.4.8 void NeuronContainer::setId (std::vector< int > *nIds*)

Definition at line 50 of file NeuronContainer.cpp.

```
{
  std::vector<int>::iterator itrId(nIds.begin());
foreach(NeuronPtr itrNeuron, *this)
  {
    itrNeuron->setId(*itrId);
  }
}
```

5.12.4.9 void NeuronContainer::setWeight (std::vector< std::vector< double > > *value*)

Definition at line 94 of file NeuronContainer.cpp.

```
{
  std::vector<std::vector<double> >::iterator itrValue(value.begin());
foreach(NeuronPtr itrNeuron, *this)
  {
    itrNeuron->setWeight(*itrValue);
    itrValue++;
  }
}
```

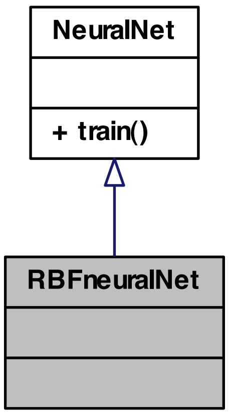
The documentation for this class was generated from the following files:

- pkg/AMORE/src/NeuronContainer.h
- pkg/AMORE/src/NeuronContainer.cpp

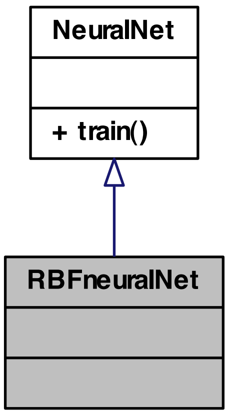
5.13 RBFneuralNet Class Reference

`#include <RBFneuralNet.h>`

Inheritance diagram for RBFneuralNet:



Collaboration diagram for RBFneuralNet:



5.13.1 Detailed Description

Definition at line 1 of file RBFneuralNet.h.

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

- pkg/AMORE/src/RBFneuralNet.h

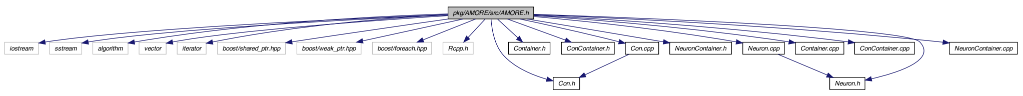
Chapter 6

File Documentation

6.1 pkg/AMORE/src/AMORE.h File Reference

```
#include <iostream>
#include <sstream>
#include <algorithm>
#include <vector>
#include <iterator>
#include <boost/shared_ptr.hpp>
#include <boost/weak_ptr.hpp>
#include <boost/foreach.hpp>
#include <Rcpp.h>
#include "Con.h"
#include "Container.h"
#include "ConContainer.h"
#include "Neuron.h"
#include "NeuronContainer.h"
#include "Con.cpp"
#include "Container.cpp"
#include "ConContainer.cpp"
#include "Neuron.cpp"
#include "NeuronContainer.cpp"
```

Include dependency graph for AMORE.h:



Defines

- #define foreach BOOST_FOREACH
- #define size_type unsigned int

Typedefs

- typedef boost::shared_ptr< Con > ConPtr
- typedef boost::shared_ptr< Neuron > NeuronPtr
- typedef boost::weak_ptr< Neuron > NeuronWeakPtr
- typedef boost::shared_ptr< Container< Con > > ContainerConPtr
- typedef boost::shared_ptr< Container< Neuron > > ContainerNeuronPtr
- typedef boost::shared_ptr< ConContainer > ConContainerPtr
- typedef boost::shared_ptr< NeuronContainer > NeuronContainerPtr
- typedef std::vector< NeuronPtr >::iterator NeuronContainer_iterator
- typedef std::vector< NeuronPtr >::const_iterator NeuronContainer_const_iterator

6.1.1 Define Documentation

6.1.1.1 #define foreach BOOST_FOREACH

Definition at line 37 of file AMORE.h.

6.1.1.2 #define size_type unsigned int

Definition at line 40 of file AMORE.h.

6.1.2 Typedef Documentation

6.1.2.1 typedef boost::shared_ptr<ConContainer> ConContainerPtr

Definition at line 48 of file AMORE.h.

6.1.2.2 typedef boost::shared_ptr<Con> ConPtr

Definition at line 43 of file AMORE.h.

6.1.2.3 typedef boost::shared_ptr<Container<Con> > ContainerConPtr

Definition at line 46 of file AMORE.h.

6.1.2.4 typedef boost::shared_ptr<Container<Neuron> > ContainerNeuronPtr

Definition at line 47 of file AMORE.h.

6.1.2.5 typedef std::vector<NeuronPtr>::const_iterator NeuronContainer_const_-iterator

Definition at line 52 of file AMORE.h.

6.1.2.6 typedef std::vector<NeuronPtr>::iterator NeuronContainer_iterator

Definition at line 51 of file AMORE.h.

6.1.2.7 typedef boost::shared_ptr<NeuronContainer> NeuronContainerPtr

Definition at line 49 of file AMORE.h.

6.1.2.8 typedef boost::shared_ptr<Neuron> NeuronPtr

Definition at line 44 of file AMORE.h.

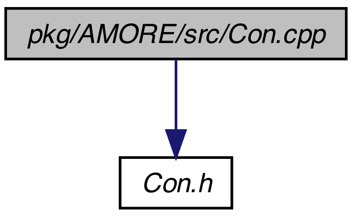
6.1.2.9 typedef boost::weak_ptr<Neuron> NeuronWeakPtr

Definition at line 45 of file AMORE.h.

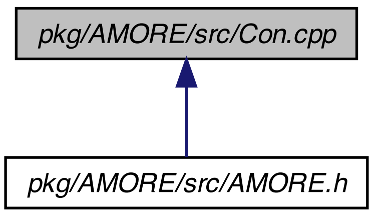
6.2 pkg/AMORE/src/Con.cpp File Reference

```
#include "Con.h"
```

Include dependency graph for Con.cpp:

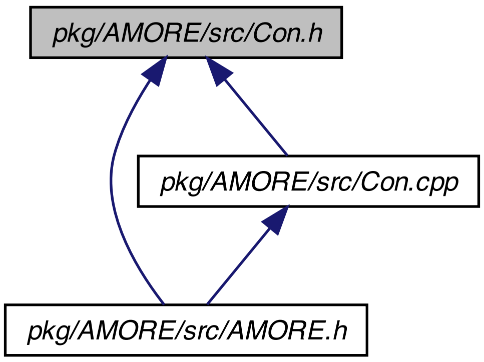


This graph shows which files directly or indirectly include this file:



6.3 pkg/AMORE/src/Con.h File Reference

This graph shows which files directly or indirectly include this file:



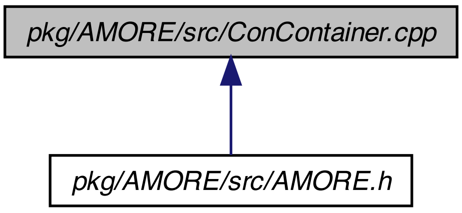
Classes

- class Con

  A class to handle the information needed to describe an input connection.

6.4 pkg/AMORE/src/ConContainer.cpp File Reference

This graph shows which files directly or indirectly include this file:

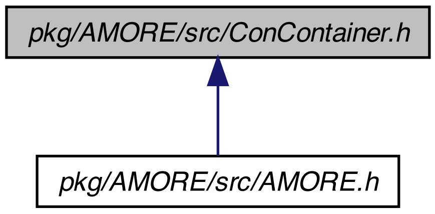


Classes

- struct CompareId

6.5 pkg/AMORE/src/ConContainer.h File Reference

This graph shows which files directly or indirectly include this file:



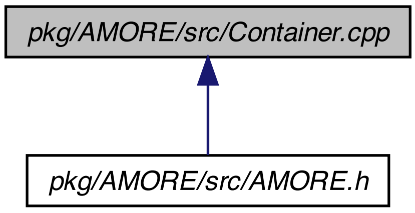
Classes

- class ConContainer

  A vector of connections.

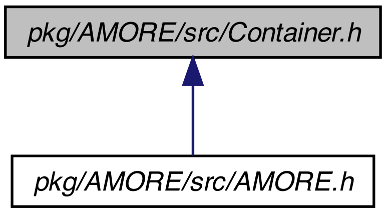
6.6 pkg/AMORE/src/Container.cpp File Reference

This graph shows which files directly or indirectly include this file:



6.7 pkg/AMORE/src/Container.h File Reference

This graph shows which files directly or indirectly include this file:



Classes

- class Container< T >

6.8 pkg/AMORE/src/MLPlayer.h File Reference

Classes

- class MLPlayer

6.9 pkg/AMORE/src/MLPlayerContainer.h File Reference

Classes

- class MLPlayerContainer

6.10 pkg/AMORE/src/MLPneuralNet.h File Reference

Classes

- class MLPneuralNet

6.11 pkg/AMORE/src/MLPneuralNetFactory.cpp File Reference

6.12 pkg/AMORE/src/MLPneuron.h File Reference

Classes

- class MLPneuron

6.13 pkg/AMORE/src/MLPneuronContainer.h File Reference

Classes

- class MLPneuronContainer

  A vector of connections.

6.14 pkg/AMORE/src/NeuralNet.h File Reference

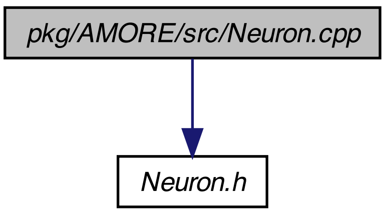
Classes

- class NeuralNet

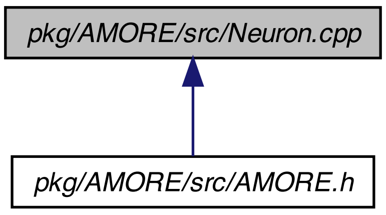
6.15 pkg/AMORE/src/Neuron.cpp File Reference

```
#include "Neuron.h"
```

Include dependency graph for Neuron.cpp:

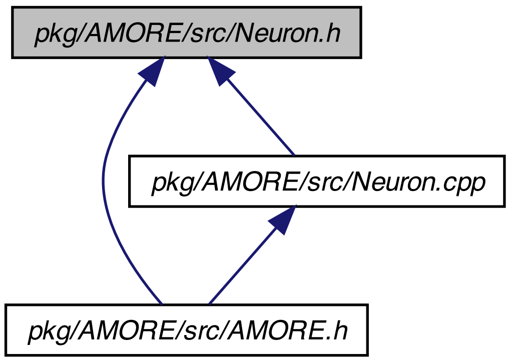


This graph shows which files directly or indirectly include this file:



6.16 pkg/AMORE/src/Neuron.h File Reference

This graph shows which files directly or indirectly include this file:



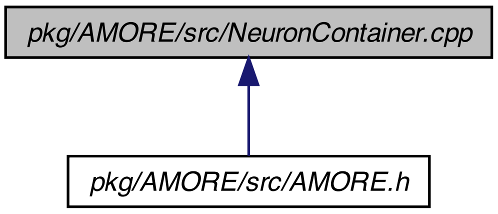
Classes

- class Neuron

    A class to handle the information contained in a general Neuron.

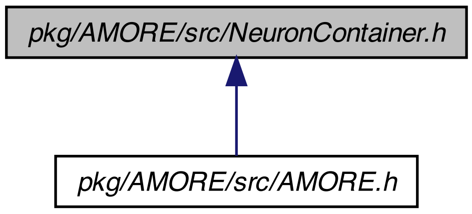
6.17 pkg/AMORE/src/NeuronContainer.cpp File Reference

This graph shows which files directly or indirectly include this file:



6.18 pkg/AMORE/src/NeuronContainer.h File Reference

This graph shows which files directly or indirectly include this file:



Classes

- class NeuronContainer

  A vector of neurons.

6.19 pkg/AMORE/src/RBFneuralNet.h File Reference

Classes

- class RBFneuralNet

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