
SPN Documentation

Release

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SPN is library to build, train and save neural networks based on Theano.
SPN defines a neural network image on hard disk to reuse and modify.

The following is the document extracted from code.

Network

class `mlbase.network.Network`

Theano based neural network.

getLastLinkName ()

Get last link file name, including path prefix.

getSaveModelName (*dateTime=None*)

Return default model saving file name, including path prefix.

load (*istream*)

Load the model from input stream. `reset()` is called to clean up network instance.

nextLayer ()

Use this method to iterate over all known layers.

reset ()

For sequential layerout network, use `append()` to add more layers, the first layer is set with `setInput()`. Network can do this, because it remember which layer to append to by using member variable `currentLayer`.

save (*ostream*)

Save model to the stream.

saveToFile (*fileName=None*)

Save the network to a file. Use the given file name if supplied. This may take some time when the model is large.

updateLatestLink ()

Create sym link to latest saved model.

mlbase.layers

Network input

class mlbase.layers.**RawInput** (*inputsizes*)

This is THE INPUT Class. Class type is checked during network building.

Parameters **input** (*tuple or list of ints*) – Input shape without batch size.

setBatchSize (*psize*)

This method is supposed to be called by network.setInput()

class mlbase.layers.**NonLinear**

predictForward (*inputtensor*)

forward link used in training

inputtensor: a tuple of theano tensor

return: a tuple of theano tensor

class mlbase.layers.**Relu**

class mlbase.layers.**Elu** (*alpha=1.0*)

class mlbase.layers.**ConcatenatedReLU**

class mlbase.layers.**Sine**

class mlbase.layers.**Cosine**

class mlbase.layers.**SeqLayer** (*name, bases, namespace, **kwargs*)

class mlbase.layers.**DAGPlan**

class mlbase.layers.**DAG** (*name, bases, namespace, **kwargs*)

<no title>

[*NonLinear*](#)

[*Relu*](#)

[*Elu*](#)

[*ConcatenatedReLU*](#)

[*Sine*](#)

[*Cosine*](#)

<no title>

<no title>

[*SeqLayer*](#)

[*DAGPlan*](#)

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DAG

<no title>

<no title>

<no title>

<no title>

<no title>

<no title>

<no title>

<no title>

Network input

RawInput

This is THE INPUT Class.

<no title>

<no title>

<no title>

Cost function

class `mlbase.cost.CostFunc`

General cost function base class.

Y: result from forward network. tY: the given true result.

class `mlbase.cost.TwoStageCost`

Cost function that needs two stage computation.

Step 1: obtain data statistics. Step 2: obtain label for each sample.

class `mlbase.cost.IndependentCost`

Cost function for each sample cost known and final cost is a statistics for all sample cost.

`mlbase.cost.aggregate` (*loss, weights=None, mode='mean'*)

This code is from lasagne/objectives.py

class `mlbase.cost.CrossEntropy`

Wrap of categorical_crossentropy from theano

class `mlbase.cost.ImageDiff`

This is the base class for cost function for images. The input format is like:

tensor4, (patch, channel, column, row)

The channel should be 1 or 3.

class `mlbase.cost.ImageSSE`

The sum of square error. Use aggregate() to get mean square error.

class `mlbase.cost.ImageDice`

Dice coefficient. Y is the set of salient pixel in one binary image tY is another set of salient pixel in the other binary image. The Dice coefficient is: $2 * |Y \cap tY| / (|Y| + |tY|)$

Optimizer

class `mlbase.gradient_optimizer.GradientOptimizer` (*lr*)

class `mlbase.gradient_optimizer.RMSprop` (*lr=0.01, rho=0.9, epsilon=1e-06*)

class `mlbase.gradient_optimizer.Adam` (*lr=0.01, beta1=0.9, beta2=0.999, epsilon=1e-07*)

class `mlbase.gradient_optimizer.Momentum` (*lr=0.01, mu=0.5*)

class `mlbase.gradient_optimizer.Nesterov` (*lr=0.01, mu=0.5*)

class `mlbase.gradient_optimizer.Adagrad` (*lr=0.01, epsilon=1e-07*)

Regularization

class `mlbase.regularization.Regulator` (*weight_decay=0.0005, reg_func=<function l2>*)

Regulator added to cost function.

`mlbase.regularization.l1` (*x*)

L1 penalty

`mlbase.regularization.l2` (*x*)

L2 penalty

Utility

class `mlbase.layers.RawInput` (*inputsize*)

This is THE INPUT Class. Class type is checked during network building.

Parameters `input` (*tuple or list of inte*) – Input shape without batch size.

setBatchSize (*psize*)

This method is supposed to be called by `network.setInput()`

CHAPTER 2

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