tf.contrib.kfac.loss_functions.NegativeLogProbLoss

Contents

Class **NegativeLogProbLoss**

Inherits From: `LossFunction`

Defined in `tensorflow/contrib/kfac/python/ops/loss_functions.py`.

Abstract base class for loss functions that are negative log probs.

Properties

`fisher_factor_inner_shape`

The shape of the tensor returned by multiply_fisher_factor.

`fisher_factor_inner_static_shape`

Static version of fisher_factor_inner_shape.

`hessian_factor_inner_shape`

The shape of the tensor returned by multiply_hessian_factor.

`hessian_factor_inner_static_shape`

Static version of hessian_factor_inner_shape.

`inputs`

`params`

Methods

`__init__`

```
__init__(
    targets=None,
    seed=None
)
```

`evaluate`

```
evaluate()
```

Evaluate the loss function.

`evaluate_on_sample`

```
evaluate_on_sample(seed=None)
```

`multiply_fisher`

```
multiply_fisher(vector)
```

Right-multiply a vector by the Fisher.

Args:

- `vector` : The vector to multiply. Must be the same shape(s) as the 'inputs' property.

Returns:

The vector right-multiplied by the Fisher. Will be of the same shape(s) as the 'inputs' property.

`multiply_fisher_factor`

```
multiply_fisher_factor(vector)
```

Right-multiply a vector by a factor B of the Fisher.

Here the 'Fisher' is the Fisher information matrix (i.e. expected outer- product of gradients) with respect to the parameters of the underlying probability distribtion (whose log-prob defines the loss). Typically this will be block-diagonal across different cases in the batch, since the distribution is usually (but not always) conditionally iid across different cases.

Note that B can be any matrix satisfying B * B^T = F where F is the Fisher, but will agree with the one used in the other methods of this class.

Args:

- `vector` : The vector to multiply. Must be of the shape given by the 'fisher_factor_inner_shape' property.

Returns:

The vector right-multiplied by B. Will be of the same shape(s) as the 'inputs' property.

`multiply_fisher_factor_replicated_one_hot`

```
multiply_fisher_factor_replicated_one_hot(index)
```

Right-multiply a replicated-one-hot vector by a factor B of the Fisher.

Here the 'Fisher' is the Fisher information matrix (i.e. expected outer- product of gradients) with respect to the parameters of the underlying probability distribtion (whose log-prob defines the loss). Typically this will be block-diagonal across different cases in the batch, since the distribution is usually (but not always) conditionally iid across different cases.

A 'replicated-one-hot' vector means a tensor which, for each slice along the batch dimension (assumed to be dimension 0), is 1.0 in the entry corresponding to the given index and 0 elsewhere.

Note that B can be any matrix satisfying B * B^T = H where H is the Fisher, but will agree with the one used in the other methods of this class.

Args:

- `index`: A tuple representing in the index of the entry in each slice that is 1.0. Note that len(index) must be equal to the number of elements of the 'fisher_factor_inner_shape' tensor minus one.

Returns:

The vector right-multiplied by B. Will be of the same shape(s) as the 'inputs' property.

`multiply_fisher_factor_transpose`

```
multiply_fisher_factor_transpose(vector)
```

Right-multiply a vector by the tranpose of a factor B of the Fisher.

Here the 'Fisher' is the Fisher information matrix (i.e. expected outer- product of gradients) with respect to the parameters of the underlying probability distribtion (whose log-prob defines the loss). Typically this will be block-diagonal across different cases in the batch, since the distribution is usually (but not always) conditionally iid across different cases.

Note that B can be any matrix satisfying B * B^T = F where F is the Fisher, but will agree with the one used in the other methods of this class.

Args:

- `vector`: The vector to multiply. Must be the same shape(s) as the 'inputs' property.

Returns:

The vector right-multiplied by B^T. Will be of the shape given by the 'fisher_factor_inner_shape' property.

`multiply_hessian`

```
multiply_hessian(vector)
```

Right-multiply a vector by the Hessian.

Here the 'Hessian' is the Hessian matrix (i.e. matrix of 2nd-derivatives) of the loss function with respect to its inputs.

Args:

- `vector` : The vector to multiply. Must be the same shape(s) as the 'inputs' property.

Returns:

The vector right-multiplied by the Hessian. Will be of the same shape(s) as the 'inputs' property.

`multiply_hessian_factor`

```
multiply_hessian_factor(vector)
```

Right-multiply a vector by a factor B of the Hessian.

Here the 'Hessian' is the Hessian matrix (i.e. matrix of 2nd-derivatives) of the loss function with respect to its inputs. Typically this will be block-diagonal across different cases in the batch, since the loss function is typically summed across cases.

Note that B can be any matrix satisfying B * B^T = H where H is the Hessian, but will agree with the one used in the other methods of this class.

Args:

- `vector` : The vector to multiply. Must be of the shape given by the 'hessian_factor_inner_shape' property.

Returns:

The vector right-multiplied by B. Will be of the same shape(s) as the 'inputs' property.

`multiply_hessian_factor_replicated_one_hot`

```
multiply_hessian_factor_replicated_one_hot(index)
```

Right-multiply a replicated-one-hot vector by a factor B of the Hessian.

Here the 'Hessian' is the Hessian matrix (i.e. matrix of 2nd-derivatives) of the loss function with respect to its inputs. Typically this will be block-diagonal across different cases in the batch, since the loss function is typically summed across cases.

A 'replicated-one-hot' vector means a tensor which, for each slice along the batch dimension (assumed to be dimension 0), is 1.0 in the entry corresponding to the given index and 0 elsewhere.

Note that B can be any matrix satisfying B * B^T = H where H is the Hessian, but will agree with the one used in the other methods of this class.

Args:

- `index` : A tuple representing in the index of the entry in each slice that is 1.0. Note that len(index) must be equal to the number of elements of the 'hessian_factor_inner_shape' tensor minus one.

Returns:

The vector right-multiplied by B^T. Will be of the same shape(s) as the 'inputs' property.

`multiply_hessian_factor_transpose`

```
multiply_hessian_factor_transpose(vector)
```

Right-multiply a vector by the tranpose of a factor B of the Hessian.

Here the 'Hessian' is the Hessian matrix (i.e. matrix of 2nd-derivatives) of the loss function with respect to its inputs. Typically this will be block-diagonal across different cases in the batch, since the loss function is typically summed across cases.

Note that B can be any matrix satisfying B * B^T = H where H is the Hessian, but will agree with the one used in the other methods of this class.

Args:

- `vector` : The vector to multiply. Must be the same shape(s) as the 'inputs' property.

Returns:

The vector right-multiplied by B^T. Will be of the shape given by the 'hessian_factor_inner_shape' property.

`sample`

```
sample(seed)
```