Package 'tidydann'

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Title Add the 'dann' Model and the 'sub_dann' Model to the Tidymodels Ecosystem

Version 1.0.1

Description Provides model specifications, tuning parameters for models in 'dann' package. Models based on Hastie (1996) <https://web.stanford.edu/~hastie/Papers/dann_IEEE.pdf>.

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Depends R (>= 4.1.0)

Suggests testthat (>= 3.0.0), dann (>= 1.0.0), recipes, mlbench, modeldata, workflows, rsample, dplyr, magrittr, tune, scales, yardstick, rlang

Config/testthat/edition 3

Imports dials, generics, tibble, parsnip

URL https://github.com/gmcmacran/tidydann

BugReports https://github.com/gmcmacran/tidydann/issues

NeedsCompilation no

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Repository CRAN

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Contents

`matrix_diagonal` *Softening*

Description

Softening

Usage

```
matrix_diagonal(range = c(0, 2), trans = NULL)
```

Arguments

`range`	A two-element vector holding the defaults for the smallest and largest possible values, respectively. If a transformation is specified, these values should be in the transformed units.
`trans`	A trans object from the scales package, such as scales::log10_trans() or scales::reciprocal_trans().If not provided, the default is used which matches the units used in range. If no transformation, NULL.

Details

Softening parameter. Usually has the least affect on performance.

Value

An S3 class of type quant_param from the dials package.

Examples

```
library(tidydann)

matrix_diagonal()
```

`nearest_neighbor_adaptive`
Discriminant Adaptive Nearest Neighbor Classification

Description

Discriminant Adaptive Nearest Neighbor Classification

Usage

```
nearest_neighbor_adaptive(
  mode = "classification",
  neighbors = NULL,
  neighborhood = NULL,
  matrix_diagonal = NULL,
  weighted = NULL,
  sphere = NULL,
  num_comp = NULL
)
```

Arguments

mode	A single character string for the type of model. The only possible value for this model is "classification".
neighbors	The number of data points used for final classification.
neighborhood	The number of data points used to calculate between and within class covariance.
matrix_diagonal	Diagonal elements of a diagonal matrix. 1 is the identity matrix.
weighted	weighted argument to ncoord. See fpc::ncoord() for details. Only sub_dann engine.
sphere	One of "mcd", "mve", "classical", or "none" See fpc::ncoord() for details. Only sub_dann engine.
num_comp	Dimension of subspace used by dann. See fpc::ncoord() for details. Only sub_dann engine.

Details

Discriminant Adaptive Nearest Neighbor (dann) is a variation of k nearest neighbors where the shape of the neighborhood is data driven. The neighborhood is elongated along class boundaries and shrunk in the orthogonal direction.

This function has engines dann and sub_dann.

Value

An S3 class of type nearest_neighbor_adaptive.

Examples

```
library(parsnip)
library(tidydann)

data("two_class_dat", package = "modeldata")

model <- nearest_neighbor_adaptive(neighbors = 2) |>
  set_engine("dann") |>
  fit(formula = Class ~ A + B, data = two_class_dat)
```

```
model |>
  predict(new_data = two_class_dat)
```

`neighborhood` *Neighborhood size*

Description

Number of data points used to calculate the shape of the neighborhood.

Usage

```
neighborhood(range = c(2L, dials::unknown()), trans = NULL)
```

Arguments

`range`	A two-element vector holding the defaults for the smallest and largest possible values, respectively. If a transformation is specified, these values should be in the transformed units.
`trans`	A trans object from the scales package, such as scales::log10_trans() or scales::reciprocal_trans().If not provided, the default is used which matches the units used in range. If no transformation, NULL.

Details

Use get_n or finalize from dials to finalize.

If cross validation is done, use get_n_frac with argument frac set to 1/V. See README for detailed example.

Value

An S3 class of type quant_param from the dials package.

Examples

```
library(dials)
library(tidydann)

data("taxi", package = "modeldata")
neighborhood() |> finalize(taxi)

neighborhood() |> get_n(taxi)
```

sphere *Sphere argument to ncoord*

Description

Sphere argument to ncoord

Usage

```
sphere(values = c("mcd", "mve", "classical", "none"))
```

Arguments

values	A one-element vector containing "mcd", "mve", "classical", or "none".

Value

An S3 class of type qual_param from the dials package.

Examples

```
library(tidydann)

sphere()
```

tunable.nearest_neighbor_adaptive *Declare tunable parameters*

Description

Returns information on potential hyper-parameters that can be optimized.

Usage

```
## S3 method for class 'nearest_neighbor_adaptive'
tunable(x, ...)
```

Arguments

x	A model specification of type nearest_neighbor_adaptive specification.
...	Other arguments passed to methods.

Value

A tibble with a column for the parameter name, information on the default method for generating a corresponding parameter object, the source of the parameter (e.g. "recipe", etc.), and the component within the source.

`update.nearest_neighbor_adaptive` *Updating a model specification.*

Description

If parameters of a model specification need to be modified, update() can be used in lieu of recreating the object from scratch.

Usage

```
## S3 method for class 'nearest_neighbor_adaptive'
update(
  object,
  parameters = NULL,
  neighbors = NULL,
  neighborhood = NULL,
  matrix_diagonal = NULL,
  weighted = NULL,
  sphere = NULL,
  num_comp = NULL,
  fresh = FALSE,
  ...
)
```

Arguments

`object`	A model specification.
`parameters`	A 1-row tibble or named list with main parameters to update. Use either parameters or the main arguments directly when updating. If the main arguments are used, these will supersede the values in parameters. Also, using engine arguments in this object will result in an error.
`neighbors`	The number of data points used for final classification.
`neighborhood`	The number of data points used to calculate between and within class covariance.
`matrix_diagonal`	Diagonal elements of a diagonal matrix. 1 is the identity matrix.
`weighted`	weighted argument to ncoord. See `fpc::ncoord()` for details. Only sub_dann engine.
`sphere`	One of "mcd", "mve", "classical", or "none" See `fpc::ncoord()` for details. Only sub_dann engine.
`num_comp`	Dimension of subspace used by dann. See `fpc::ncoord()` for details. Only sub_dann engine.
`fresh`	A logical for whether the arguments should be modified in-place or replaced wholesale.
`...`	Not used for update().

`weighted` *Weighted argument to ncoord*

Description

Weighted argument to ncoord

Usage

```
weighted(values = c(FALSE, TRUE))
```

Arguments

`values`	A one-element vector containing FALSE or TRUE.

Value

An S3 class of type qual_param from the dials package.

Examples

```
library(tidydann)

weighted()
```

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