Package ‘tabularMLC’

October 5, 2021

Type Package

Title Tabular Maximum Likelihood Classifier

Version 0.0.3

Description The maximum likelihood classifier (MLC) is one of the most common classifiers used for remote sensing imagery.
This package uses ‘RcppArmadillo’ to provide a fast implementation of the MLC to train and predict over tabular data (data.frame).
The algorithms were based on Mather (1985) <doi:10.1080/01431168508948456> method.

License GPL-3

Depends Rcpp, methods

Imports stats

LinkingTo Rcpp, RcppArmadillo

RoxygenNote 7.1.2

Encoding UTF-8

URL https://github.com/caiohamamura/tabularMLC

BugReports https://github.com/caiohamamura/tabularMLC/issues

Author Caio Hamamura [aut, cre] (<https://orcid.org/0000-0001-6149-5885>)

Maintainer Caio Hamamura <caiohamamura@gmail.com>

Repository CRAN

Repository/R-Forge/Project tabularmlc

Repository/R-Forge/Revision 5

Repository/R-Forge/DateTimeStamp 2021-10-04 20:39:29

Date/Publication 2021-10-05 08:30:02 UTC

NeedsCompilation yes

R topics documented:

  tabularMLC-package ........................................... 2
  MLC .......................................................... 2
  MLC.model-class ............................................. 3
  predict.MLC.model ......................................... 4
**MLC**

**Description**

Maximum likelihood is a common classifier used for land use classification. It calculates the likelihood of an object to belong to each class based on an expected distribution and a metric of distance.

**Details**

The most common implementation, like in this package, will assume normal distributed variables within classes, and calculate the distance, based on Mahalanobis distance.

**Author(s)**

**Maintainer:** Caio Hamamura <caiohamamura@gmail.com> (ORCID)

**References**


**Imports**

See Also

Useful links:

- [https://github.com/caiohamamura/tabularMLC](https://github.com/caiohamamura/tabularMLC)
- Report bugs at [https://github.com/caiohamamura/tabularMLC/issues](https://github.com/caiohamamura/tabularMLC/issues)

---

**MLC**

**Maximum Likelihood Classifier**

**Description**

Function to create the classifier class from the training set

**Usage**

MLC(x, ...)

## S3 method for class 'formula'
MLC(formula, data = NULL, ...)

## Default S3 method:
MLC(x, y = NULL, ...)
MLC.model-class

Arguments

x feature vector for the training set
... for other signatures
formula formula. The formula for defining the model.
data the dataset
y factor vector with the training set labels

Value

An object of class MLC.model parameters used for the model

Examples

data(iris)

x = iris[, -5]
y = iris$Species

# Default x y interface
mlcModel1 = MLC(x, y)

# Formula interface
mlcModel2 = MLC(Species ~ Petal.Length + Petal.Width, iris)

# Formula except one column
mlcModel3 = MLC(Species ~ . - Sepal.Length, iris)

MLC.model-class Maximum likelihood model class

Description

Maximum likelihood model class

Slots

k the constant fraction to be used in model \( \frac{1}{(2\pi)^{\frac{D}{2}}} \sqrt{|\Sigma_i|} \)
mu mean (\( \mu_i \)) list for each variable and class
inverseCovarianceMatrices inverted covariance matrix (\( \Sigma_i \)) for each class
groups the classification levels
vars the variables used for training the model

See Also

MLC which creates this class
predict.MLC.model

Predict function for MLC.model-class

Description

predict is inherited from the generic function for predictions from the results.

Usage

## S3 method for class 'MLC.model'
predict(object, x = NULL, likelihood = FALSE, ...)

Arguments

- object: MLC.model-class model class to use for prediction
- x: data.frame. The feature vector to predict
- likelihood: logical. Whether to return or not the likelihood values, default FALSE.
- ...: inherited from generic function (not in use)

Value

a factor vector with the predicted value. If likelihood is TRUE, then it will also return the calculated likelihoods.

Examples

data(iris)

n = length(iris$Species)

# Split training by sample
training = sample(1:n, size=n*0.7)
validation = (1:n)[-training]

# Train model with training dataset
mlcModel = MLC(Species ~ ., iris[training,])

# Predict using validation dataset
predict = predict(mlcModel, iris[validation,])

# Print confusion matrix
confusionMatrix = table(predicted=predict, observed=iris$Species[validation])
predict(confusionMatrix)
Index

MLC, 2, 3
MLC.model, 3
MLC.model-class, 3

predict.MLC.model, 4

tabularMLC (tabularMLC-package), 2
tabularMLC-package, 2