

# Package ‘fastNaiveBayes’

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**Type** Package

**Title** Extremely Fast Implementation of a Naive Bayes Classifier

**Version** 1.1.2

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**Description** This is an extremely fast implementation of a Naive Bayes classifier. This package is currently the only package that supports a Bernoulli distribution, a Multinomial distribution, and a Gaussian distribution, making it suitable for both binary features, frequency counts, and numerical features. Another feature is the support of a mix of different event models. Only numerical variables are allowed, however, categorical variables can be transformed into dummies and used with the Bernoulli distribution. This implementation offers a huge performance gain compared to other implementations in R. The execution times were compared on a data set of tweets and this package was found to be around 283 to 34,841 times faster for the Bernoulli event models and 17 to 60 times faster for the Multinomial model. See the vignette for more details. For the Gaussian distribution this package was found to be between 2.8 and 1679 times faster. The implementation is largely based on the paper “A comparison of event models for Naive Bayes anti-spam e-mail filtering” written by K.M. Schneider (2003) <doi:10.3115/1067807>. Any issues can be submitted to: <<https://github.com/mskogholt/fastNaiveBayes/issues>>.

**Depends** R (>= 3.2.0)

**License** GPL-3

**Encoding** UTF-8

**URL** <https://github.com/mskogholt/fastNaiveBayes>

**BugReports** <https://github.com/mskogholt/fastNaiveBayes/issues>

**LazyData** TRUE

**Imports** Matrix, stats

**Suggests** knitr, rmarkdown, testthat

**RoxygenNote** 6.1.1

**VignetteBuilder** knitr

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**Repository** CRAN

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fastNaiveBayes	<i>fastNaiveBayes</i>
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### Description

This is an extremely fast implementation of a Naive Bayes classifier. This package is currently the only package that supports a Bernoulli distribution, a Multinomial distribution, and a Gaussian distribution, making it suitable for both binary features, frequency counts, and numerical features. Another unique feature is the support of a mix of different event models. Only numerical variables are allowed, however, categorical variables can be transformed into dummies and used with the Bernoulli distribution.

### Details

This implementation offers a huge performance gain compared to the 'e1071' implementation in R. The execution times were compared on a data set of tweets and was found to be around 1135 times faster. Compared to other implementations the minimum speed up was found to be 12.5 times faster for the Bernoulli distribution. See the vignette for more details. This performance gain is only realized using a Bernoulli event model. Furthermore, the Multinomial event model implementation is even slightly faster, but incomparable since it was not implemented in 'e1071'. Compared to other implementations of a Multinomial distribution, this package was found to give a speed up of 12.2 times.

The implementation is largely based on the paper "A comparison of event models for Naive Bayes anti-spam e-mail filtering" written by K.M. Schneider (2003) <doi:10.3115/1067807>.

Any issues can be submitted to: <<https://github.com/mskogholt/fastNaiveBayes/issues>>.

For a complete list of functions, use `library(help = "fastNaiveBayes")`.

---

fastNaiveBayes.bernoulli

*Fast Naive Bayes Classifier with a Bernoulli event model*


---

### Description

Extremely fast implementation of a Naive Bayes Classifier. This instance only uses the Bernoulli event model for all columns.

### Usage

```
fastNaiveBayes.bernoulli(x, y, laplace = 0, sparse = FALSE, ...)
```

```
## Default S3 method:
```

```
fastNaiveBayes.bernoulli(x, y, laplace = 0,
  sparse = FALSE, ...)
```

### Arguments

x	a numeric matrix with 1's and 0's to indicate the presence or absence of features. A sparse dgMatrix is also accepted
y	a factor of classes
laplace	A number used for Laplace smoothing. Default is 0
sparse	Use a sparse matrix? If true a sparse matrix will be constructed from x, which can give up to a 40% speedup. It's possible to directly feed a sparse dgMatrix as x, which will set this parameter to TRUE
...	Not used.

### Details

A Naive Bayes classifier that assumes independence between the feature variables. The bernoulli distribution should be used when the features are 0 or 1 to indicate the presence or absence of the feature in each document. NA's are simply treated as 0.

By setting sparse = TRUE the numeric matrix x will be converted to a sparse dgMatrix. This can be considerably faster in case few observations have a value different than 0.

It's also possible to directly supply a sparse dgMatrix, which can be a lot faster in case a fastNaive-Bayes model is trained multiple times on the same matrix or a subset of this. See examples for more details. Bear in mind that converting to a sparse matrix can actually be slower depending on the data.

### Value

A fitted object of class "fastNaiveBayes.bernoulli". It has four components:

**probability\_table** Posterior probabilities

**priors** calculated prior probabilities for each class

**names** names of features used to train this fastNaiveBayes

**See Also**

[predict.fastNaiveBayes.bernoulli](#) for the predict function for the fastNaiveBayes.bernoulli class, [fastNaiveBayes.mixed](#) for the general fastNaiveBayes model, [fastNaiveBayes.gaussian](#) for a Gaussian distribution only model, and finally, [fastNaiveBayes.multinomial](#) for a multinomial only distribution model.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrows = nrow(x))

# Bernoulli only
vars <- c(dist$bernoulli, dist$multinomial)
newx <- x[, vars]
for (i in 1:ncol(newx)) {
  newx[[i]] <- as.factor(newx[[i]])
}
new_mat <- model.matrix(y ~ . - 1, cbind(y, newx))

mod <- fastNaiveBayes.bernoulli(new_mat, y, laplace = 1)
pred <- predict(mod, newdata = new_mat)
mean(pred != y)
```

---

```
fastNaiveBayes.detect_distribution
Distribution Detection Function
```

---

**Description**

Determines which distribution to use for which columns in the matrix based on a set of rules.

**Usage**

```
fastNaiveBayes.detect_distribution(x, nrows = 10)

## Default S3 method:
fastNaiveBayes.detect_distribution(x, nrows = 10)
```

**Arguments**

x	a numeric matrix, or a dgcMatrix
nrows	number of rows to use to detect distributions
...	Not used.

**Details**

A simple utility function to detect the distribution to use for each columns

**Value**

A list of distribution names mapped to column names

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

# Uses default of top 10 rows to determine distributions
dist <- fastNaiveBayes.detect_distribution(x)
print(dist)

# Uses all rows of x to determine distributions
dist <- fastNaiveBayes.detect_distribution(x, nrow = nrow(x))
print(dist)
```

---

fastNaiveBayes.gaussian

*Fast Naive Bayes Classifier with a Gaussian event model*

---

**Description**

Extremely fast implementation of a Naive Bayes Classifier. This instance only uses the Gaussian event model for all columns.

**Usage**

```
fastNaiveBayes.gaussian(x, y, sparse = FALSE, ...)
```

```
## Default S3 method:
```

```
fastNaiveBayes.gaussian(x, y, sparse = FALSE, ...)
```

**Arguments**

x	a numeric matrix. A sparse dgcMatrix is also accepted
y	a factor of classes
sparse	Use a sparse matrix? If true a sparse matrix will be constructed from x, which can give up to a 40 It's possible to directly feed a sparse dgcMatrix as x, which will set this parameter to TRUE
...	Not used.

## Details

A Naive Bayes classifier that assumes independence between the feature variables. The Gaussian distribution should be used with numerical variables.

By setting `sparse = TRUE` the numeric matrix `x` will be converted to a sparse `dgcMatrix`. This can be considerably faster in case few observations have a value different than 0.

It's also possible to directly supply a sparse `dgcMatrix`, which can be a lot faster in case a `fastNaiveBayes` model is trained multiple times on the same matrix or a subset of this. See examples for more details. Bear in mind that converting to a sparse matrix can actually be slower depending on the data.

## Value

A fitted object of class `"fastNaiveBayes.bernoulli"`. It has four components:

**probability\_table** Posterior probabilities

**priors** calculated prior probabilities for each class

**names** names of features used to train this `fastNaiveBayes`

## See Also

[predict.fastNaiveBayes.gaussian](#) for the predict function for the `fastNaiveBayes.gaussian` class, [fastNaiveBayes.mixed](#) for the general `fastNaiveBayes` model, [fastNaiveBayes.bernoulli](#) for a Bernoulli distribution only model, and finally, [fastNaiveBayes.multinomial](#) for a multinomial only distribution model.

## Examples

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrow = nrow(x))

# Gaussian only
vars <- c("hp", dist$gaussian)
newx <- x[, vars]

mod <- fastNaiveBayes.gaussian(newx, y)
pred <- predict(mod, newdata = newx)
mean(pred != y)
```

---

fastNaiveBayes.mixed *Fast Naive Bayes Classifier for mixed Distributions*


---

**Description**

Extremely fast implementation of a Naive Bayes Classifier.

**Usage**

```
fastNaiveBayes.mixed(x, y, laplace = 0, sparse = FALSE,
  distribution = NULL, ...)

## Default S3 method:
fastNaiveBayes.mixed(x, y, laplace = 0,
  sparse = FALSE, distribution = NULL, ...)
```

**Arguments**

x	a numeric matrix, or a dgcMatrix
y	a factor of classes
laplace	A number used for Laplace smoothing. Default is 0
sparse	Use a sparse matrix? If true a sparse matrix will be constructed from x, which can give up to a 40 It's possible to directly feed a sparse dgcMatrix as x, which will set this parameter to TRUE
distribution	A list with distribution names and column names to for which to use the distribution, see examples.
...	Not used.

**Details**

A Naive Bayes classifier that assumes independence between the feature variables. Currently, either a Bernoulli, multinomial, or Gaussian distribution can be used. The bernoulli distribution should be used when the features are 0 or 1 to indicate the presence or absence of the feature in each document. The multinomial distribution should be used when the features are the frequency that the feature occurs in each document. NA's are simply treated as 0. Finally, the Gaussian distribution should be used with numerical variables. By setting the distribution parameter a mix of different distributions can be used for different columns in the input matrix

By setting sparse = TRUE the numeric matrix x will be converted to a sparse dgcMatrix. This can be considerably faster in case few observations have a value different than 0.

It's also possible to directly supply a sparse dgcMatrix, which can be a lot faster in case a fastNaive-Bayes model is trained multiple times on the same matrix or a subset of this. See examples for more details. Bear in mind that converting to a sparse matrix can actually be slower depending on the data.

**Value**

A fitted object of class "fastNaiveBayes". It has four components:

**models** The fitted models, one for each distribution specified

**priors** calculated prior probabilities for each class

**names** names of features used to train this fastNaiveBayes

**distribution** the distribution assumed for probability calculations and predictions

**See Also**

[predict.fastNaiveBayes.mixed](#) for the predict function for a fastNaiveBayes class, [fastNaiveBayes.bernoulli](#) for a Bernoulli only model, [fastNaiveBayes.gaussian](#) for a Gaussian distribution only model, and finally, [fastNaiveBayes.multinomial](#) for a multinomial only distribution model.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

# Mixed event models
dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrows = nrow(x))
print(dist)
mod <- fastNaiveBayes.mixed(x, y, laplace = 1)
pred <- predict(mod, newdata = x)
mean(pred != y)
```

---

fastNaiveBayes.multinomial

*Fast Naive Bayes Classifier with a Multinomial event model*

---

**Description**

Extremely fast implementation of a Naive Bayes Classifier. This instance only uses the Multinomial event model for all columns.

**Usage**

```
fastNaiveBayes.multinomial(x, y, laplace = 0, sparse = FALSE, ...)
```

```
## Default S3 method:
```

```
fastNaiveBayes.multinomial(x, y, laplace = 0,
  sparse = FALSE, ...)
```

**Arguments**

x	a numeric matrix with frequency counts. A sparse dgcmatrix is also accepted
y	a factor of classes
laplace	A number used for Laplace smoothing. Default is 0
sparse	Use a sparse matrix? If true a sparse matrix will be constructed from x, which can give up to a 40 It's possible to directly feed a sparse dgcmatrix as x, which will set this parameter to TRUE
...	Not used.

**Details**

A Naive Bayes classifier that assumes independence between the feature variables. The multinomial distribution should be used when the features are the frequency that the feature occurs in each document.

By setting sparse = TRUE the numeric matrix x will be converted to a sparse dgcmatrix. This can be considerably faster in case few observations have a value different than 0.

It's also possible to directly supply a sparse dgcmatrix, which can be a lot faster in case a fastNaiveBayes model is trained multiple times on the same matrix or a subset of this. See examples for more details. Bear in mind that converting to a sparse matrix can actually be slower depending on the data.

**Value**

A fitted object of class "fastNaiveBayes.bernoulli". It has four components:

- probability\_table** Posterior probabilities
- priors** calculated prior probabilities for each class
- names** names of features used to train this fastNaiveBayes

**See Also**

[predict.fastNaiveBayes.multinomial](#) for the predict function for the fastNaiveBayes.multinomial class, [fastNaiveBayes.mixed](#) for the general fastNaiveBayes model, [fastNaiveBayes.bernoulli](#) for a Bernoulli distribution only model, and finally, [fastNaiveBayes.gaussian](#) for a Gaussian only distribution model.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrow = nrow(x))

# Multinomial only
```

```
vars <- c(dist$bernoulli, dist$multinomial)
newx <- x[, vars]

mod <- fastNaiveBayes.multinomial(newx, y, laplace = 1)
pred <- predict(mod, newdata = newx)
mean(pred != y)
```

---

```
predict.fastNaiveBayes.bernoulli
```

*Predict Method for fastNaiveBayes.bernoulli fits*

---

### Description

Uses a `fastNaiveBayes.bernoulli` model and a new data set to create the classifications. This can either be the raw probabilities generated by the `fastNaiveBayes.bernoulli` model or the classes themselves.

### Usage

```
## S3 method for class 'fastNaiveBayes.bernoulli'
predict(object, newdata,
        type = c("class", "raw", "rawprob"), sparse = FALSE,
        threshold = .Machine$double.eps, ...)
```

### Arguments

<code>object</code>	A fitted object of class "fastNaiveBayes.bernoulli".
<code>newdata</code>	A numeric matrix with 1's and 0's to indicate the presence or absence of features. A Sparse <code>dgcMatrix</code> is also accepted. Note that if <code>newdata</code> contains features that were not encountered in the training data, these are omitted from the prediction. Furthermore, <code>newdata</code> can contain fewer features than encountered in the training data. In this case, <code>newdata</code> will be padded with extra columns all filled with 0's.
<code>type</code>	If "raw", the conditional a-posterior probabilities for each class are returned, and the class with maximal probability else.
<code>sparse</code>	Use a sparse Matrix? If true a sparse matrix will be constructed from <code>x</code> , which can give up to a 40% speed up. It's possible to directly feed a sparse <code>dgcMatrix</code> as <code>x</code> , which will set this parameter to TRUE
<code>threshold</code>	A threshold for the minimum probability. For Bernoulli and Multinomial event models Laplace smoothing solves this, but in the case of Gaussian event models, this ensures numerical probabilities
<code>...</code>	Not used.

**Details**

In the extremely unlikely case that two classes have the exact same estimated probability, the first encountered class is used as the classification and a warning is issued.

Using a sparse matrix directly can be especially useful if it's necessary to use predict multiple times on the same matrix or on different subselections of the same initial matrix, see examples for further details.

**Value**

If type = 'class', a factor with classified class levels. If type = 'raw', a matrix with the predicted probabilities of each class, where each column in the matrix corresponds to a class level.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)

cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrow = nrow(x))

# Bernoulli only
vars <- c(dist$bernoulli, dist$multinomial)
newx <- x[, vars]
for (i in 1:ncol(newx)) {
  newx[[i]] <- as.factor(newx[[i]])
}
new_mat <- model.matrix(y ~ . - 1, cbind(y, newx))
mod <- fastNaiveBayes.bernoulli(new_mat, y, laplace = 1)
pred <- predict(mod, newdata = new_mat)
mean(pred != y)
```

---

predict.fastNaiveBayes.gaussian

*Predict Method for fastNaiveBayes.gaussian fits*

---

**Description**

Uses a fastNaiveBayes.gaussian model and a new data set to create the classifications. This can either be the raw probabilities generated by the fastNaiveBayes.gaussian model or the classes themselves.

**Usage**

```
## S3 method for class 'fastNaiveBayes.gaussian'
predict(object, newdata,
        type = c("class", "raw", "rawprob"), sparse = FALSE,
        threshold = .Machine$double.eps, ...)
```

**Arguments**

object	A fitted object of class "fastNaiveBayes.gaussian".
newdata	A numeric matrix. A Sparse dgcMatrix is also accepted. Note that if newdata contains features that were not encountered in the training data, these are omitted from the prediction. Furthermore, newdata can contain fewer features than encountered in the training data.
type	If "raw", the conditional a-posterior probabilities for each class are returned, and the class with maximal probability else.
sparse	Use a sparse Matrix? If true a sparse matrix will be constructed from x, which can give up to a 40% speed up. It's possible to directly feed a sparse dgcMatrix as x, which will set this parameter to TRUE
threshold	A threshold for the minimum probability. For Bernoulli and Multinomial event models Laplace smoothing solves this, but in the case of Gaussian event models, this ensures numerical probabilities
...	Not used.

**Details**

In the extremely unlikely case that two classes have the exact same estimated probability, the first encountered class is used as the classification and a warning is issued.

Using a sparse matrix directly can be especially useful if it's necessary to use predict multiple times on the same matrix or on different subselections of the same initial matrix, see examples for further details.

**Value**

If type = 'class', a factor with classified class levels. If type = 'raw', a matrix with the predicted probabilities of each class, where each column in the matrix corresponds to a class level.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)
cars <- mtcars
y <- as.factor(iffelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrows = nrow(x))

# Gaussian only
vars <- c("hp", dist$gaussian)
```

```
newx <- x[, vars]

mod <- fastNaiveBayes.gaussian(newx, y)
pred <- predict(mod, newdata = newx)
mean(pred != y)
```

---

predict.fastNaiveBayes.mixed

*Predict Method for fastNaiveBayes fits*

---

### Description

Uses a fastNaiveBayes model and a new data set to create the classifications. This can either be the raw probabilities generated by the fastNaiveBayes model or the classes themselves.

### Usage

```
## S3 method for class 'fastNaiveBayes.mixed'
predict(object, newdata, type = c("class",
  "raw"), sparse = FALSE, threshold = .Machine$double.eps, ...)
```

### Arguments

object	A fitted object of class "fastNaiveBayes".
newdata	A numeric matrix with 1's and 0's to indicate the presence or absence of features. A Sparse dgcMatrix is also accepted. Note that if newdata contains features that were not encountered in the training data, these are omitted from the prediction. Furthermore, newdata can contain fewer features than encountered in the training data. In this case, newdata will be padded with extra columns all filled with 0's.
type	If "raw", the conditional a-posterior probabilities for each class are returned, and the class with maximal probability else.
sparse	Use a sparse Matrix? If true a sparse matrix will be constructed from x, which can give up to a 40% speed up. It's possible to directly feed a sparse dgcMatrix as x, which will set this parameter to TRUE
threshold	A threshold for the minimum probability. For Bernoulli and Multinomial event models Laplace smoothing solves this, but in the case of Gaussian event models, this ensures numerical probabilities
...	Not used.

### Details

In the extremely unlikely case that two classes have the exact same estimated probability, the first encountered class is used as the classification and a warning is issued.

Using a sparse matrix directly can be especially useful if it's necessary to use predict multiple times on the same matrix or on different subselections of the same initial matrix, see examples for further details.

**Value**

If type = 'class', a factor with classified class levels. If type = 'raw', a matrix with the predicted probabilities of each class, where each column in the matrix corresponds to a class level.

**Examples**

```
rm(list = ls())
library(fastNaiveBayes)

cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

# Mixed event models
dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrow = nrow(x))
print(dist)
mod <- fastNaiveBayes.mixed(x, y, laplace = 1)
pred <- predict(mod, newdata = x)
mean(pred != y)
```

---

predict.fastNaiveBayes.multinomial

*Predict Method for fastNaiveBayes.multinomial fits*

---

**Description**

Uses a fastNaiveBayes.multinomial model and a new data set to create the classifications. This can either be the raw probabilities generated by the fastNaiveBayes.multinomial model or the classes themselves.

**Usage**

```
## S3 method for class 'fastNaiveBayes.multinomial'
predict(object, newdata,
        type = c("class", "raw", "rawprob"), sparse = FALSE,
        threshold = .Machine$double.eps, ...)
```

**Arguments**

object	A fitted object of class "fastNaiveBayes.multinomial".
newdata	A numeric matrix with 1's and 0's to indicate the presence or absence of features. A Sparse dgMatrix is also accepted. Note that if newdata contains features that were not encountered in the training data, these are omitted from the prediction. Furthermore, newdata can contain fewer features than encountered in the training data. In this case, newdata will be padded with extra columns all filled with 0's.
type	If "raw", the conditional a-posterior probabilities for each class are returned, and the class with maximal probability else.

sparse	Use a sparse Matrix? If true a sparse matrix will be constructed from x, which can give up to a 40% speed up. It's possible to directly feed a sparse dgcmatrix as x, which will set this parameter to TRUE
threshold	A threshold for the minimum probability. For Bernoulli and Multinomial event models Laplace smoothing solves this, but in the case of Gaussian event models, this ensures numerical probabilities
...	Not used.

### Details

In the extremely unlikely case that two classes have the exact same estimated probability, the first encountered class is used as the classification and a warning is issued.

Using a sparse matrix directly can be especially useful if it's necessary to use predict multiple times on the same matrix or on different subselections of the same initial matrix, see examples for further details.

### Value

If type = 'class', a factor with classified class levels. If type = 'raw', a matrix with the predicted probabilities of each class, where each column in the matrix corresponds to a class level.

### Examples

```
rm(list = ls())
library(fastNaiveBayes)

cars <- mtcars
y <- as.factor(ifelse(cars$mpg > 25, "High", "Low"))
x <- cars[, 2:ncol(cars)]

dist <- fastNaiveBayes::fastNaiveBayes.detect_distribution(x, nrows = nrow(x))

# Multinomial only
vars <- c(dist$bernoulli, dist$multinomial)
newx <- x[, vars]
mod <- fastNaiveBayes.multinomial(newx, y, laplace = 1)
pred <- predict(mod, newdata = newx)
mean(pred != y)
```

---

tweets

*This data originally came from Crowdfower's Data for Everyone library.*

---

### Description

As the original source says,

**Usage**

tweets

**Format**

A data frame with 14640 rows and 2 columns

**airline\_sentiment** sentiment, as either 'negative', 'neutral', 'positive'

**text** raw text, character

**Details**

"A sentiment analysis job about the problems of each major U.S. airline. Twitter data was scraped from February of 2015 and contributors were asked to first classify positive, negative, and neutral tweets, followed by categorizing negative reasons (such as "late flight" or "rude service")."

The data provided here is an altered version of the original source.

**Source**

<https://www.figure-eight.com/data-for-everyone/>

---

tweetsDTM

*This data originally came from Crowdflower's Data for Everyone library.*

---

**Description**

As the original source says,

**Usage**

tweetsDTM

**Format**

A data frame with 14640 rows and 2186 columns

**airline\_sentiment** sentiment, as either 'negative', 'neutral', 'positive'

**said** Frequency count, numeric

**virginamerica** Frequency count, numeric

**commerci** Frequency count, numeric

**experi** Frequency count, numeric

**plus** Frequency count, numeric

**anoth** Frequency count, numeric

**mean** Frequency count, numeric

**must** Frequency count, numeric  
**need** Frequency count, numeric  
**take** Frequency count, numeric  
**today** Frequency count, numeric  
**trip** Frequency count, numeric  
**amp** Frequency count, numeric  
**blast** Frequency count, numeric  
**entertain** Frequency count, numeric  
**face** Frequency count, numeric  
**guest** Frequency count, numeric  
**littl** Frequency count, numeric  
**realli** Frequency count, numeric  
**recours** Frequency count, numeric  
**bad** Frequency count, numeric  
**big** Frequency count, numeric  
**thing** Frequency count, numeric  
**fli** Frequency count, numeric  
**flight** Frequency count, numeric  
**pay** Frequency count, numeric  
**play** Frequency count, numeric  
**seat** Frequency count, numeric  
**serious** Frequency count, numeric  
**away** Frequency count, numeric  
**everi** Frequency count, numeric  
**near** Frequency count, numeric  
**time** Frequency count, numeric  
**wonut** Frequency count, numeric  
**yes** Frequency count, numeric  
**hat** Frequency count, numeric  
**miss** Frequency count, numeric  
**opportun** Frequency count, numeric  
**without** Frequency count, numeric  
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### Details

"A sentiment analysis job about the problems of each major U.S. airline. Twitter data was scraped from February of 2015 and contributors were asked to first classify positive, negative, and neutral tweets, followed by categorizing negative reasons (such as "late flight" or "rude service")."

The data provided here is an altered and cleaned version version of the original source.

### Source

<https://www.figure-eight.com/data-for-everyone/>

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