

Package: text2emotion (via r-universe)

May 11, 2026

Type Package

Title Real-Time Emoji Mapping for Emotional English Text

Version 0.1.0

Description This package allows users to analyze text and classify emotions such as happiness, sadness, anger, fear, and neutrality. It combines text preprocessing, TF-IDF feature extraction, and Random Forest classification to predict emotions and map them to corresponding emojis for enhanced sentiment visualization.

License GPL-2

Encoding UTF-8

LazyData true

Depends R (>= 4.4.0)

Imports stringr, textclean, magrittr, text2vec, ranger, caret,
parallel, stats

RoxygenNote 7.3.2

Suggests Matrix, rmarkdown, knitr, testthat (>= 3.0.0)

NeedsCompilation no

Config/testthat/edition 3

VignetteBuilder knitr

Config/pak/sysreqs libicu-dev

Repository <https://hateprograming.r-universe.dev>

Date/Publication 2025-05-05 06:25:06 UTC

RemoteUrl <https://github.com/hateprograming/text2emotion>

RemoteRef HEAD

RemoteSha a307c75157336b58955605599f0eb16d54aadcaa

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evaluate_rf_model	<i>Evaluate a Random Forest Model on Test Data</i>
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Description

Evaluate a Random Forest Model on Test Data

Usage

```
evaluate_rf_model(
  rf_model,
  test_texts,
  test_labels,
  tfidf_model,
  vectorizer,
  stopwords,
  verbose = TRUE
)
```

Arguments

rf_model	A trained ‘ranger‘ model object.
test_texts	A vector of raw test texts.
test_labels	A factor vector of true labels.
tfidf_model	The TF-IDF transformer used for training.
vectorizer	The vectorizer used to build DTM.
stopwords	A character vector of stopwords.
verbose	Whether to print progress. Default TRUE.

Value

A list with test accuracy, test predictions, and aligned test data.

handle_negation	<i>Handle Negation in Token List</i>
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Description

This function processes a character vector of tokens and handles negations by combining the word "not" with the immediately following word (e.g., "not happy" becomes "not_happy"). This technique helps to better preserve sentiment polarity during text analysis.

Usage

```
handle_negation(tokens)
```

Arguments

tokens A character vector of tokens (individual words).

Details

The negation handling procedure follows these steps:

- Iterate through each token.
- If a token is "not" and followed by another token, merge them into a single token separated by an underscore (e.g., "not_happy").
- Skip the next token after merging to avoid duplication.
- Otherwise, keep the token unchanged.

This method is especially useful in sentiment analysis tasks where the presence of negations can invert the sentiment polarity of words.

Value

A character vector of tokens with negations handled by combining "not" with the next word.

Examples

```
handle_negation(c("i", "am", "not", "happy"))  
# Returns: c("i", "am", "not_happy")
```

```
handle_negation(c("this", "is", "not", "good", "but", "not", "terrible"))  
# Returns: c("this", "is", "not_good", "but", "not_terrible")
```

```
handle_negation(c("nothing", "to", "worry", "about"))  
# Returns: c("nothing", "to", "worry", "about")
```

`predict_emotion_with_emoji`*Predict Emotion with Emoji Representation*

Description

This function takes input text, preprocesses it, extracts TF-IDF features using a pre-trained model, predicts the emotion using a trained classifier, and returns the result with optional emoji representation.

Usage

```
predict_emotion_with_emoji(text, output_type = "textemoji")
```

Arguments

<code>text</code>	Character string containing the text to analyze.
<code>output_type</code>	Type of output to return. Must be one of: <ul style="list-style-type: none">• "emotion" - returns only the predicted emotion label• "emoji" - returns only the corresponding emoji• "textemoji" - returns original text appended with predicted emoji (default)

Value

Depending on `output_type`:

- For "emotion": character string of predicted emotion
- For "emoji": character string of corresponding emoji
- For "textemoji": original text with appended emoji

The function also prints the result to console.

Examples

```
## Not run:  
predict_emotion_with_emoji("I'm so happy today!")  
predict_emotion_with_emoji("This makes me angry", "emoji")  
predict_emotion_with_emoji("I feel scared", "emotion")  
  
## End(Not run)
```

preprocess_text	<i>Preprocess Text with Slang Handling</i>
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Description

This function performs multi-stage text preprocessing, including lowercasing, HTML cleaning, punctuation normalization, contraction expansion, internet slang replacement, emoticon replacement, and final standardization.

Usage

```
preprocess_text(text, use_textclean = TRUE, custom_slang = NULL)
```

Arguments

text	A character vector of input texts.
use_textclean	Logical. Whether to use textclean for internet slang and emoticon replacement. Default is TRUE.
custom_slang	A named character vector providing user-defined slang mappings. Optional.

Details

The preprocessing pipeline includes:

- Lowercasing the text.
- Replacing HTML entities and non-ASCII characters.
- Expanding common English contractions (e.g., "I'm" -> "I am").
- Replacing internet slang and emoticons if use_textclean is TRUE.
- Handling additional slang defined by the user.
- Normalizing repeated punctuations and whitespace.

Value

A character vector of cleaned and normalized text.

Examples

```
preprocess_text("I'm feeling lit rn!!!")  
preprocess_text("I can't believe it... lol :)", use_textclean = TRUE)
```

train_full_model	<i>Train a full model pipeline including text preprocessing, TF-IDF vectorization, random forest tuning, and training.</i>
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Description

Train a full model pipeline including text preprocessing, TF-IDF vectorization, random forest tuning, and training.

Arguments

custom_slang	A named list for custom slang replacements (optional).
max_features	Maximum number of features for TF-IDF vectorizer (default 10000).
min_df	Minimum document frequency for TF-IDF (default 2).
max_df	Maximum document frequency for TF-IDF (default 0.8).
mtry_grid	Grid of values for 'mtry' parameter to tune in random forest (default: c(5, 10, 20)).
ntree_grid	Grid of values for 'ntree' parameter to tune in random forest (default: c(100, 200, 300)).
stopwords_file	Path to the stopwords RDS file (default: "final_stopwords.rds").
vectorizer_file	Path to save the trained vectorizer (default: "trained_vectorizer.rds").
tfidf_model_file	Path to save the trained TF-IDF model (default: "trained_tfidf_model.rds").
rf_model_file	Path to save the trained random forest model (default: "trained_rf_ranger_model.rds").
train_df_cache_path	Path to cache the training data frame (default: "train_df_cached.rds").

Value

A list containing the trained TF-IDF model, vectorizer, random forest model, and test accuracy.

train_rf_model	<i>Train a Random Forest Model with TF-IDF Features</i>
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Description

Train a Random Forest Model with TF-IDF Features

Usage

```
train_rf_model(  
  train_matrix,  
  train_labels,  
  ntree = 300,  
  mtry = NULL,  
  seed = 123,  
  verbose = TRUE,  
  train_df_cache_path = "train_df_cached.rds"  
)
```

Arguments

train_matrix A sparse matrix ('dgCMatrix') of training features.

train_labels A factor vector of training labels.

ntree Number of trees. Default 300.

mtry Variables to consider at each split. If NULL, auto-selected.

seed Random seed. Default 123.

verbose Whether to print progress. Default TRUE.

train_df_cache_path
Path to cache the train data frame. Default "train_df_cached.rds".

Value

A trained 'ranger' model object.

train_tfidf_model *Train a TF-IDF Model (for Training Phase)*

Usage

```
train_tfidf_model(  
  preprocessed_text,  
  max_features = 10000,  
  min_df = 2,  
  max_df = 0.8  
)
```

Arguments

preprocessed_text
A character vector containing the preprocessed text.

max_features The maximum number of features (terms) to include in the vocabulary. Default is 10000.

min_df Minimum document frequency for terms. Default is 2 (terms must appear in at least 2 documents).

max_df Maximum document frequency as a proportion of documents. Default is 0.8 (terms must appear in less than 80)

A list with the following components:

tfidf_model The trained TF-IDF model object.

vectorizer The vocabulary vectorizer used in training.

tfidf_matrix The TF-IDF sparse matrix representing the text data.

Train a TF-IDF model with customizable tokenization and vocabulary pruning.

This function performs the following steps:

1. Tokenizes the preprocessed text into words and removes stopwords.
2. Defines custom stopwords and retains important emotional function words.
3. Creates a vocabulary based on unigrams and trigrams, pruning terms based on document frequency and term count.
4. Builds the TF-IDF sparse matrix for the input text.

```
preprocessed_text <- c("I'm feeling so happy today!", "I feel really excited and hopeful!")
result <- train_tfidf_model(preprocessed_text)
result$tfidf_model # Access the trained TF-IDF model
```

tune_rf_model

Tune Random Forest Model Hyperparameters

Description

This function performs hyperparameter tuning for a Random Forest model using grid search. It searches over the grid of 'mtry' (number of variables to consider at each split) and 'ntree' (number of trees in the forest) to find the best model based on training accuracy.

Usage

```
tune_rf_model(
  train_matrix,
  train_labels,
  mtry_grid = c(5, 10, 20),
  ntree_grid = c(100, 200, 300),
  seed = 123,
  verbose = TRUE
)
```

Arguments

train_matrix A sparse matrix (class 'dgCMatrix') representing the training feature data.

train_labels A factor vector representing the training labels.

mtry_grid A vector of values to search for the 'mtry' parameter (number of variables to consider at each split). Default is 'c(5, 10, 20)'.

<code>n</code> <code>tree_grid</code>	A vector of values to search for the ‘ <code>n</code> <code>tree</code> ’ parameter (number of trees in the forest). Default is ‘ <code>c(100, 200, 300)</code> ’.
<code>seed</code>	A seed value for reproducibility. Default is ‘123’.
<code>verbose</code>	A logical indicating whether to print progress information during the grid search. Default is ‘ <code>TRUE</code> ’.

Details

The function trains multiple Random Forest models using different combinations of ‘`m``try`’ and ‘`n``tree`’ values, and evaluates their performance based on training accuracy. The hyperparameters that give the highest accuracy are returned as the best parameters. The process uses the ‘`ranger`’ package for training the Random Forest model.

Value

A list containing the best hyperparameters (‘`m``try`’, ‘`n``tree`’, and ‘`accuracy`’):

- ‘`m``try`’: The best number of variables to consider at each split.
- ‘`n``tree`’: The best number of trees in the forest.
- ‘`accuracy`’: The accuracy achieved by the model with the best hyperparameters.

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