

schahmatist / Amazon_Reviews_Sentiment_Analysys

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<> Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

main

1 branch

0 tags

Go to file

Add file

Code

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src	gzipped files	6 hours ago
.gitattributes	gzipped files	6 hours ago
.gitignore	lfs install	5 hours ago
README.md	typos fixing in README.md	11 minutes ago
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README.md

Sentiment Analysis for Product Reviews

- Using ML algorithms to capture customer's "sentiment" from the text of his/her review.
- To be able to identify both: satisfied and unsatisfied customers
- With relative simplicity of implementation to get maximum accuracy and precision

WHAT'S IN THE REPOSITORY?

reports (*presentations*)

- [non-technical-presentation.pdf](#) - A presentation for non-techincal stakeholders about the project and its potential business usage
- [technical-summary.pdf](#) - The same information as in this README.md but in .pdf format

notebooks

- [EDA.ipynb](#) - Exploring the Data before creating a model
- [Preprocessing_Pipe.ipynb](#) - Pre-processing data as a part of sklearn pipeline
- [Modeling.ipynb](#) - Modeling - Iterative approach, progress from the first to the best model
- [Load_model_and_data.ipynb](#) - Optionally, you can load pickled models and preproessed data to save time on training

src


- [import_libraries.py](#) - Importing required sklearn, nltk, pandas, numpy, and other libraries
- [initial_preprocessing.py](#) - Initial loading and very basic pre-processing of the data
- [import_functions.py](#) - Importing custom functions
- [preproc_pipe.py](#) - Building a preproc pipeline with custom classes and functions as described in [Preprocessing_Pipe.ipynb](#)

data

- [raw](#) - Contains Reviews.csv.gz
- [preprocessed](#) - Contains df.pkl.gz, prep_test_X.npz, prep_train_X.npz. These optionally can be loaded in [Load_model_and_data.ipynb](#)
- [supplementary](#) - Contains webster.json to check the spelling of words

HIGH LEVEL PROJECT DETAILS:

DATA



- Food Amazon Reviews from Oct 1999 - Oct 2012
- 568,454 reviews
- 256,059 users
- 74,258 products
- Source: <https://www.kaggle.com/datasets/snap/amazon-fine-food-reviews>

DATA PRE-PROCESSING

- Used 'Text' and 'Summary' for prediction
- removing non-alpha characters
- converted to lowercase
- stemming words
- removed common words
- converted to base/dictionary form for EDA and visualizations

NEW FEATURES

Lots of features were considered for training the model (including use of smiles, dots, and various punctuation in a review)

The following features were chosen:

- Length of the review
- Capitalization
- Use of punctuation (? and !)
- ngrams (word combinations)
- Words and ngrams frequencies
- Checking for misspelled words
- "Bag of words" method

ALGORITHMS

Multiple algorithms were considered including MultinomialNB, XGB, Bernoulli, RandomForest

The following were chosen for the best model:

Voting Ensemble of:

- ComplementNB
- XGB boost

EVALUATION

- Accuracy of 95.3 was achieved

More detailed evaluation metrics:

	precision	recall	f1-score
Neg.	0.81	0.91	0.86
Pos.	0.98	0.96	0.97
Accuracy :	0.953		

True label

Neg.

Pos.

Neg.

Pos.

Predicted label

0.91

0.086

0.04

0.96

0.8

0.6

0.4

0.2

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