Sentiment categorization of Beer reviews

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Introduction

- Why sentiment analysis ?
- Why beer reviews ?
  - Growing interest, huge population etc.
  - What's wrong with Beer reviews ?
    - *'Bottle Dark brown colour with ruby reflexes rocky head that does not stay long Aroma is quite much candy sugar raisin pleasant warming alcohol Medium sweetness not bitter Soft carbonation smooth not cloying Not very complex but well balanced and easy to drink Good'*
    - *Pours a rust orange with white head A citrus pine fruit and grain aroma A fruit citrus and pine taste A lingering sweet and dry grain aftertaste*
- Sentiment analysis ? How ?
  - LogisticRegression()
  - Cross validation accuracy
  - Fit best classifier
  - Evaluation: precision, top misclassified probabilities

Data Analysis

- Beer reviews:
  - RateBeer.com (https://www.ratebeer.com/beer-ratings/)
  - *{"review": "Pour out of 750 mL bottle hazy golden pour with white head aroma brought notes of big white fruit apricot touch of biscuit oak vanilla hints of spice yeast touch of earth Taste was a mix of biscuit bread lemon hints of vanilla oak lemon peel nice apricot overripe peach hints of spice finishing slightly tart slightly bitter", "name": "Fair State Barrel 5", "type_score": {"appearance": 4.0, "palate": 4.0, "taste": 4.0, "aroma": 4.0, "overall": 4.25}}*

- AFINN Sentiment:
  - http://www2.imm.dtu.dk/pubdb/views/publication_details.php?id=6010

Feature selection

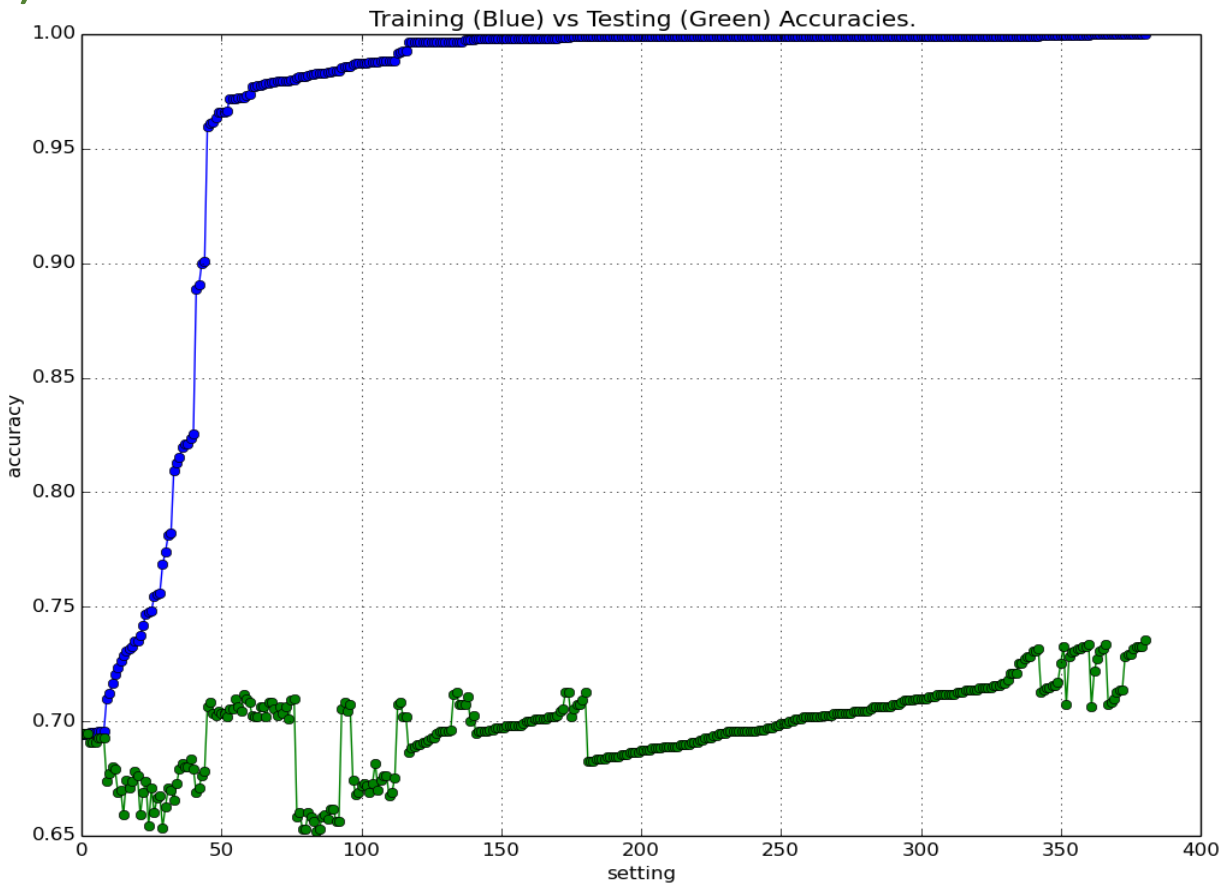
- Features:
  - Token featurize
  - Token Pair featurized
  - tfidf featurize
  - AFINN featurize
  - POS tagger featurize
  - Parse tree featurize
  - Word2vec featurize

Algorithm

- Evaluate all combinations of features
- Best cross validation result
- Fit best classifier
- Predict on test data
- Top-misclassified documents

Accuracy

- Train accuracy (blue) : 99%
- Test accuracy (green) : 73.5%
- Bias vs variance ?



- Log.txt:-
- ([<function parse_tree_features at 0x7f791d48f0d0>, <function pos_tagger_features at 0x7f791dd04ea0>, <function word2vec_features at 0x7f791dd04f28>, <function afinn_features at 0x7f791dd04c80>], 5)
  - Accuracy: (0.7559090909090086, 0.6672727272727735)
- ([<function parse_tree_features at 0x7f791d48f0d0>, <function pos_tagger_features at 0x7f791dd04ea0>, <function tfidf_features at 0x7f791dd04d90>, <function afinn_features at 0x7f791dd04c80>], 4)
  - Accuracy: (0.9990909090909903, 0.6927272727272764)
- best cross-validation result:
  - {'accuracy': (1.0, 0.73545), 'features': [<function token_features at 0x7f791dd047b8>, <function token_pair_features at 0x7f791d48f048>, <function parse_tree_features at 0x7f791d48f0d0>, <function pos_tagger_features at 0x7f791dd04ea0>, <function tfidf_features at 0x7f791dd04d90>], 'min_freq': 2}
- truth=1 predicted=0 proba=0.999809
  - *Draft at Barrel Republic Pours almost clear gold with a frothy off white head Tastes like grapefruit hops bready malt light spice and fruity Light body and low carbonation Smells like grapefruit hops bready malt fruity and light spice*

conclusion

- Beer reviews are fragmented. This affects POS tagger and Parse tree feature implementation.
- Need more concrete rules for parse tree and POS tagger.
- Beer word terminology differs from that of other product reviews. The top misclassified reviews include words like bitter, sour etc. This suggests that classifier is misguided and treats bitter, sour as negative words.
- Initially stop-words proved to be useful in improving our classification performance, but turned out to be harmful when used in conjunction with a other features in sentiment model.

Thank You !

- Questions ?
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