Discourse and Sentiment Analysis

Chris Hidey

Columbia University

April 30, 2015

Overview

1. Background
2. Methodology
3. Corpora
4. Results

Background

Discourse

- Comparison/Contrast (but, in contrast)
- Explanation/Expansion (also, furthermore)
- Reason/Result (because)
- Temporal (then, after)

Background

Discourse

- Comparison/Contrast (but, in contrast)
- Explanation/Expansion (also, furthermore)
- Reason/Result (because)
- Temporal (then, after)

Goal: research possible improvements in sentiment analysis using discourse

Background

Related Work

- Sentiment Analysis in Twitter with Lightweight Discourse Analysis (Mukherjee and Bhattacharyya, 2012)
- Discourse Connectors for Latent Subjectivity in Sentiment Analysis (Trivedi and Eisenstein, 2013)

Background

Related Work

- Sentiment Analysis in Twitter with Lightweight Discourse Analysis (Mukherjee and Bhattacharyya, 2012)
- Discourse Connectors for Latent Subjectivity in Sentiment Analysis (Trivedi and Eisenstein, 2013)

Areas of Improvement

1. Within sentence discourse relations
2. Implicit relations across sentences

Methodology: Part 1

Sentiment140 (Go et al., 2009)

Sentences weakly marked with polarity

- 1,600,000 Tweets
- 33% have discourse marker
- for each discourse marker
  1. Balance positive and negative classes
  2. Train/tune/test linear SVM model with cross-validation
  3. If word pair features outperform unigram features, indicates that long-term context is important
- Try to detect which connectives most influence sentiment (top K according to p-value)

Methodology: Part 2

IMDB (Maas et al., 2011)

Documents marked with polarity
50,000 movie reviews (balanced)
Latent structured SVM (Yessenalina et al., 2010)

1. Identify subjective sentences with subjectivity features
2. Identify polarity of subjective sentences with polarity features
3. Iterate

IMDB Results

Features

Subjectivity:

Explicit discourse markers (Trivedi, 2013)

Implicit discourse features

Subjective vs objective score

Polarity:

Sentiment discourse models

Top K sentiment discourse models

IMDB Results

Features

Subjectivity:

Explicit discourse markers (Trivedi, 2013)

Implicit discourse features

Subjective vs objective score

Polarity:

Sentiment discourse models

Top K sentiment discourse models

Model	Accuracy
baselines:	
unigrams (Yessenalina, 2010):	88.16
markers (Trivedi, 2013):	88.48
unigrams + best features:	89.04

Problems

Reproducibility

Unclear parameters, data and code not available

Twitter data

Better test set

Data Sparsity

Clustering discourse connectives according to contexts