

Contextual Phrase-Level Polarity Analysis

Apoorv Agarwal

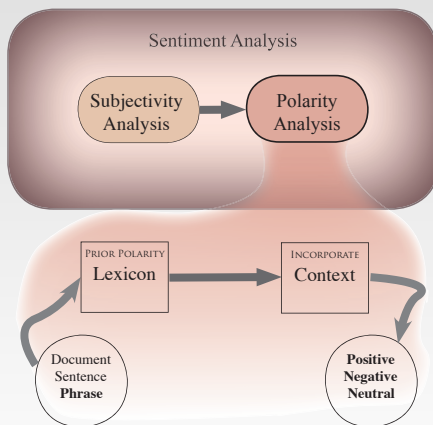
Fadi Biadisy

Kathleen McKeown



COMPUTER SCIENCE AT
COLUMBIA UNIVERSITY

Sentiment Analysis



Our Contributions

- Use Dictionary of Affect in Language (DAL) to suggest a scoring scheme to enable automatic scoring of majority content words
- Propose a feature that is a combination of the 3 scores given to words in DAL that differentiates between high and low subjective words
- Suggest new contextual features based on N-gram of polar constituents of subjective phrases

Challenges

Greece has **great** food but I find the **strike to be annoying**

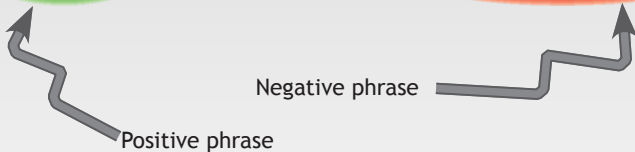
Positive phrase

Negative phrase

- A sentence may have positive, negative and neutral opinions

Challenges

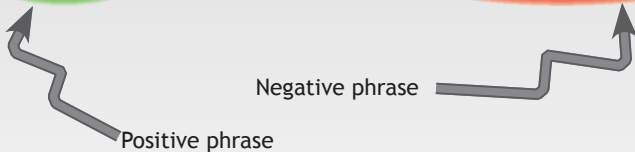
Greece has great food but I find the strike to be annoying



- A sentence may have positive, negative and neutral opinions
- It is difficult to accurately mark subjective phrase boundaries

Challenges

Greece has great food but I find the strike to be annoying



- A sentence may have positive, negative and neutral opinions
- It is difficult to accurately mark subjective phrase boundaries
- Negations and connectives change prior polarity

Dictionary of Affect in Language (DAL)

- 8742 English word dictionary to measure emotional meaning of texts
- Assigns 3 scores to each word on a scale of 1(low) - 3(high)
 - Pleasantness (*ee*)
 - Activeness (*aa*)
 - Imagery (*ii*)

Word	<i>ee</i>	<i>aa</i>	<i>ii</i>
<i>Affect</i>	1.75	1.85	1.60
<i>Affection</i>	2.77	2.25	2.00
<i>Slug</i>	1.00	1.18	2.40
<i>Energetic</i>	2.25	3.00	3.00
<i>Flower</i>	2.75	1.07	3.00

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- 3 scores are uncorrelated (Cowie et. al., 2001)

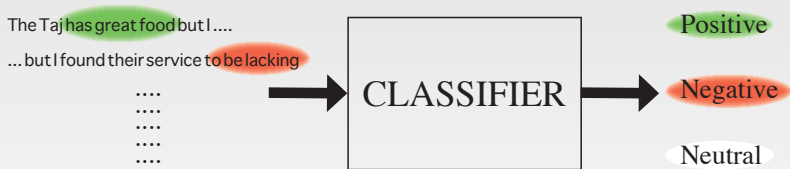
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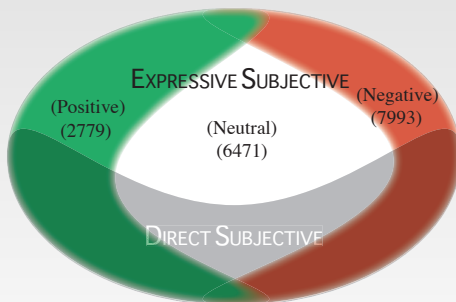
- 3 scores are uncorrelated (Cowie et. al., 2001)
- Contains different scores for inflectional forms

Our Task... (Reminder)



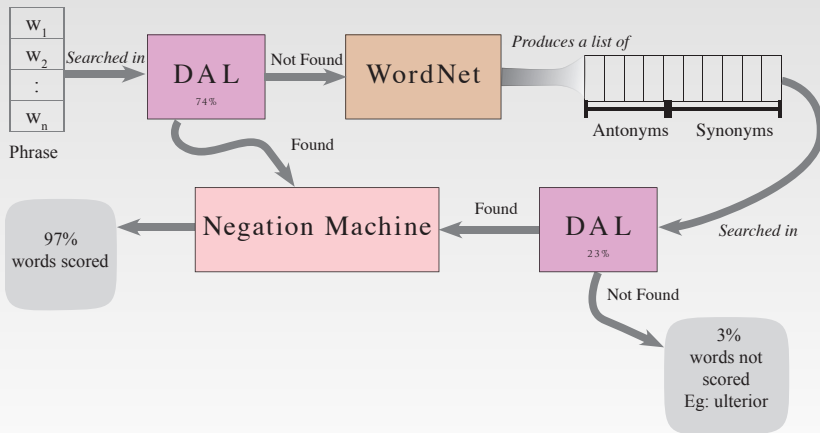
Corpus

Multi-Perspective Question Answering (MPQA) corpus

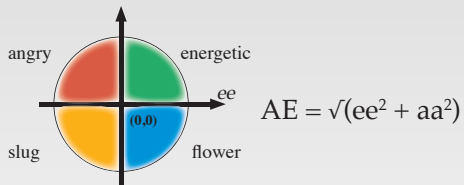


Gold Standard: Manual annotation tag (positive, negative, neutral) given to subjective phrases in the corpus

Basic Scoring Scheme

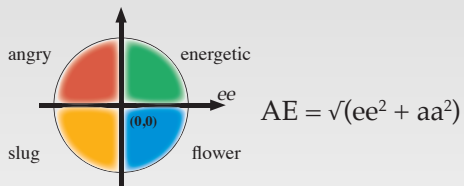


Norm



Activation - Evaluation (AE) space score (Cowie et. al. 2001)

Norm

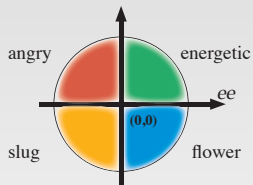


Activation - Evaluation (AE) space score (Cowie et. al. 2001)

$$Subjectivity \propto \frac{1}{Imagery}$$

Eg: *goodies* vs *good*

Norm



$$AE = \sqrt{(ee^2 + aa^2)}$$

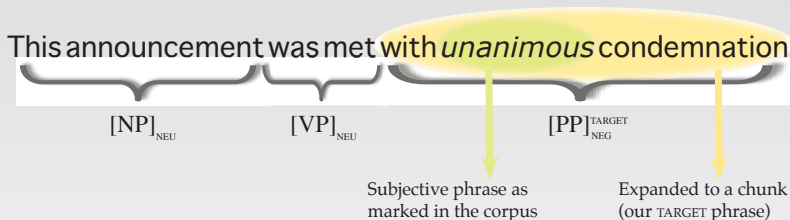
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$$Subjectivity \propto \frac{1}{Imagery}$$

Eg: *goodies* vs *good*

$$norm = \frac{\sqrt{ee^2 + aa^2}}{ii}$$

Contextual Features



Lexical Features

..... as in previous work (Wilson et. al., 2005)

Syntactic Features

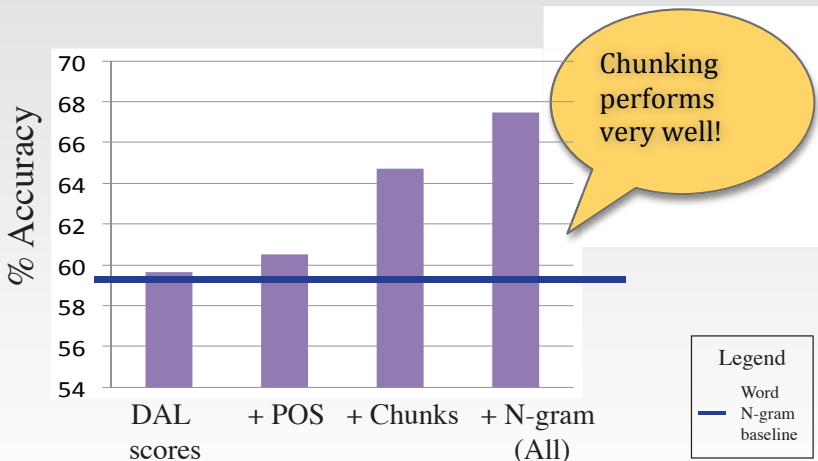
- N-grams over polar chunks, e.g. bigram: $[VP]_{NEU} [PP]_{TARGET_NEG}^{TARGET}$
- Minimum and maximum ee scores of chunks in the target phrase
- Count of syntactic categories of chunks associated with their prior polarity to the left and right of target phrase and in the target phrase

Experimental Set-up

- MPQA corpus
 - # of positive phrases: 2779
 - # of negative phrases: 6471
 - # of neutral phrases: 7993
- Random down sampling to get a balanced data-set
- Logistic classifier, 10-fold cross validation
- Baseline: Word N-gram

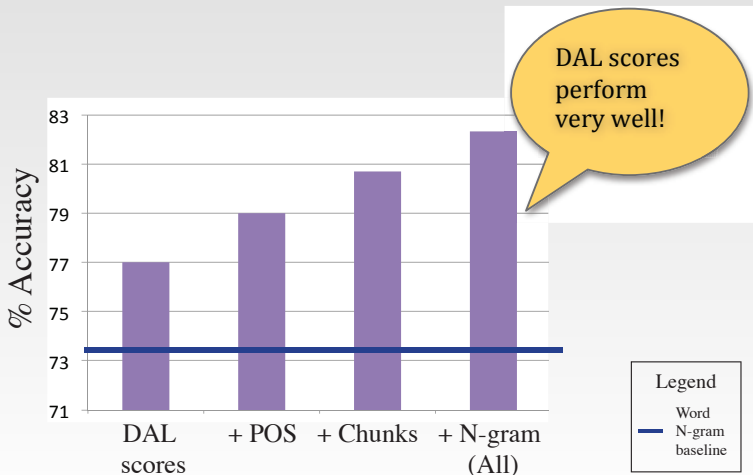
3-way Classifier

Positive vs. Negative vs. Neutral



2-way Classifier

Positive vs. Negative



Conclusion

- Introduce completely automated system for scoring subjective phrases using DAL and WordNet
- Introduce new contextual features based on N-grams of constituents
- Don't need accurate phrase boundary
- Limitation: do not handle polysemy

Future Work

- Study if there's a correlation between subjectivity and polarity
- Use same framework for subjectivity and intensity analysis by tagging chunks with the imagery and activeness score respectively