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ÅBO AKADEMI
Information Studies

Adapting systems for different domains and languages

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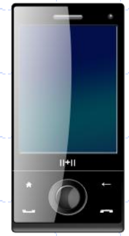
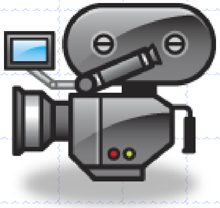
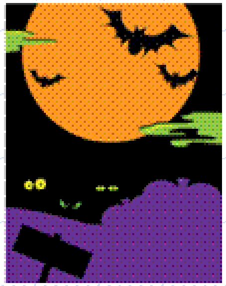




- The importance of domain in sentiment analysis
- Techniques for transferring from one domain to another
- Domain-independent methods
- Language issues and methods to translate a sentiment analysis method from one language to another

Are these positive or negative, and what are the sentiment terms?

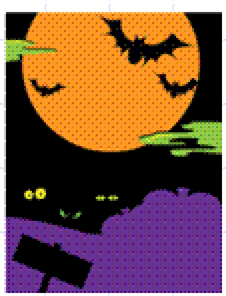
- The Maxtor hard disk was very large and could fit all of my data.
- The cellphone was very large and could not fit in my pocket.
- The horror movie was very frightening.
- The car brakes were very frightening.



Two issues

1. Non-sentiment words may express clearly positive or negative opinions in a particular context
   - E.g., large (memory, screen), heavy (computer, cellphone), long (travel time, film duration), reliable (brakes), unpredictable (movie plot)

2. Non-sentiment words (and even some sentiment words) vary in typical meaning according to context
   - Typically positive words in horror movie reviews
     - Frightening, scary, unexpected, entertaining, Depp(?), good, excellent, recommend

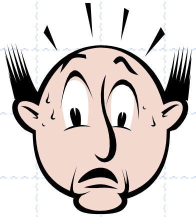


   - Typically positive words in family car reviews
     - Reliable, economical, roomy, large, strong, Honda(?), good, cheap

     - What could be typically negative words in these contexts?

Domain dependence

- The polarity and strength of words may vary by domain
- This is typically opinion or judgement words rather than direct sentiment words – e.g.,
  - “frightening” is typically positive for a horror movie review, but negative for a car review
  - “large” is typically positive for hard disk reviews, negative for cellphones



Domain context dependence

- The polarity and strength of words may also vary by context within a domain, e.g.,
  
  - "large" is typically positive for a cellphone screen but negative for cellphone size
  
  - "cheap" may be positive for a car overall but negative for the seats (or individual parts)

  - Any other examples??

Domain dependence – implications for sentiment analysis

- Generic sentiment algorithms will miss some domain-specific expressions
- Domain-specific algorithms can therefore be more accurate
- But domain-specific algorithms need domain-specific training data – often time consuming and difficult to produce

Cross-domain sentiment analysis

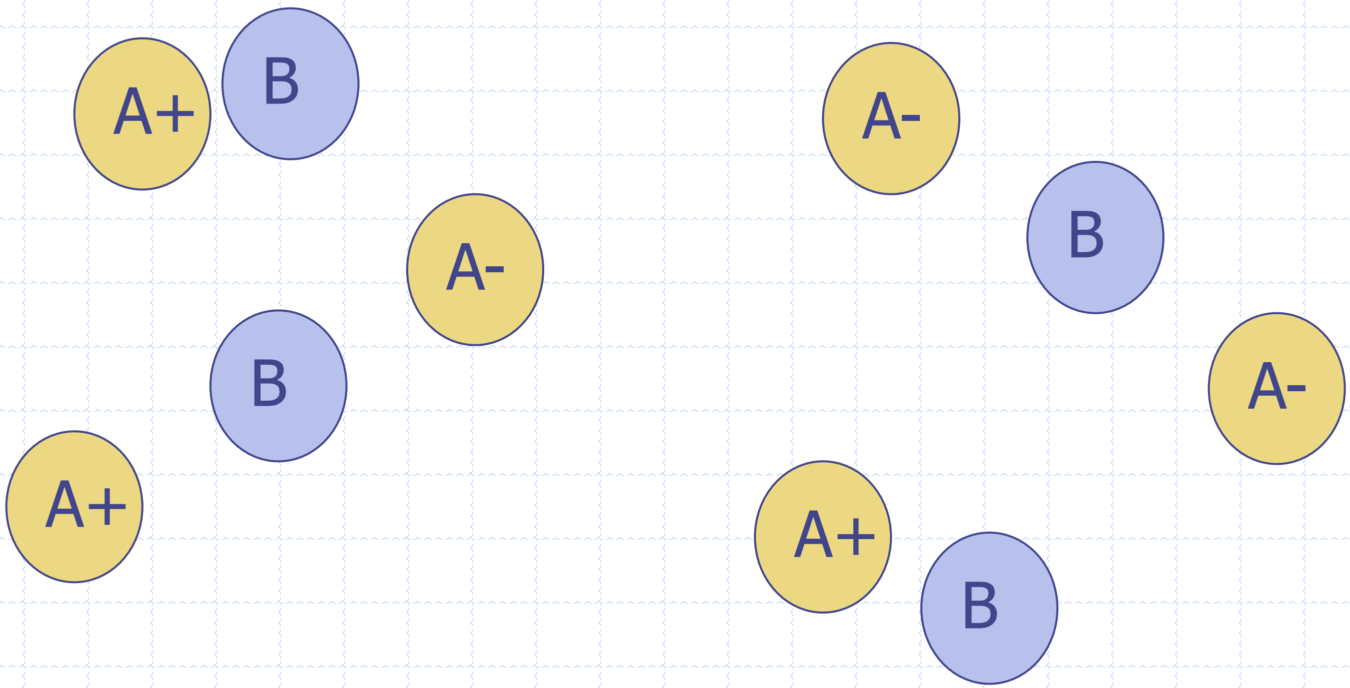
- Domain transfer is the problem of taking a sentiment classifier trained on one domain and adapting it to work on another domain
- Why not train a new classifier on the new domain?
  - Because of the problem creating training data
  - Especially if *many* new domains need sentiment classifiers

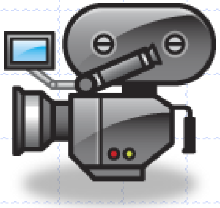
Cross domain A -> B: 5 methods

1. Train classifier on A, apply to B (no domain transfer)
2. Use ensembles of classifiers trained on different domain As
3. Train classifier on A, classify texts in B with the classification of texts in A that they are most similar to (e.g., TF-IDF)
4. Train classifier on A, annotate texts in B with the classification of texts in A that they are most similar to (e.g., TF-IDF) & retrain classifier on A & B
5. Train a classifier for B on the data from A but with only features found in B

How should the Bs be classified?



Summary



- Domain-specific sentiment analysis can be more accurate than general sentiment analysis
  - Especially for product reviews
- Domain-specific algorithms can be difficult to create due to the need for large gold standard text collections
- Cross-domain methods make it easier to generate domain-specific algorithms

Bibliography

- Aue, A., & Gamon, M. (2005). Customizing sentiment classifiers to new domains: A case study. *Proccedings of the International Conference on Recent Advances in Natural Language Processing*, http://research.microsoft.com/pubs/65430/new_domain_sentiment.pdf