Other Tasks related to Sentiment Analysis

Other Tasks: Subjectivity Detection

- For many applications, first decide if the document contains subjective information or which parts are subjective
  - Focus of TREC 2006 Blog track
  - Label sentences or documents as to whether they are objective or subjective

Computational work on other affective states

- **Emotion**:
  - Detecting annoyed callers to dialogue system
  - Detecting confused/frustrated versus confident students
- **Mood**:
  - Finding traumatized or depressed writers
- **Interpersonal stances**:
  - Detection of flirtation or friendliness in conversations
- **Personality traits**:
  - Detection of extroverts
- **Certainty:**
  - How certain the holder is of the opinion or sentiment

Detection of Friendliness

Ranganath, Jurafsky, McFarland

- Friendly speakers use collaborative conversational style
  - Laughter
  - Less use of negative emotional words
  - More sympathy
    - `That's too bad  I'm sorry to hear that`
  - More agreement
    - `I think so too`
  - Less hedges
    - `kind of  sort of  a little …`

Viewpoints and Perspectives

- In some types of documents, the authors are not necessarily discussing opinions on particular topics, but are revealing general attitudes or sometimes a set of bundled attitudes and beliefs
  - Classifying political blogs as liberal, conservative, libertarian, etc.
  - Identifying Israeli vs. Palestinian viewpoints
- One type of this is Multi-perspective Question Answering
  - On next slide . . .

MPQA

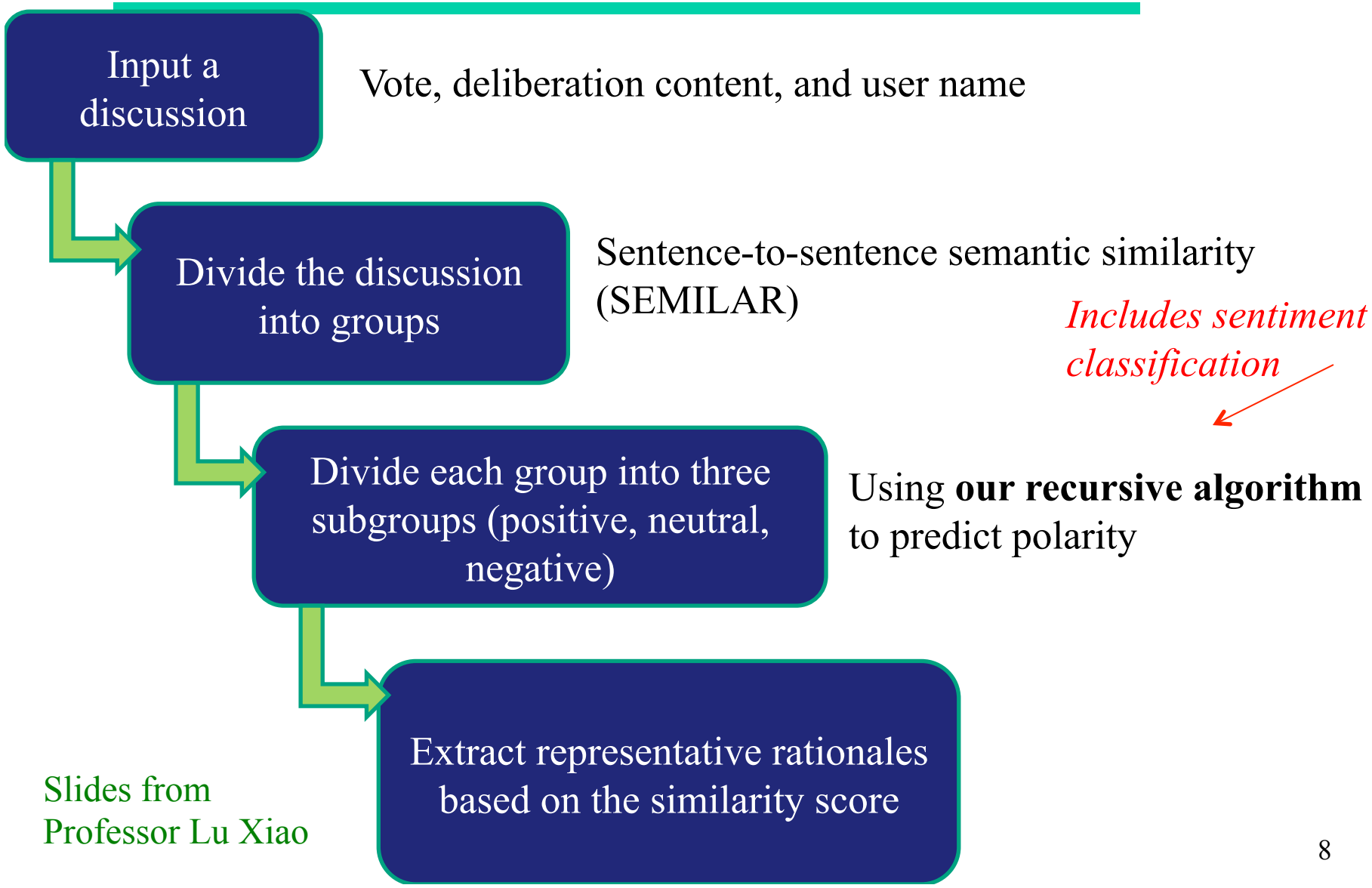
- Multi-Perspective Question Answering
  - *What does Bush think about Hillary Clinton?*
  - *How does the US regard the latest terrorist attacks in Baghdad?*
- Sentence, or part of a sentence, that answers the question:
  - *"How does X feel about Y?"*
  - *"It makes the system more flexible," argues a Japanese businessman.*
- Looking for opinion linked to opinion-holder
  - Where the opinion holder is someone other than the author

Stoyanov, Cardie, Wiebe, & Litman,
Evaluating an Opinion Annotation Scheme Using a Multi-Perspective Question and Answer Corpus. *2004 AAAI Spring Symposium on Exploring Attitude and Affect in Text*,

Stance and Argumentation

- Some forms of online discourse takes the form of trying to argue a viewpoint or opinion, or taking a stance in a particular debate
  - Ideological Debates
    - Somasundaram and Wiebe – look at argumentation
    - Abbot, Walker, et al – classifying stance in on-line debates
      - "Cats rule, dogs drool!" is much easier to classify than debates on abortion, religion, politics

Detection Of **Representative** Rationales In Wikipedia Deliberations (Mao, Xiao, & Mercer, 2014)



Slides from Professor Lu Xiao

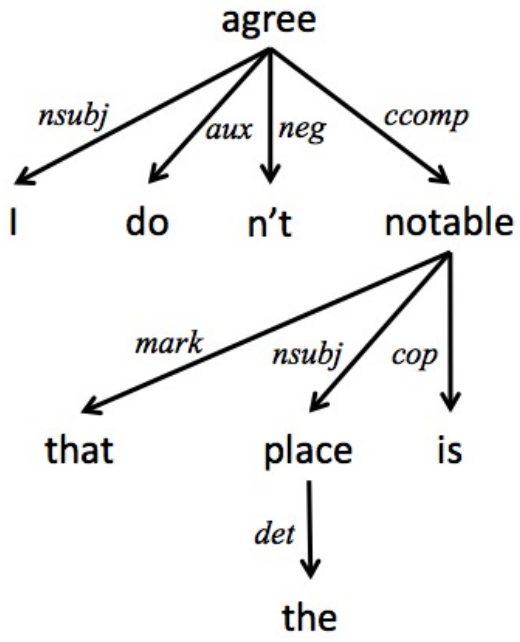
Our Recursive Algorithm to Predict Sentiment Polarity at Sentence Level

-Based on the dependency structure tree

- Take a node as input, and the polarity score for the node as output.

-The algorithm assigns a polarity score to each node in the dependency structure tree

-Integrate five types of negations



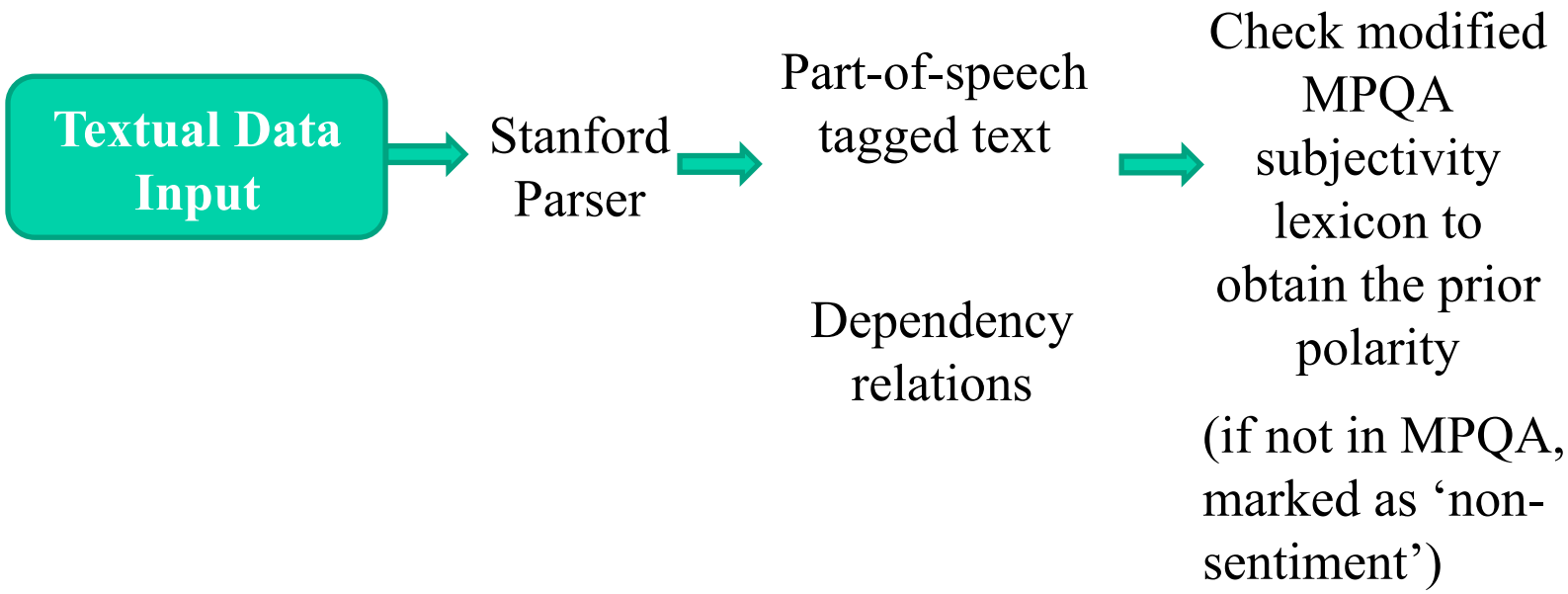
Slides from
Professor Lu Xiao

Five Negations

- Local negation: A not usually modifies the sentiment word.
  - "The place is *not notable*."
- Predicate negation: using verbs with negative polarity.
  - "I *disagree* that the place is *notable*."
- Subject negation: a subject leads to the negation of its predicate.
  - "*Neither* one of us *agrees* that the place is *notable*."
- Preposition negation: the polarity of the object following the preposition "of" can be changed by the word modified by the prep.
  - "It is a *violation* of *notability*."
- Modifier negation: some sentiment word's polarity can be negated by its modifier.
  - "The place is of *indeterminable notability*."

Sentiment Analysis

- Determine the sentiment polarity of a statement in our language context ("notable")
  - MPQA Subjectivity Lexicon + additional words



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Experiment And Evaluation On Sentence Polarity Prediction

- Methods
  - Stanford sentiment analysis tool vs. our algorithm

	Stanford sentiment analysis	recursive algorithm without machine learning	recursive algorithm with machine learning
Accuracy (%)	48.73	58.47	60.17

- Accuracy of Stanford sentiment analysis tool classifying movie review
  - 5-category: 45.7%, 2-category: 85.4%

Slides from
Professor Lu Xiao

Twitter Sentiment Detection

- Twitter sentiment detection task is usually to label the entire tweet as postive, negative or neutral in overall sentiment
- Many efforts in this area, notably
  - NRC-Canada-2014: Recent Improvements in Sentiment Analysis of Tweets, Xiaodan Zhu, Svetlana Kiritchenko, and,Saif M. Mohammad, In Proceedings of the eighth international workshop on Semantic Evaluation Exercises (SemEval-2014), August 2014, Dublin, Ireland."
    - Released description of features.
    - Released resources created (**tweet-specific sentiment lexicons**).
    - www.purl.com/net/sentimentoftweets (2013 paper) and http://www.saifmohammad.com/WebDocs/SemEval2014-Task9.pdf (2014 paper)
  - **Importance of manually created sentiment lexicons and also tweet-specific automatically created lexicons.**

Examples of Twitter Sentiment Features

Features	Examples
sentiment lexicons	**#positive: 3, scorePositive: 2.2; maxPositive: 1.3; last: 0.6, scoreNegative: 0.8, scorePositive_neg: 0.4**
word n-grams	**spectacular, like documentary**
char n-grams	**spect, docu, visua**
part of speech	**#N: 5, #V: 2, #A:1**
Negation	**#Neg: 1; ngram:perfect → ngram:perfect_neg, polarity:positive → polarity:positive_neg**
word clusters	**probably, definitely, def**
all-caps	**YES, COOL**
Punctuation	**#!+: 1, #?+: 0, #!?+: 0**
Emoticons	**:D, >:(**
elongated words	**soooo, yaayyy**

- *There were about 70k features in their classifier*

Summary on Sentiment

- Understanding semantics of less factual aspects of text
- Sentiment analyzers available:
  - Vary widely as to what types of text and domains they work well on
- Generally modeled as classification or regression task
  - predict a binary label for polarity
  - or predict an ordinal label for the level of sentiment
- Features:
  - Negation is important
  - Using all (filtered) words works well for some tasks
  - Finding subsets of words may help in other tasks
    - Hand-built polarity lexicons
    - Use seeds and semi-supervised learning to induce lexicons