



# Sentiment Analysis

# Other Sentiment Tasks



## Finding sentiment of a sentence

- Important for finding aspects or attributes
  - Target of sentiment
- The food was great but the service was awful



## Finding aspect/attribute/target of sentiment

M. Hu and B. Liu. 2004. Mining and summarizing customer reviews. In Proceedings of KDD.

S. Blair-Goldensohn, K. Hannan, R. McDonald, T. Neylon, G. Reis, and J. Reynar. 2008. Building a Sentiment Summarizer for Local Service Reviews. WWW Workshop.

- Frequent phrases + rules
  - Find all highly frequent phrases across reviews (“fish tacos”)
  - Filter by rules like “occurs right after sentiment word”
    - “...great fish tacos” means fish tacos a likely aspect

Casino	casino, buffet, pool, resort, beds
Children’s Barber	haircut, job, experience, kids
Greek Restaurant	food, wine, service, appetizer, lamb
Department Store	selection, department, sales, shop, clothing



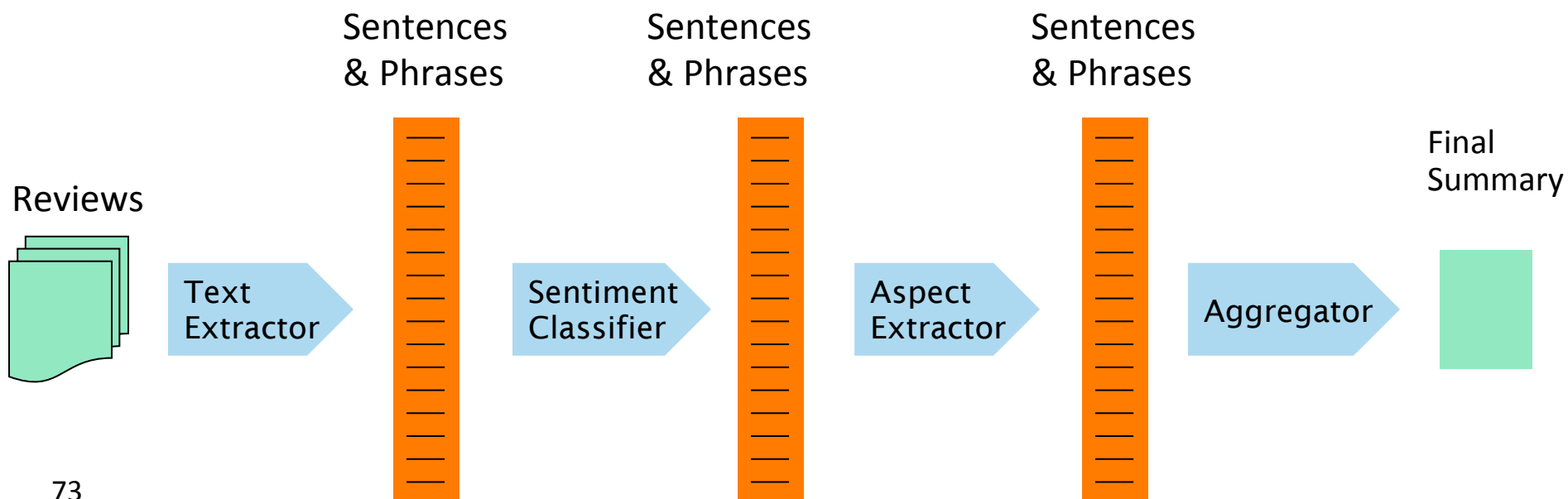
## Finding aspect/attribute/target of sentiment

- The aspect name may not be in the sentence
- For restaurants/hotels, aspects are well-understood
- Supervised classification
  - Hand-label a small corpus of restaurant review sentences with aspect
    - food, décor, service, value, NONE
  - Train a classifier to assign an aspect to a sentence
    - “Given this sentence, is the aspect *food*, *décor*, *service*, *value*, or *NONE*”



# Putting it all together: Finding sentiment for aspects

S. Blair-Goldensohn, K. Hannan, R. McDonald, T. Neylon, G. Reis, and J. Reynar. 2008. Building a Sentiment Summarizer for Local Service Reviews. WWW Workshop





## Results of Blair-Goldensohn et al. method

Rooms (3/5 stars, 41 comments)

(+) The room was clean and everything worked fine – even the water pressure ...

(+) We went because of the free room and was pleasantly pleased ...

(-) ...the worst hotel I had ever stayed at ...

Service (3/5 stars, 31 comments)

(+) Upon checking out another couple was checking early due to a problem ...

(+) Every single hotel staff member treated us great and answered every ...

(-) The food is cold and the service gives new meaning to SLOW.

Dining (3/5 stars, 18 comments)

(+) our favorite place to stay in biloxi.the food is great also the service ...

(+) Offer of free buffet for joining the Play



# Baseline methods assume classes have equal frequencies!

- If not balanced (common in the real world)
  - can't use accuracies as an evaluation
  - need to use F-scores
- Severe imbalancing also can degrade classifier performance
- Two common solutions:
  1. Resampling in training
    - Random undersampling
  2. Cost-sensitive learning
    - Penalize SVM more for misclassification of the rare thing



# How to deal with 7 stars?

Bo Pang and Lillian Lee. 2005. Seeing stars: Exploiting class relationships for sentiment categorization with respect to rating scales. ACL, 115-124

1. Map to binary
2. Use linear or ordinal regression
  - Or specialized models like metric labeling





## Summary on Sentiment

- Generally modeled as classification or regression task
  - predict a binary or ordinal label
- Features:
  - Negation is important
  - Using all words (in naïve bayes) 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



# Scherer Typology of Affective States

- **Emotion:** brief organically synchronized ... evaluation of a major event
  - *angry, sad, joyful, fearful, ashamed, proud, elated*
- **Mood:** diffuse non-caused low-intensity long-duration change in subjective feeling
  - *cheerful, gloomy, irritable, listless, depressed, buoyant*
- **Interpersonal stances:** affective stance toward another person in a specific interaction
  - *friendly, flirtatious, distant, cold, warm, supportive, contemptuous*
- **Attitudes:** enduring, affectively colored beliefs, dispositions towards objects or persons
  - *liking, loving, hating, valuing, desiring*
- **Personality traits:** stable personality dispositions and typical behavior tendencies
  - *nervous, anxious, reckless, morose, hostile, jealous*



# 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



# 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 ...



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