The OPAL System at NTCIR 8 MOAT

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Outline

- Motivation
- Contribution
- Related Work
- English Monolongual Subtask
- English-Chinese Cross-Lingual Subtask
- Evaluation
- Discussion

Motivation

Challenges

Growth in the access to technology +

Development of the Social Web

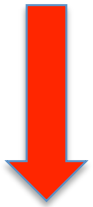
Exponential increase of the subjective data on the Web: factoid & opinionated info

Big impact on lives/business

NEED FOR AUTHOMATIC PROCESSING METHODS FOR SUBJECTIVE TEXT : Sentiment Analysis (SA)

Motivation

- Factod Question Answering (QA): long tradition
- Opinionated QA: remains a challenge
- Need for OQA



- Need for specialised tools and methods

Contribution

- Deep study of the performance of new sentiment-topic detection methods

- Introduction of specialised tools
  - temporal expressions and
  - anaphora resolution and

  analysis of their effect

- New retrieval techniques (using Wikipedia with LSA), improving the performance.

Related Work

- Cardie et al., 2003: separated opinions from facts and summarized them as answer to opinion questions.
- Kim and Hovy, 2005: identified opinion holders, which are frequently asked in opinion questions.
- TAC 2008 Opinion QA track: a collection of factoid and opinion queries -"rigid list" (factoid) and "squishy list" (opinion) - to which the traditional systems had to be adapted.
- The Alyssa system (Shen et al. 2007): a SVM classifier trained on the MPQA corpus, English NTCIR data and rules based on the subjectivity lexicon
- Varma et al., 2008: query analysis to detect the polarity of the question using defined rules.
- The QUANTA system (Li et al, 2008): OQA by detecting the opinion holder, the object and the polarity of the opinion. It uses a semantic labeler based on PropBank and manually defined patterns. Sentiment classification: extract and classify the opinion words. Answer retrieval: score the retrieved snippets depending on the presence of topic and opinion words and only choose as answer the top ranking results

English Monolingual Subtask

- 20 topics
- For each topic:
  - a question & short query were given
  - Expected Polarity & Period of time
- Each topic:
  - set of documents split into sentences
  - opinion units
    - for polarity,
    - opinion target
    - source task
- We submitted 3 runs of the OpAL system for: **opinionated**, **relevance** and **polarity judgement tasks**

English Monolingual subtask

Judging sentence opinionatedness

- The system has to assign YES –opinionated-/NO-factoid- to each sentence
- We employed
  - system run 1
  - system runs 2 & 3
- Rule based but with different resources
- Opinionated sentence: at least 2 opinion words or one opinion word preceeded by a modifier

English Monolingual subtask

Judging sentence opinionatedness

- 1st approach: opinion word from:
  - General Inquirer,
  - Micro WordNet Opinion and
  - Opinion Finder
- 2nd approach: opinion word from:
  - General Inquirer
  - Micro WordNet Opinion

English Monolingual subtask

Determining sentence relevance

- The system had to output for each sentence an assessmant of relevance
- 3 strategies:
- 1st JIRS (Java Information Retrieval System) to find relevant snippets JIRS retrieves passages based on the question structures (not keywords)

English Monolingual subtask

Determining sentence relevance

- 2nd Faceted Search Wikipedia and LSA, to find words related to the topic –find concepts-
- We match the query words to a category in Wikipedia and two consecutive words, 3, 4 …the concepts found are the topic components.
- For each topic component we employ LSA to the first 20 documents (retrieved by Yahoo) to determine the most related words (LSA we employ Infomap)
- We expand the query using words similar to the topic

English Monolingual subtask

Determining sentence relevance

- 3rd we judge a part for the topic relevance, the temporal appropiateness
- We employ TERSEO
- We filter the sentences obtained

Polarity and topic-polarity classification for judging sentence answerness

- Required the system to assign a value of POS, NEG or NEU to each of the sentences in the documents provided.
- Polarity of the sentences: we passed each sentence through an opinion mining system employing SVM ML over the NTCIR 7 MOAT corpus, the MPQA corpus and *EmotiBlog*.
- Each sentence is preprocessed using Minipar
- System training:
  - the part of speech (POS)
  - opinionatedness/intensity - if the word is annotated as opinion word, its polarity, i.e. 1 and -1
  - syntactic relatedness with other opinion word – if it is directly dependent of an opinion word or modifier (0 or 1), plus the polarity/intensity and emotion of this word (0 for all the components otherwise).

Polarity and topic-polarity classification for judging sentence answerness

- The difference between the submitted runs consisted in the lexicons used to determine whether a word was opinionated or not.
- 1st run: General Inquirer, MicroWordNet and the Opinion Finder opinion resources.,
- 2nd: aside from these three sources, the “emotion trigger” resource (Balahur and Montoyo, 2008).

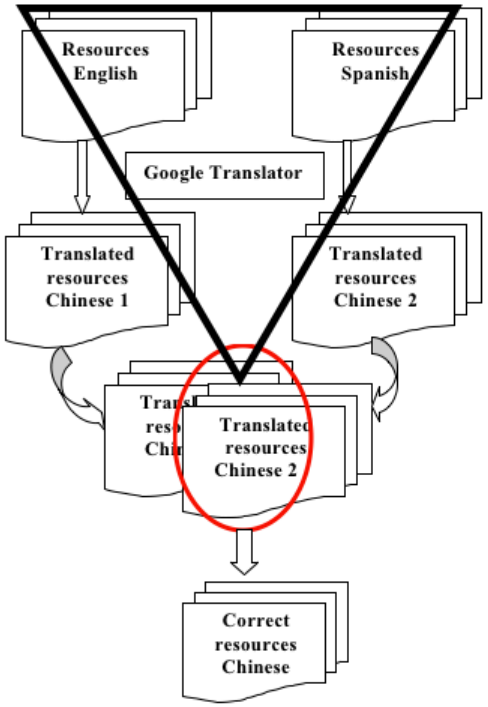
English-Chinese cross-lingual subtask

- Systems have to output, for each of the twenty topics and their corresponding questions (in a language), the list of sentences containing answers (in another language).
- The topics and questions are given in English;
- the output of the system contains the sentences in set of documents in Traditional Chinese which contain an answer to the given topics.

- 3 runs of OpAL

English-Chinese cross-lingual subtask

- To tokenize the Chinese texts using LingPipe
- We applied a technique known as “triangulation” to obtain opinion and subjectivity resources for Chinese to obtain resources for different languages, starting from correct parallel resources in 2 initial languages.



English-Chinese cross-lingual subtask

- This technique requires the existence of two correct parallel resources in two different languages to obtain correct resources for a third language.
- We have previously translated and cleaned the General Inquirer, MicroWordNet and Opinion Finder lexicons for Spanish.
- The “emotion triggers” resource is available for English and Spanish--translated into Chinese (Google translator)
- We performed the intersection of the obtained translations –the corresponding words translated in the same manner (from English as well as from Spanish).
- We removed words that we translated differently from English and Spanish.

English-Chinese cross-lingual subtask

- We mapped each of these resources to four classes, depending on the score they are assigned in the original resource – of “high positive”, “positive”, “high negative” and “negative” and we give each word a corresponding value (4, 1, -4 and 1), respectively.
- We translated the topic words determined in English using LSA.
- For each of the sentence, we compute a score, given by the sum of the values of the opinion words that are matched in it.
- Conditions to be considered an answer:
  - to contain at least one topic word
  - the polarity determined corresponds to the required polarity, as given in the topic description.
- 1st: General Inquirer and MicroWordNet
- 2nd :we added the “emotion trigger resource”
- 3rd : only the Opinion Finder lexicon.

Evaluation & Discussion

Results of system runs for opinionated

System RunID	P	R	F
OPAL1	17.99	45.16	25.73
OPAL2	19.44	44	26.97
OPAL3	19.44	44	26.97

Results of system runs for relevance

System RunID	P	R	F
OPAL1	82.05	47.83	60.43
OPAL2	82.61	5.16	9.71
OPAL3	76.32	3.94	7.49

Evaluation & Discussion

Results of system runs for polarity

System RunID	P	R	F
OPAL1	38.13	12.82	19.19
OPAL2	50.93	12.26	19.76

Results of system runs for the cross-lingual task – agreed measures, Traditional Chinese

System RunID	P	R	F
OPAL1	3.54	56.23	6.34
OPAL2	3.35	42.75	5.78
OPAL3	3.42	72.13	6.32

Evaluation & Discussion

Results of system runs for the cross-lingual task – non-agreed measures, Traditional Chinese

System RunID	P	R	F
OPAL1	14.62	60.47	21.36
OPAL2	14.64	49.73	19.57
OPAL3	15.02	77.68	23.55

Evaluation & Discussion

- Extensive filtering for topic and the temporal restrictions increases the system precision, but dramatic drop in the recall.
- Simpler methods in the cross-lingual task yielded better results, the OpAL cross-lingual run 3 obtaining the highest F score for the non-agreed measures and ranking second according to the agreed measures.
- The LSA-based method to determine topic-related words is not enough to perform this task.
- The terms obtained by employing this method are correct and useful
  - they should be expanded using language models, to better account for the language variability.
- Systems performing finer tasks, (temporal expression, anaphora resolution), are not mature enough and led to lower performances of the system and dramatic loss in recall.
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Thank you for your attention