Eliciting Subjectivity and Polarity Judgements on Word Senses

Fangzhong Su & Katja Markert

School of Computing
University of Leeds

August 23, 2008

Motivation I

- A popular task
  - Annotating word subjectivity or polarity:
    subjective/objective, or positive/negative/neutral

"positive" $\longrightarrow$ subjective; "catch"$\longrightarrow$ neutral

- Existing problems
  - Subjectivity-ambiguous or polarity-ambiguous words

(1)positive, electropositive—having a positive electric charge (*objective*)
(2)plus, positive—involving advantage or good(*subjective*)
(3)catch—a hidden drawback; "it sounds good but what's the catch?"
(*negative*)
(4)catch, match—a person regarded as a good matrimonial prospect
(*positive*)

- Human judgement difficulty in opinions

- Impact on other tasks or applications
- Word sense disambiguation (Wiebe and Mihalcea, ACL'06)

Outline

Subjectivity and Polarity Property of Senses

- Subjectivity
  - Refer to private states: emotions, judgements, or mental states(doubts, beliefs or speculations)
  - Categories: subjective (S), objective (O), and both (B)
- Polarity
  - Refer to positive or negative connotations associated with a sense
  - Categories: positive (P), negative (N), varying (V), and no-polarity (NoPol)

Difference between subjectivity and polarity

Subjectivity: private state
Polarity: positive/negative connotation

Subjectivity Property of Senses

- Definition
  Follow Wiebe and Mihalcea (ACL'06)
- Subjective
  Refer to private states: emotions, judgements, and mental states (doubts, beliefs, and speculations)
- Objective
  Refer to persons, objects, actions or states without inherent emotion, judgement or mental states
- Both
  Conflate both opinionated and objective expressions

Examples [1]

- angry—feeling or showing anger;"angry at the weather";"angry customers"; "an angry silence" (*Subjective—emotion*)
- beautiful—aesthetically pleasing (*Subjective—aesthetic assessment*)
- alarm clock, alarm – a clock that wakes sleeper at preset time (*Objective—non-judgemental reference to object*)
- lawyer, attorney – a professional person authorized to practice law; conducts lawsuits or gives legal advice (*Objective—non-judgemental reference to person*)
- alcoholic, alky, dipsomaniac, boozer, lush, soaker, souse—a person who drinks alcohol to excess habitually (*Both*)

---

[1]All examples are from WordNet 2.0

Polarity Property of Sense

Polarity of Subjective Senses

- S:P—private states that express a positive attitude, emotions or judgements
- S:N—private states that express a negative attitude, emotion or judgement
- S:V—polarity is varying by context or user

Polarity of Objective Senses

- O:P—objective sense with strong positive connotation
- S:N—objective sense with strong negative connotation
- O:NoPol—objective sense with no strong, generally shared connotations

Examples

- good, right, ripe – most suitable or right for a particular purpose; "a good time to plant tomatoes"; "the right time to act"; *(S:P)*
- hot – very unpleasant or even dangerous; "make it hot for him"; "in the hot seat" *(S:N)*
- aloof, distant, upstage—remote in manner; "stood apart with aloof dignity"; "a distant smile"; "he was upstage with strangers" *(S:V)*
- remedy, curative, cure – a medicine or therapy that cures disease or relieve pain *(O:P)*
- disease—an impairment of health or a condition of abnormal functioning *(O:N)*
- above—appearing earlier in the same text; "flaws in the above interpretation" *(O:NoPol)*

Hierarchy of all categories

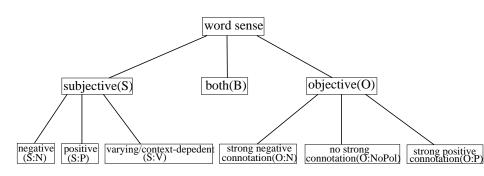Figure: Overview of the hierarchy over all categories

Annotation Study

- **Dataset**
  - Micro-WNOp corpus[2]
  - 3 Groups, 298 words with 1105 WordNet senses
  - Representative of the part-of-speech distribution in WordNet

- **Annotation Procedures**
  - Annotators—2 near native English speakers
  - Annotation Guidelines
  - Annotate each item independently

---

[2]http://www.unipv.it/wnop/micrownop.tgz

Agreement Study

Training:

	B	S:N	S:P	S:V	O:NoPol	O:N	O:P	total
B	1	0	0	0	2	0	0	3
S:N	0	13	0	0	0	2	0	15
S:P	0	0	8	1	1	0	0	10
S:V	1	1	0	13	6	0	0	21
O:NoPol	1	0	0	0	50	0	0	51
O:N	0	0	0	0	2	4	0	6
O:P	0	0	1	0	0	0	3	4
total	3	14	9	14	61	6	3	110

- Agreement: 83.6%   Kappa: 0.76
- Categories with low reliability: B and S:V

Agreement Study

Testing:

	B	S:N	S:P	S:V	O:NoPol	O:N	O:P	total
B	7	2	0	2	0	0	0	11
S:N	0	41	1	0	0	0	0	42
S:P	0	0	65	4	0	0	2	71
S:V	0	0	7	17	3	0	0	27
O:NoPol	9	1	2	6	253	5	8	284
O:N	0	14	0	2	0	25	0	41
O:P	1	0	5	0	1	0	13	20
total	17	58	80	31	257	30	23	496

- Agreement: 84.9%   Kappa: 0.77

- Single-category Kappa:

S:N	S:P	O:NoPol	B	S:V	O:N	O:P
0.80	0.84	0.86	0.49	0.56	0.68	0.59

The Effect of Hierarchical Annotation I

Subjectivity Distinction Only

- Merging subcategories:
  S—S:V, S:P, and S:N;
  O—O:NoPol, O:P, and O:N;
  B (remain)

Results

- Agreement: 90.1%   Kappa: 0.79
- Single-category Kappa:

S	O	B
0.82	0.80	0.49

The Effect of Hierarchical Annotation II

Polarity Distinction Only

- Merging subcategories:
  N—O:N and S:N;
  P—O:P and S:P;
  B (remain);
  V—S:V;
  NoPol—O:NoPol

Results

- Agreement: 89.1%   Kappa: 0.83
- Single-category Kappa:

N	P	B	V	NoPol
0.92	0.85	0.49	0.56	0.86

- Individual perspective or bias

	B	N	P	V	NoPol	total
B	7	2	0	2	0	11
N	0	80	1	2	0	83
P	1	0	85	4	1	91
V	0	0	7	17	3	27
NoPol	9	6	10	6	253	284
total	17	88	103	31	257	496

- Conflation of near-synonym terms which differ in sentiment property

(1)alcoholic, alky, dipsomaniac, boozer, lush, soaker, souse—a person who drinks alcohol to excess habitually

- Connotation bias in a gloss or its hierarchical organization

(2)Iran, Islamic Republic of Iran, Persia—a theocratic islamic republic in the Middle East in western Asia; Iran was the core of the ancient empire that was known as Persia until 1935; rich in oil; involved in state-sponsored terrorism

(3)skinhead—a young person who belongs to a British or American group that shave their heads and gather at rock concerts or engage in white supremacist demonstrations

skinhead ⟵ bully, tough, hooligan, ruffian, roughneck, rowdy, yob, yobo, yobbo—(a cruel and brutal fellow)

Gold Standard

- Subjectivity-ambiguous words: 32.5% (97/298)

- Polarity-ambiguous words:
  - 3.4% (10/298) of words have at least one positive and one negative polarity
  - With further 14.8% (44/298) of words having varying (S:V) polarity

Conclusion and Future Work

- **Conclusion**
  - Difference between subjectivity and polarity
  - A substantial proportion of words are subjectivity-ambiguous (polarity-ambiguous)
  - Hierarchical annotation affects human agreement significantly
  - Annotation bias

- **Future Work**
  - Refine guidelines for the more difficult categories
  - Perform larger-scale annotation with more annotators
  - Use the annotated dataset to explore learning algorithms for the automatic detection of subjectivity and polarity properties of word sense