Construction of a Chinese Opinion Treebank

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Overview

- Introduction
- Tagging Scheme
- Sources of Corpus
- Annotation Tools
- Statistics of Chinese Opinion Treebank
- Potential Applications
- Conclusion

Why opinion processing is important?

- Documents discussing public affairs, common themes, interesting products, and other topics are reported and distributed on the Web.
  - review sites, forum, discussion groups, blogs, news, …
- Watching specific information sources and summarizing the newly discovered opinions are important
  - for governments to improve their services,
  - for companies to market their products, and
  - for customers to purchase their objects.

Motivation

- Bag of Word Model is not Enough
  - 提高薪資 (increase salary) is positive for individuals
  - 提高稅率 (increase tax rate) is negative for individuals, but positive for government
- Morphological Structures
  - Predicting Morphological Types of Chinese Bi-Character Words by Machine Learning Approaches (Huang, Ku, and Chen, LREC 2010)
- Syntactic Structures

Opinionated Sentences

- Three formal types of opinion are defined based on Wiebe et al. (2005)
  - Explicit mentions of opinion
    - **Psychologists** *argue* that teenagers are not old …
  - Speech events expressing opinion
    - **Ito** *said* the government must concentrate now ...
  - Expressive subjective elements
    - Japan must seem to be a country full of antiquated rules. (Opinion holder: **author**)

MOAT in NTCIR

- Multilingual Opinion Analysis Task held at NTCIR-6, -7, and -8 (2006-current)
- Languages
  - English, Chinese, and Japanese
- Subtasks:
  - Opinion detection, polarity judgment, holder, target, and relevance judgment, etc.
- No opinion type and syntactic information

Tagging scheme

- Opinion: yes or no
- Opinion Polarity: positive, neutral, negative
- Opinion Types:
  - expression: people reflect their subjective judgment.
  - status: the subjective information appears as descriptions.
  - action: the opinion holder’s attitude is revealed by his action.

A Tagging scheme

- Structural relations between words in terms of trio
  - Parallel Type: 美麗 (beautiful) 而 (and) 聰慧 (smart)
  - Substantive-Modifier Type: 淒涼地 (sadly) 笑著 (laugh)
  - Subjective-Predicate Type: 討論 (discussion) 熱烈 (enthusiastic)
  - Verb-Object Type: 恢復 (overcome) 疲勞 (tiredness)
  - Verb-Complement Type: 收拾 (put things) 乾淨 (in order)

Source of Annotation Corpus

- Chinese Treebank 5.1
  - Purchased from Linguistic Data Consortium
  - 507,222 words
  - 824,983 Hanzi
  - 18,782 sentences
  - 890 data files

Annotation Tool (OAT)

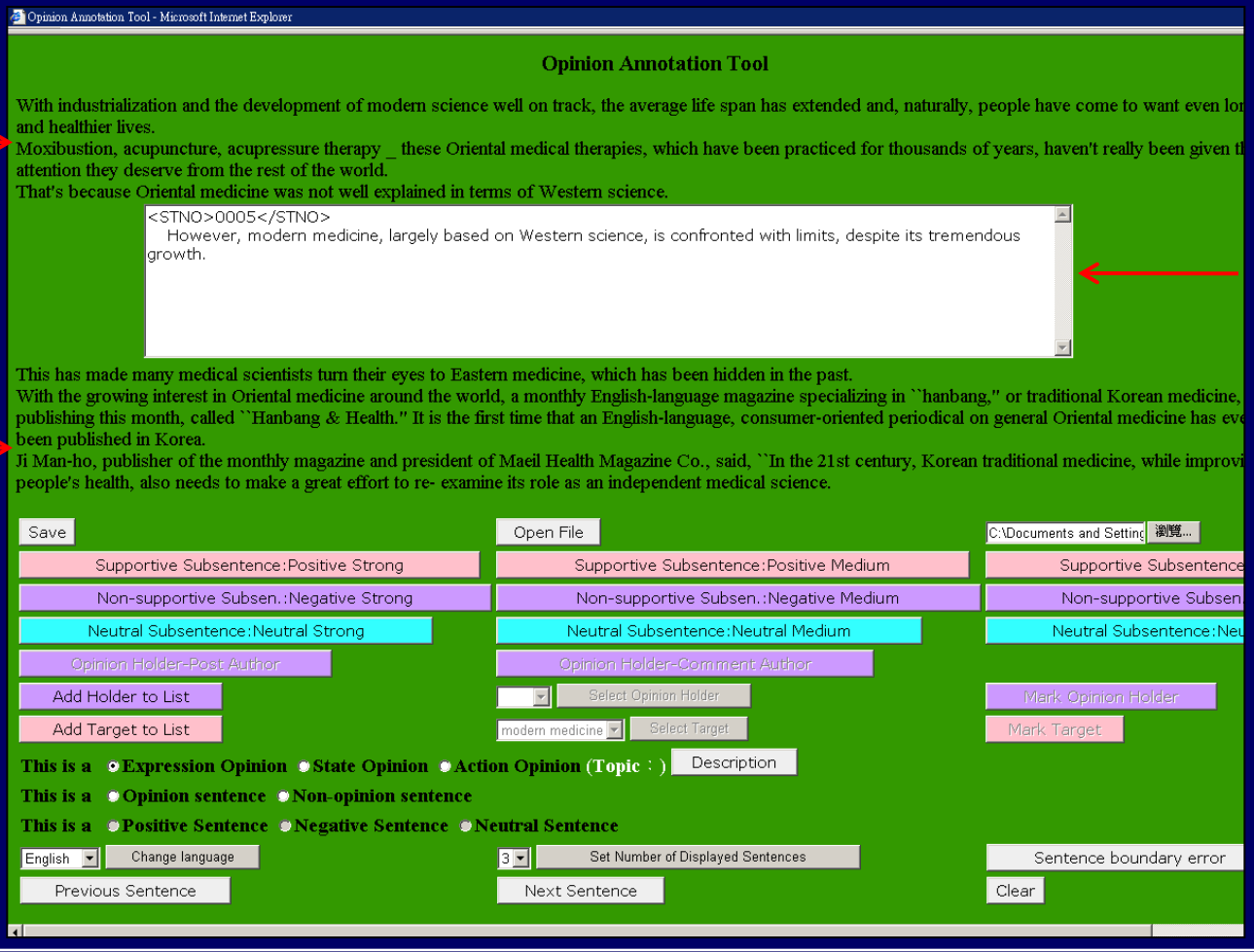
previous sentence

next sentence

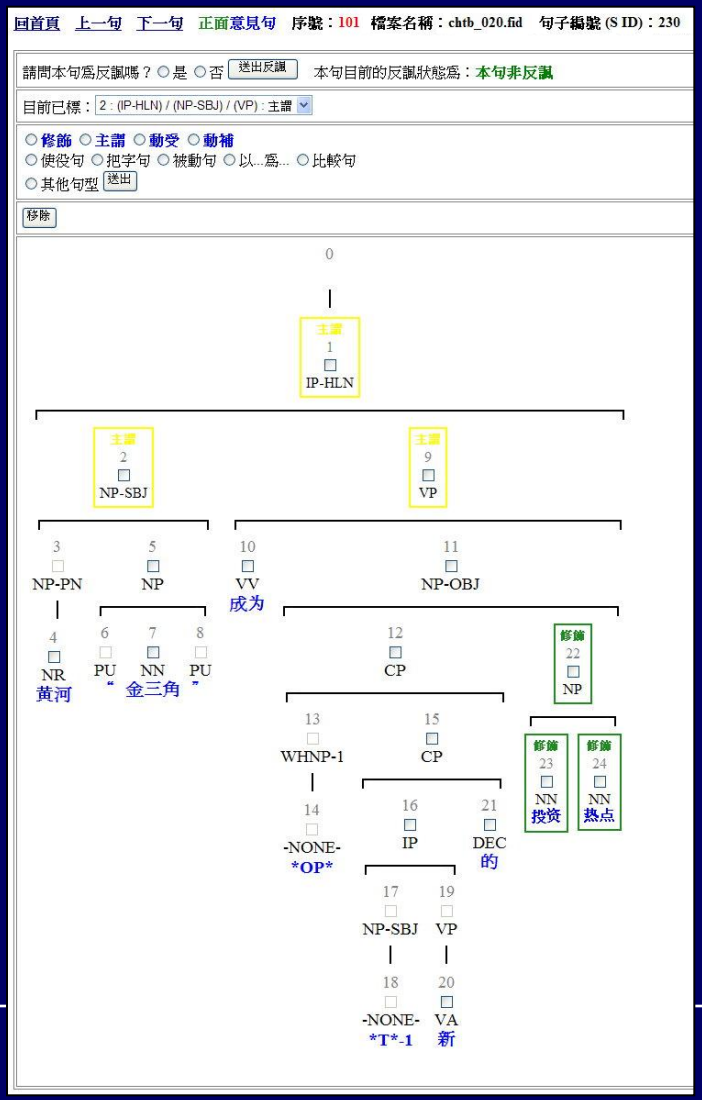
clause-level annotation

sentence-level annotation

current sentence



Annotation Tool (PAN)



- (S ID=230: 黄河“金三角”成为新的投资热点)
- (Golden Triangle of Yellow River becomes a new invest hotspot)

Chinese Opinion Treebank

- Statistics of opinion sentences

	Opinion				Non-Opinion
Polarity	Positive	Neutral	Negative		
#	6,916	1,824	1,937		
%	64.78	17.08	18.14		
Type	Exp	Status	Act	N/A	
#	4,240	4,072	722	1,643	
%	39.71	38.14	6.76	15.39	
Total #	10,677				8,108
Total %	56.84				43.16

Chinese Opinion Treebank

- average kappa value:
  - 0.49 (moderate agreement) between two annotators
  - 0.73 (substantial agreement) between one annotator and the lenient gold standard

Chinese Opinion Treebank

S ID=230: 黄河“金三角”成为新的投资热点

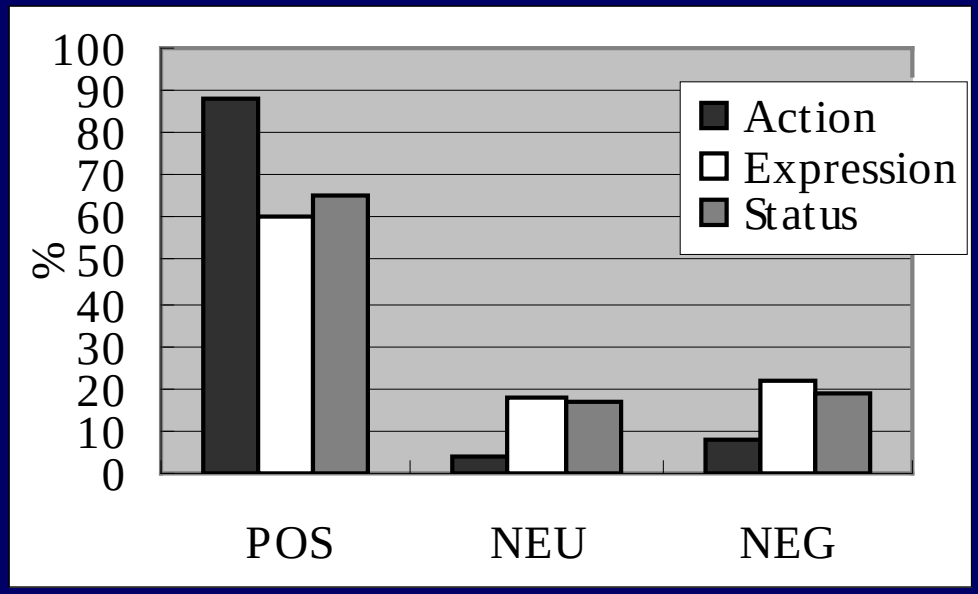
.node file	.tree file	.trio file
Fields		
Node ID, POS, node content, node depth	Node ID: children	Trio ID, trio head, trio left node, trio right node, trio type
Content		
0,,,0 1,IP-HLN,,1 2,NP-SBJ,,2 3,NP-PN,,3 4,NR,黄河,4 5,NP,,3 6,PU,“,4 7,NN,金三角,4 8,PU,”,4 9,VP,,2 10,VV,成为,3 11,NP-OBJ,,3 12,CP,,4 13,WHNP-1,,5 14,-NONE-,*OP*,6 15,CP,,5 16,IP,,6 17,NP-SBJ,,7 18,-NONE-,*T*-1,8 19,VP,,7 20,VA,新,8 21,DEC,的,6 22,NP,,4 23,NN,投资,5 24,NN,热点,5	0:1, 1:2,9, 2:3,5, 3:4, 4: 5:6,7,8, 6: 7: 8: 9:10,11, 10: 11:12,22, 12:13,15, 13:14, 14: 15:16,21, 16:17,19, 17:18, 18: 19:20, 20: 21: 22:23,24, 23: 24:	2,1,2,9,3 3,22,23,24,2
Opinion labels of three annotators (filename, SID, opinion, polarity, opinion type)		
annotators chtb_020.raw,230,N,, chtb_020.raw,230,Y,POS,STATE chtb_020.raw,230,Y,POS,STATE		
Opinion gold standard		
chtb_020.raw,230,Y,POS,STATE		

Chinese Opinion Treebank

Trio Type	Number	Percentage %
2	20,061	36.92
3	15,544	28.61
4	17,580	32.36
5	1,147	2.11
Total	54,332	100.00

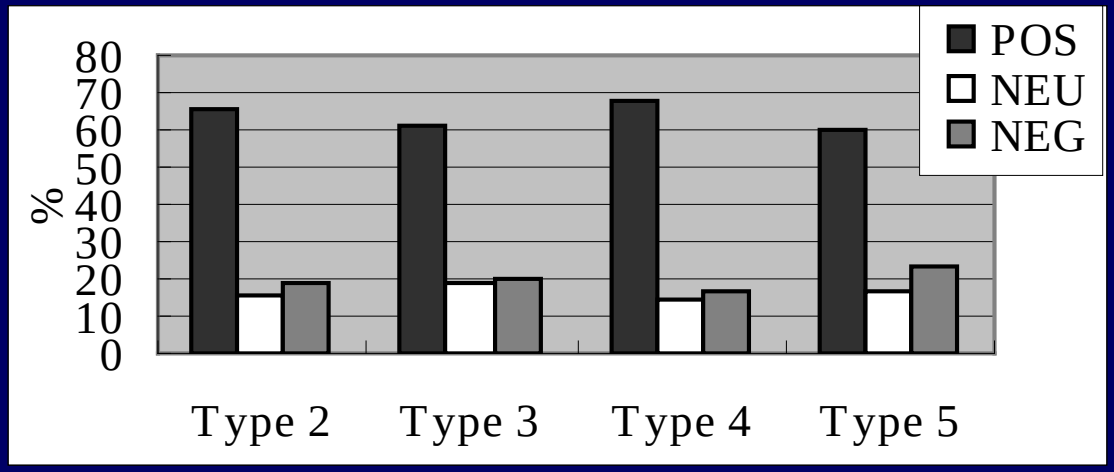
Discussion

- Statistics of opinions by type
- The distribution of the action type is different from the other two types, and the percentage of positive opinions of the action type is overwhelming.



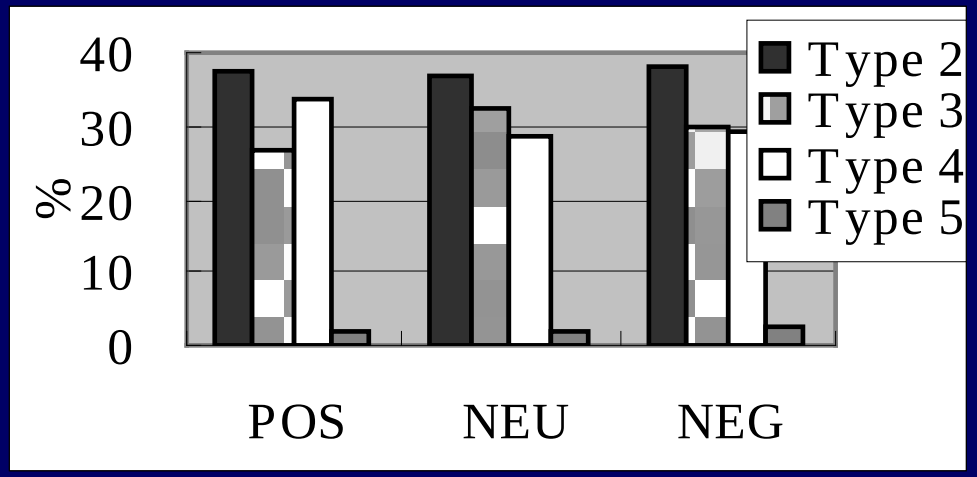
Discussion

- Statistics of structural trios by polarity
- The distributions of trios appearing in positive, neutral, and negative opinion sentences are similar.



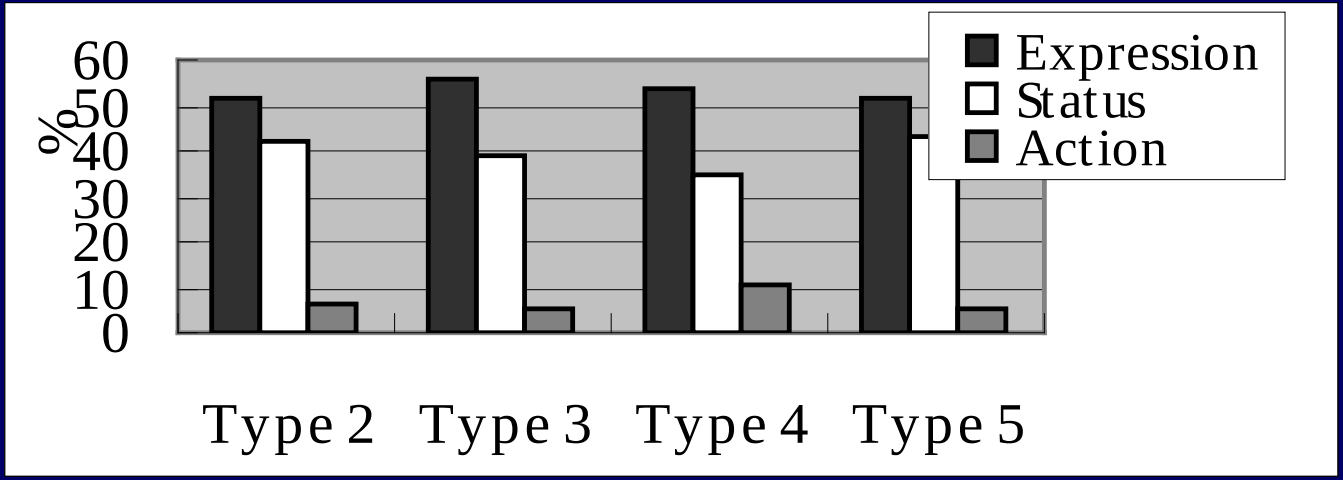
Discussion

- Statistics of opinion polarities by structural trio
- There are more Type 4 (Verb-Object) trios in positive opinion sentences.



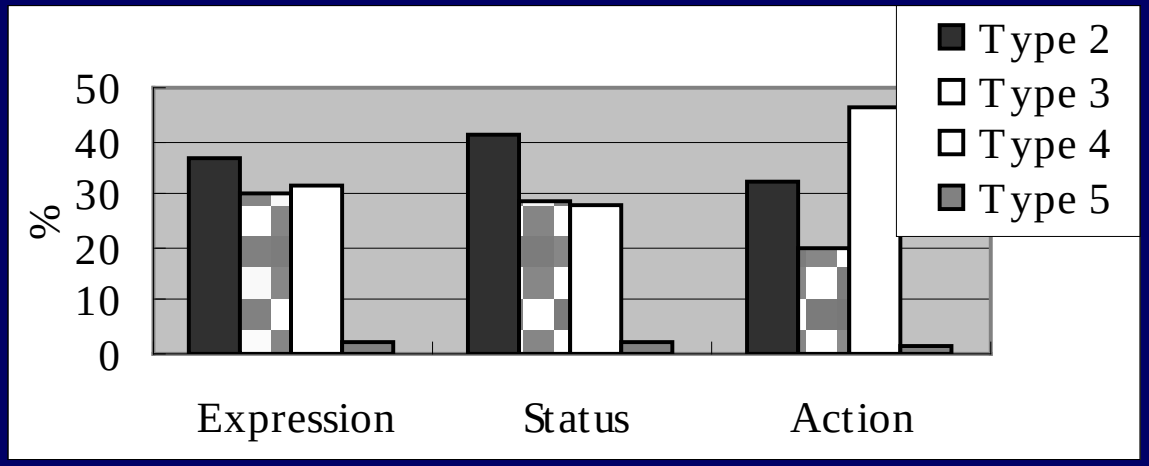
Discussion

- Statistics of structural trios by opinion type
- The distributions of opinions are similar in all four trio types.



Discussion

- Statistics of opinion types by structural trio.
- In action opinion sentences, Type 4 trios appear more often, while in expression and status opinion sentences, Type 2 trios are the majority.

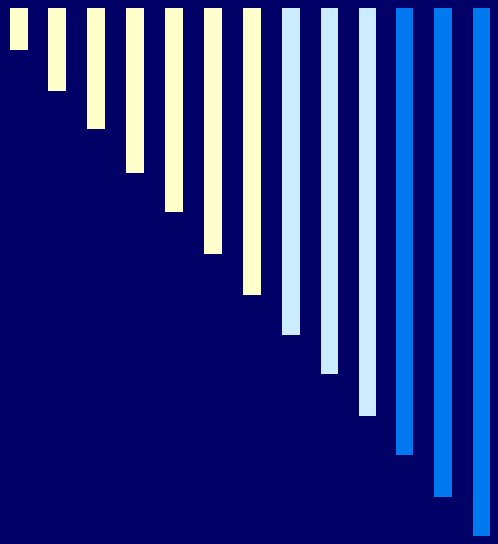


Potential Applications in Opinion Mining (EMNLP 2009)

Setting	Word [w]	Sentence [s]	f-Score (opinion)	f-Score (polarity)
1	bag	bag	0.7073	0.4988
2	struc	bag	0.7162	0.5117
3	bag	struc	0.8000	0.5361
4	struc	struc	0.7922	0.5297
5	struc	struc	0.7993	0.5187

Conclusion

- We have constructed a Chinese Opinion Treebank, which includes 18,785 sentences.
- Information including opinions, their polarities, types, and structural trios is annotated.
- The substantial agreement between annotations ensures the applicability and reliability of the constructed corpus.



Thanks & Comments