

**An Overview On Semantic Orientation
——On the Rule-based Semantic Identification of Computer**

Yong Lu and Penguan Liu*

Beijing Language and Culture University
No.15, Xueyuan Road, Haidian District
Beijing, China
ly_yonglu@163.com
liupengyuan@pku.edu.cn

Received December 2016; revised December 2016

***ABSTRACT.** We write down semantic orientation as a directed semantic association between semantic components in semantic structure. This paper try to review the research on theory of semantic orientation, mainly introducing the followings aspects: the origin and backgrounds, definition and scope, principles and methods, patterns and significance etc. At last, This paper points out the shortcomings in the study and look into the future study of semantic orientation. Besides, Aiming at the need of language information processing, This paper discuss the rule-based research of computer identification on semantic orientation in the last part and we believe that the combination of semantic orientation and computer will be helpful and important to semantic orientation and language information processing.*

Keywords: Semantic Orientation, Semantic Identification, Rule-based

Since the 1980's, the semantic orientation has become one of the hottest topics to discuss in Chinese academic circles, and has been recognized and accepted gradually in academia. People explored semantic orientation widely and deeply from different aspects. Generally speaking, mainly from the following two aspects: firstly, they try to explore the theoretical system of semantic orientation including the origin and backgrounds, definition and scope, principles and methods, patterns and significance etc. Secondly, they try to analyze

* Corresponding Author.

linguistic phenomenon by using semantic orientation and to explore the essential law of the language phenomenon.

This paper try to introduce and review the theory of semantic orientation generally from the first aspect. Finally, the paper points out the focus problems about semantic orientation in the future. The focus is to combine the computer and explore the semantic Identification technology, so as to provide help to the semantic processing.

1. The origin and backgrounds of semantic orientation.

1.1. For the time of generation of semantic orientation, there are several views: Shen Kaimu thought that semantic orientation had evolved from orientation which is putted forward by Lv Shuxiang firstly^[1]. Lu Jianming considered that semantic orientation should be traced back to the “action point”^[2]. Although they depended the specific origins, the two seem to have recognized that the semantic orientation produced in the 1980s. Zhou Gang pointed out that the semantic orientation actually dated back to the 1960s, specifically originated in the term “Description^[4]”^[3]. Through a comprehensive study about the development process of Chinese grammar, Shui Changxi thought that the semantic orientation had gone through three periods¹: hazy period, infancy and exploration period^[5]. The different periods of semantic orientation reflects deeper understanding to it.

Shui Changxi’s thoughts about the historical development of semantic orientation may be general, but they are scientific and credible conclusions on the basis of various theories after an overall study of semantic orientation from the macroscopic perspective.

1.2. The theoretical background of semantic orientation. Any kind of theories all have a certain theoretical background, and semantic orientation is also not exceptional. If we want to rise to a theory we will need enough academic nutrition. Lu Jianming thought that the emergence of semantic orientation was the result of the principle of combining form and meaning in Chinese study and the effect of Fillmore’s Case Grammar^[2]. Wang Hongqi believed that it was the popularity of the view of syntactic structure hierarchy and correct understanding to the status of semantic relations in syntactic structure that make the analysis of semantic orientation possible^[7]. Zhou Gang further pointed out that the analysis of semantic orientation was produced and developed on the basis of Three Planes Theory^[3].

The scholars’ views above seem to be different, actually they are same. Because they are all comprehensive products that are under a big trend which is a dialectic identity thought about the relationship between syntactic form and semantic content around Chinese academic circles since the early 1980s and the foreign relevant theories such as case grammar, valence grammar etc.

¹ Hazy period: From " Grammar Talk from Mr Ma" (1898s) to “Modern Chinese Grammar Speech” in the early 1960’s; Early period: since the early 1960s Wen Lian put forward the word “explain” to the “semantic orientation” proposed by Liu Ningsheng in the mid 1980s; Exploration period: From Liu Ningsheng first time come up with the “semantic orientation” term to today.

2. The definition and scope of semantic orientation. Although the research achievements of semantic orientation are fruitful, it's difficult to reach a consensus about defining the semantic orientation and the scope accurately in the Chinese academic circle.

2.1. The definition of semantic orientation. Integrating the research results of predecessors, we generalize the definitions of semantic orientation into different categories:

(1) The semantic relations - semantic function. Lu Yingshun^[8], Lu Jianming^[2], Wang Hongqi^[7], ZhouGang^[3], Chen Changlai^[9], Shao Jingmin^[10] are all from syntactic components that have semantic relations in syntactic structure to define; Chen Baoya^[11] saw the semantic orientation as the semantic relations between semantic components in the semantic structure; Shen Kaimu^[1], Fan Xiao、Hu Yushu^[12] focused on associated control ability of words. This is from the perspective of semantic function to analyze. Shui Changxi^[13] and Zhou Guoguang^[14] seemed to combine with both of them deliberately from the perspective of two aspects to explain the semantic orientation.

(2) The range of semantic orientation. In general, there are three divisions. Shen Kaimu^[1] and WangHongqi^[7] were very strict to scope of semantic orientation and they were also very strict to the definition of semantic orientation; The opposite was Zhan renfeng^[15]; Other scholars such as Lu Jianming^[2], Zhou Gang^[3], Shui Changxi^[13] and Shao Jingmin^[10] were between the above two.

Visibly, scholars in chinese grammar field are divided on the semantic orientation and it is precisely because scholars can't clear the connotation of semantic orientation that make the problem such as what is the scope of semantic orientation also ambiguous.

In addition, reviewing the research of semantic orientation in recent years, we found that the researchers tended to use the definition of semantic orientation of the group scholars represented by Lu Jianming^[2] when they analyzed the specific language phenomenon. Visibly, Chinese academic circles supported the view of semantic orientation based on semantic relation.

2.2. The scope of the semantic orientation. It was worthwhile to mention that Shui Changxi concluded the scope of semantic orientation into four situations^[5]:

(1) from the need of study to determine the scope, such as if semantic orientation should study the verb, it should be based on the need. Fan Xiao, Hu Yushu proposed that it was necessary to study the orientation of verbs in the range of semantic orientation^[12]. Lu Yingshun put forward more clearly that verbs were also needed to make study about semantic orientation^[8]. Lu Jianming thought that semantic orientation of verbs was a kind of case relation actually^[2]. Visibly, Lu and front several scholars had different understanding of the problems significantly about whether we needed put verbs into semantic orientation category. As for this problem, we believe that Liu Jianming's opinion seems to be more in line with the language facts itself. We believe that the essence of the orientation of verbs is not true "orientation", but a "radiation", meaning that it can be related with ones that have semantic relations with it. However, the semantic relation is a kind of divergent and targeted, it should belong to the case relation. And the essence of the semantic "orientation" is unity of the directivity and target. For example "*I was tired to*

chop wood (我砍柴砍累了/ wǒ kǎn chái kǎn leì le)”, academic circles have the common perception that “tired(累)” is the complement and its semantic orientation is the subject “I(我)”. But As for the semantic orientation of the verb “cut(砍)” is subject “I(我)” and the object center “wood(柴)”, we did not think they are semantic orientation generally but thought as the case relationship of “action” and “agent”, “action” and “patient”. However, some scholars also thought predicate verbs have semantic orientation, such as Lu Yingshun^[8]、Shui Changxi^[13], etc². However, their analysis of semantic orientation of verbs was actually based on the theory of the verb valence. They thought the monovalent verbs only have one argument and the argument is the object of the monovalent verbs’ semantic orientation; The bivalent verbs have two argument, respectively the two argument are object of the bivalent verbs’ semantic orientation. Obviously, this analysis does not seem to be scientific; In addition, it also seems to be very fuzzy when they analyze specific examples, and not fully follow this principle. Such as Lu Yingshun’s ^[8] analysis of the example of verbs obviously has inconsistent problem. We believe that the “semantic orientation” and “valence” are different theoretical methods and each of them has their applicable scopes. Therefore the two can’t be confused each other and can’t simply explain the orientation of verbs on the basis of verb valence. Therefore, it doesn’t seem right based on the principles of valence to analyze semantic orientation of verb. So we think it is more appropriate that the problems about orientation of verbs essentially belong to the relationship category before we can not find a more reasonable opinions that the educational world can widely accept them. However, in general, whether verbs have semantic orientation remains to be further discussed and further researched.

(2) The view that determining the research scope though the location of the semantic relations were agreed by Shen Kaimu ^[1] and Wang Hongqi ^[7]. Shen Kaimu pointed out that the research scope of semantic orientation only included a few words such as “dou(都)”, “quan(全)”, “bu(不)”, “ye(也)” and so on^[1]. Wang Hongqi had expanded the research scope to predicate composition, and negation “no(不、没有)”, scope adverbs “dou(都)”, “zhi(只)”, “jiu(就)”, “jinjin(仅仅)” and other words such as “zui(最)”, “ye(也)”, “dayue(大约)”^[7].

(3) The view that the semantic orientation only analyze semantic relations between

² For example, “*I can’t find something to eat*(我找不着东西吃/ wǒ zhǎo bú zhe dōng xī chī)”, Lu Yingshun thought that the semantic of verb “to eat(吃)” orients patient “something(吃东西)”; “*I can’t find teacher to teach me*(我找不着老师学/ wǒ zhǎo bú zhe lǎo shī xué)”, the semantic of verb “study(学)” orients agent “me(我)”; “*I can’t find teacher to teach*(我找不着老师教/ wǒ zhǎo bú zhe lǎo shī jiāo)”, the semantic of verb “teche(教)” orients agent “teacher(老师)”. For another example, “*leader in conference* (领导在开会/ lǐng dǎo zài kāi huì)”, “*leader criticize xiao zhang* (领导批评了小张/ lǐng dǎo pī píng le xiǎo zhāng)”. Shui Changxi indicates the semantic of verb “in conference (开会)” in the first sentence orients “leader (领导)”, the semantic of phrase “*criticize xiao zhang*” (批评了小张) in the second sentence orients “leader (领导)” also, but the second sentence can be extended to analysis the semantic orientation of “criticize (批评)” as a the center of the sentence, “criticize (批评)” as bivalent verb in normal orients agent and orients patient.

indirect syntactic components was agreed by Zhou Gang ^[3].

(4) Zhan Renfeng thought the structures³ that had semantic relations could be analyzed their semantic orientation ^[15]. This view is extensive. Obviously, Zhan's view of semantic orientation is actually a kind of common language phenomenon that exists in the syntax structure.

Above scholars' understanding of the connotation and research scope of semantic orientation are different from each other, and they have taken different observation of view. However, when it comes to semantic relations between the sentence constituents, their positions are similar. They admitted the conflict between the hierarchy of syntactic structure and multiplicity of semantic expression under the linear sequence of words combination. And grammatical form and meaning present a unity of opposites relations. But we think the above scholars' discussion about the semantic orientation still have shortcomings that are follows: first, definition inaccuracy. Semantic orientation belongs to the semantic level and should be included in the semantic category. Therefore, it should be cut from the semantic level when we define semantic orientation. Second, Semantic orientation, semantic case and semantic scope are not clearly enough⁴. We believe that the semantic orientation components orient and describe components that be oriented. The associated relationship is not simple, but a party on the semantic description of the other party .It reflects directivity and target. This should be the key to distinguish it from other semantic concepts.

As the concept that Chinese community put forward in the 1980s, semantic orientation should have a certain scope and strict definition, and distinguishes from the concepts such as semantic case and semantic scope. After referring to the research results of predecessors and markings a number of corpus, we tend to explain the semantic orientation like the following: we write down semantic orientation as a directed semantic association between semantic components in semantic structure.. The orienting orients or describes the oriented. They (more) form a structure of semantic orientation. The orienting reflects unification of directivity and target. Therefore, strictly, the research scope of semantic

³ Mr Zhan thought that the scope of semantic orientation analysis include express relation inside structure of subject predicate, the control relation inside verb-object structure, coordinative relation inside coordinative structure and restriction relation inside modification structure which also contain verb-complement structure.

⁴ Lu Yong points out that the function of semantic case just reveal the surface level semantic structure mode of sentence, but it's possible for semantic orientation to distinguish surface level semantic structure modes that have the same semantic form. General speaking, semantic case focuses on description and semantic orientation focuses on explication, this is two different basic spirit and this is precisely the key that semantic orientation is different from semantic case. Compared to semantic orientation, semantic scope denote a range of scope and semantic relations itself of the range of scope are fuzzy, the bigger the range of scope, the more vague the semantic relations, on the contrary, the smaller the range of scope, the more precise the semantic relations. When the range of scope is a simple sentence component, that is same with semantic orientation, In a word, the object of semantic orientation is a precise semantic component, but the range of semantic scope is a vague segment of language.

orientation should be the directional semantic relation in arbitrary semantic structure.

3. **The patterns of semantic orientation.** The earlier scholar who studied the form of semantic orientation was Yin Shichao, who divided the syntactic relations and semantic relations that were not corresponding into differential five types as following: single and double transferring, rhetorical question, type of co-rotating difference, type of internal and external difference, and type of level difference ^[16]. Lv Shuxiang first put forward explicitly that according to structural relationships. A should belong to B, but A orients C ^[17] on semantics. Zhang Guoxian seemed to be inspired from the conclusion of Lv Shuxiang, and divided semantic orientation into the same semantic orientation and different semantic orientation ^[18]. Shao Jingmin put forward “the orienting or oriented item, the orienting direction or mode, and the semantic linking item” the three concepts from the aspect of the semantic relations of adverbs ^[10]. Since then, study to the form of the semantic orientation usually from these aspects, such as Lu Jianming ^[2] and so on. Subsequently, Shui Changxi put forward the concept of “semantic matching”, and summarized semantic orientation as “semantic matching, the orienting or oriented item, the orienting direction or mode, and the semantic linking item” four aspects ^[13]. Using the above four concepts synthetically is helpful to study adverb classification and semantic orientation deeply, and have implication on the study of the semantic relation of other ingredients in a sentence. Zhao Shiju divided the attributive semantic orientation into a variety of types such as forward and backward, implicit and curved, inside and outside, single and multiple ^[19]. The above scholars did a very beneficial exploration from different angles, but many of them did not have a systematic discussion. They also did not have a systematic discussion about the patterns of semantic orientation. Shui Changxi made a profound and comprehensive discussion. On the one hand, he concluded eight types⁵ of structure model of semantic orientation from the different levels; And from the perspective of context, on the other hand, he made a detailed classification of the external semantic orientation. At the same time, he also used abundant instances to every small class, aiming to guarantee to have a reasonable and common explanation. This classification is comprehensive and has strong practicality. Not only such a comprehensive system of research is of great significance to improve the theory on semantic orientation, and have important implications on natural language processing. However, the articles of Shui about semantic orientation to the structure of the model also have limitations inevitably. Shui, for example, distinguished between special orientation and single orientation, but we think that both are discussed in a specific context orienting only one composition whose object is specific and definite. Such as examples in Shui Changxi’s article^[20] “*The sister’s crying waked up brother*(妹妹哭醒了弟弟/ mèi mèi kū xǐng le dì dì)”, “wake up(醒)” in this sentence orients “brother(弟弟)” which is the only one possibility. Shui considered that the reason why “wake up(醒)” and “sister(妹妹)” could combine was because they could collocate on the collocation of semantic

⁵ The eight types of semantic orientation are forward orientation and backward orientation, sequence orientation and opposite orientation, adjacent orientation and separate orientation, special orientation and simultaneous orientation, single orientation and double orientation, strong orientation and weak orientation, obvious orientation and underlying orientation, internal orientation and external orientation.

combination which was out of the meaning of sentence context in essence. It is different from semantic orientation collocation. But there will be contradictory to the definition of “orientation”. However, constrained by scholarship, i will make omission errors. Please correct me.

4. The principles and methods of semantic orientation. When we determine semantic orientation of a composition, it seems to be sure through relying on the language sense. However, with only a vague language sense, no objective laws to verify, semantic orientation analysis is extremely weak. Therefore, some scholars began to explore scientific principles and test methods of semantic orientation. Zhou Gang put forward that we could determine semantic orientation of a composition by investigating the word order of sentences, form markers in the sentence, sentence pattern and the transformation of sentence ^[3]. Then Ding Lingyun found that semantic feature could be used to determine the semantic orientation of attributive ^[21]. Jiang Jingzhong on the basis of the predecessors’ study summarized three principles of the determination of the semantic orientation : A. the principle of semantic feature matching; B. the principle of forward orientation priority; C. the principle of agentive subject priority^[22]. In general, the above scholars had made a very beneficial exploration, but they usually from the perspective of microcosmic and single study and had no deeply excavating the theoretical foundation of the semantic orientation principle. Thus it makes the research lack of empirical and persuasive. Furthermore, the above research results are also based on semantic orientation of a certain word or a composition to make summary and induction. There is not an applicable system to the whole semantic orientation principle and method. The largest contribution to the principles and methods of semantic orientation is Zhou Youguang ^[14]. Zhou put forward two basic principles in the article: vocabulary, semantic compatibility principle and syntax, semantic compatibility principle, and some auxiliary principles such as focus information principle, coexistence principle and so on. At the same time, he also summed up some effective methods to determine the semantic orientation such as elimination method, changing method, etc. This is the most systematic discussion to the principles and test methods of semantic orientation since it has been a theory. And there is no doubt that it will be good to build and complete orientation system. However, although his paper mentioned that words-semantic compatibility and secondary category association are vocabulary and category serial in the brain, but he without backing how they formed in further. It involves the problem that language and thinking which one is first. The controversy about this problem has a long time and we do not discuss here. However, we believe that vocabulary and category serial in the brain is the essence of a comprehensive product of people’s cognitive ability and language ability, and is formed in cognitive process where potential encyclopedic knowledge projects in the speech act of people (including thinking words).

In conclusion, the scholars have different expressions and classifications on the principles and methods of semantic orientation, but they are all from different angles and levels on the analysis of specific examples. And the basic position is to admit duality of grammatical structure, namely, form and meaning of unity of opposites. The principle of semantic orientation guides to methods, in other word, methods of semantic orientation is

under the guidance of the principle of it. The two are interdependent and indispensable.

5. The significance of semantic orientation. Human speech acts (including thinking words) in the final analysis, it is human's cognition of the world and representation of the process. But the colorful objective world and complex human understanding of the world make the symbolic language in the linear arrangement of time dimension surface syntactic level and the deep meaning of the expression of multidimensional show a relationship of unity of opposites. And the semantic orientation belongs to the semantic category, its main purpose is to reveal the relationship between the combination relations of semantic components in semantic structure and human cognitive model, so that the study of Chinese grammar has more theoretical and practical significance. About the meaning of the semantic direction, fan, Hu Yushu ^[12], Lu Jianming ^[2], Zhou Guoguang ^[14] and so on behalf of the scholars are described in detail. We summarized the scholars' views as follows:

Theoretical significance: (1) make up the defects that case grammar and valence grammar consider predicates as the core in semantic relations, deepen the understanding of the relationship between the semantic structures; (2) expanded the grammar research ideas and vision, and deepen the study of grammar.

Practical significance. (1) it has a deeper and more comprehensive understanding of semantic structure, and further to reveal the characteristics of semantic structure; (2) for some special ambiguous sentence it can play to eliminate discrimination and differentiation effect; (3) it provides a new point of view, to effectively explain some language phenomena; (4) it can puts words and the syntactic constituents into small; (5) the semantic orientation has a certain degree help in semantic processing of language information processing.

6. The shortcomings in the study and the research directions in the future. Throughout the thirty years, in general, we have made important progress in constructing and perfecting the system of semantic orientation theory and application of semantic analysis of language facts. Semantic orientation has been widely recognized as a theoretical method, but the author through the CNKI (China journal full-text database) entered the theme of "semantic orientation" from 1984 to 2015 to retrieve the relevant papers published in the journal the exact matching of 2119. We found that since Zhou Guoguang's article ^[14] about semantic orientation theory system the others rarely occurred. But before this, the mainstream of semantic orientation is to explain the linguistic facts and non mainstream is theoretical exploration. It can be seen that, in the past 10 years, the academic circles seem to have no specific text to discuss the semantic orientation itself. Why? Is the semantic orientation itself already perfect and does not need to be studied? Or are there some problems can not start? Although the semantic orientation as a theoretical method has begun to take shape, we should also see the problems in the study, the specific performance as follows: (1) There is a big ambiguous to understand meaning of the connotation of semantic orientation. To sum up with three different points of view simply: firstly, the view of semantic relation including the semantic relations of syntactic components and semantic components; Secondly, the view of semantic function; Thirdly, semantic relations and semantic function combined. Because there is no clear and unified understanding, some understanding about

theory questions such as the research scope and the expression form are obviously absent. (2) There are great differences in the research scope of semantic orientation. Some believe that several words such as “dou(都)”, “ye(也)”, “no(不)” and so on have semantic orientation. Some have extended research scope broadly .As long as the grammatical structure has grammar relations it has the semantic orientation; Some of them are in the range of these. (3) Whether the orientation of verbs is a semantic orientation, people are different from each other, and it leads to ambiguous and embarrassing. (4) As for research data, previous theoretical exploration is based on introspective analysis, for example, without the use of large-scale real corpus of language and the regularity understanding explanatory power is not enough. (5) As for research methods, previous theoretical study of semantic orientation is more influenced by structural linguistics. They summed up the law basing on the description in fact. Although some achievements have been made, overall it is subjective and the power of explanation is not enough, especially the research results and methods from Psycholinguistics, computational linguistics are not enough. It can be seen that there is still a long way to go in existing semantic orientation, and it needs to be improved and improved.

Based on the deficiencies of the research about semantic orientation and the existing research results, we believe that the research should do a good job in the following aspects in the future:

(1) combining with the research results of syntactic theory and pragmatic theory, we broad the depth and breadth of the research ideas and focus on the urgent fundamental questions which need to be solved, and strengthen the theoretical basis.

(2) based on a large scale of real corpus, we need more detailed description and more in-depth thinking, and strive to summarize the law, enrich and improve the theoretical system of semantic orientation.

(3) with the development of society, the era of interdisciplinary science also requires our language study, especially in the new period that is the study of semantic orientation. We should benefit from the research results and methods of the computational linguistics, to make it have more theoretical significance and application value. The following will be presented in detail.

7. The study about the Rule-based Semantic Identification of Computer. Over the past 30 years, the linguistic studies around semantic orientation have an extensive range, multiple perspectives and a deep level. They have taken proved to be very successful and significant. Especially the achievements in the studies of analyzing linguistic fact by semantic orientation analysis are very fruitful. However, it is a pity that early studies of semantic orientation are based on the discussion of linguistic itself, short of the combination of other subjects and practical application. With the development of information processing, it is a basic requirement for realizing human-machine interaction that having computers understand languages, and the key of understanding languages is semantics. So studying the semantic orientation identification of computer is an important practice of improving the semantic analysis of sentence level via computers. In recent years, only Hao Lin et al ^[23] did some research about it. We think that semantic recognition is

helpful for natural language processing techniques such as disambiguation of sentence meaning, automatic Question Answering and information retrieval. The examples are as follows.

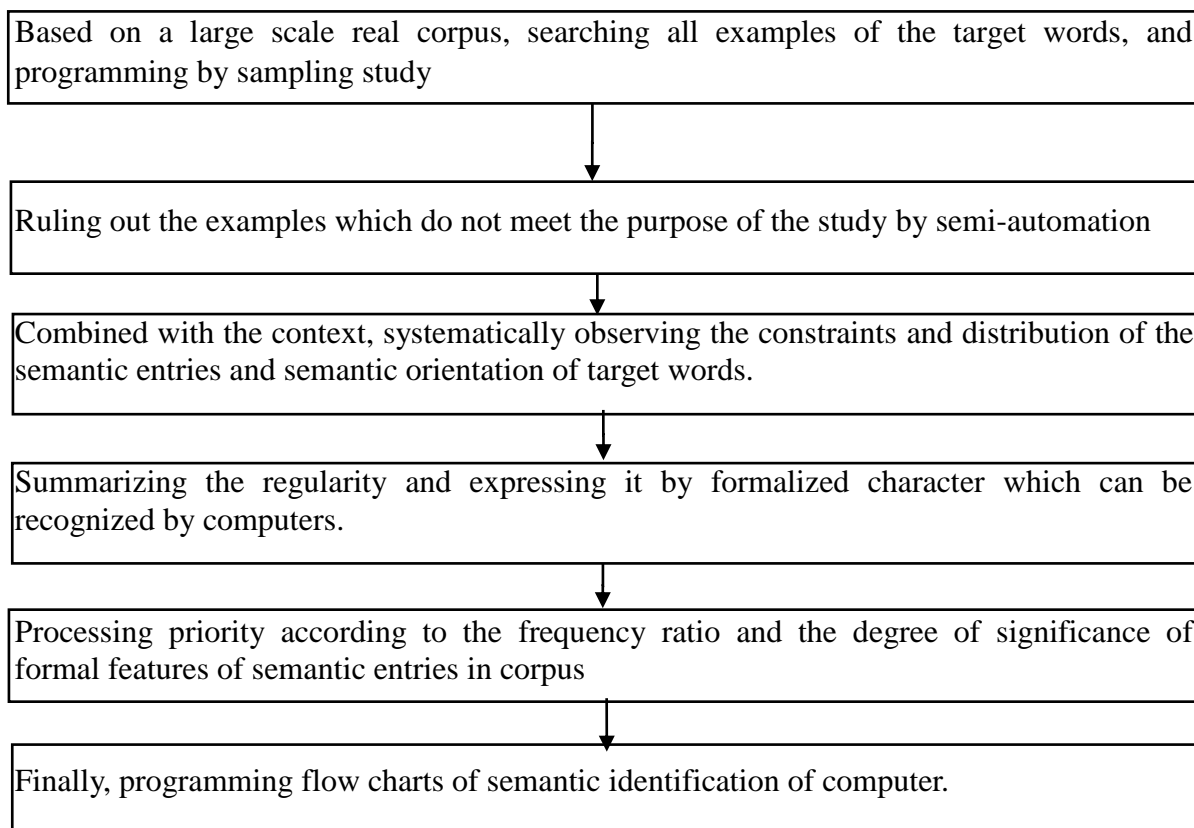
Disambiguation of Sentence Meaning: the sentence “*The meal we have all finished*(饭我们都吃完了/ fàn wǒ men dōu chī wán le)” is actually an ambiguous sentence. If the semantic of “all(都)” in the sentence orients “we(我们)”, the meaning is all of us have finished the meal. If the semantic of “all(都)” orients “the meal(饭)”, the meaning is the meal has been ate up. This proves that if the semantic orientation of “all(都)” is different, the meaning of the sentence will be different too. If we cannot judge the semantic orientation of “all(都)” correctly, we will not comprehend the meaning of the sentence accurately, even misunderstand it. Therefore, for sentence processing, if we make computers “understand” and recognize the meaning of sentences by themselves, it will be a great advancement of improving the semantic analysis of sentence level.

Automatic Question Answering: supposing that the presupposition is “*Headmaster Chen and Vice-headmaster He all met Professor Miami from America yesterday morning*(昨天上午, 陈校长和何副校长都会见了美国的麦阿密教授/ zuó tiān shàng wǔ , chén xiào zhǎng hé hé fù xiào zhǎng dōu huì jiàn le měi guó de mài ā mì jiāo shòu)”. If be asked that “*Who met with Professor Miami from America yesterday morning?* (昨天上午谁(哪些人)会见了美国的麦阿密教授?/zuó tiān shàng wǔ shuí (nǎ xiē rén) huì jiàn le měi guó de mài ā mì jiāo shòu?)”, the computer can arrive at three points of cognition based on the knowledge of the semantic orientation of “both(都)”: ① *Yesterday morning, Headmaster Chen met with Professor Miami from America*(昨天上午, 陈校长会见了美国的麦阿密教授). ② *Yesterday morning, Vice-headmaster He met with Professor Miami from America*(昨天上午, 何副校长会见了美国的麦阿密教授). ③ *Yesterday morning, Headmaster Chen met with Professor Miami from America together with Vice-headmaster*(昨天上午, 陈校长和何副校长一起会见了美国的麦阿密教授). Obviously, the computer arrives at these answers based on understanding of the semantic orientation of “both(都)”. And adopting methods based on statistic or other rules can make computer choose the best answer about the semantic orientation object of “both(都)” for us.

It seems that promoting the combination of semantic orientation and computers is a very meaningful measure. Different with Hao Lin ^[24], Lu Yong ^[25] recognized the sense of target words based on the attempt at discussion of the computer oriented recognition of semantic orientation. Firstly, we do something about identification of semantic entry .In other words, the identification of semantic orientation is based on semantic entry identification, and it is the second identification of orientation followed semantic entry identification. more often than not the reason is that both reflects the precise consistency in identification, and the determinants of semantic orientation depend on the directing composition of lexical semantic characteristics, in other word, lexical semantic characteristics is the base and fundamental elements of semantic orientation. For some typical adverbs such as “dou(都)”, “jiu(就)”, we think that only if make computers judge their specific sense in context, we can make computers recognize their semantic orientation in context well. So whether the semantic entry identification is correct directly affects the

analysis of semantic orientation. We collectively call the identification of semantic entry and semantic orientation semantic identification of computer. How to carry out the semantic identification of computer? At present, we mainly using the rule-based method, systematically summing up the structural regularity of target words, and describing them formally and processing priority by observing the constraints of target words in the large scale real corpus, then make computers “understand” and recognize them correctly. Here is the specific process:

FLOW CHARTS OF RULE-BASED SEMANTIC IDENTIFICATION OF COMPUTER



We think that studies on computer-oriented semantic identification are an important practice and embodiment of semantic processing in language information processing. They have important implications on the ontology studies of semantic orientation, and are very helpful for language information processing. To sum up, studies of computer-oriented semantic identification provide us a new angle to reflect some phenomenon of languages in linguistics, and cause us to rethink and locate semantic orientation, so that they bring us new enlightenment and reflection to the studies of semantic orientation. Otherwise, the studies of semantic orientation of adverbs and other parts of speech will be very helpful for understanding and disambiguation of semantic of sentence level. All in all, the combination of semantic orientation and computers have important theory and practice meaning for studies of semantic orientation and information processing.

Acknowledgment. This research project is supported by Major Project of the National Language Committee of the 12th Five-Year Research Plan in 2015 (No.WT125-45) and by Science Foundation of Beijing Language and Culture University (supported by “the Fundamental Research Funds for the Central Universities”) (16YJ030003)

REFERENCES

- [1] Shen, K: A Study on “Semantic Orientation”. Journal of South China Normal University (Social Science). 1996, 01:67-74+66. (沈开木. 论“语义指向”[J]. 华南师范大学学报(社会科学版),1996,01:67-74+66.) (in Chinese)
- [2] Lu, J: On Semantic Orientation Analysis. China linguistics review (First Edition). BeiJing Language and Culture University Press (1997). (陆俭明.关于语义指向分析[J],中国语言学论丛(第一辑)[M],北京:北京语言文化大学出版社,1997.) (in Chinese)
- [3] Zhou, G: Discussion on Semantic Orientation Analysis. Linguistic Research 3, 27-34(1998). (周刚. 语义指向分析刍议[J]. 语文研究,1998,03:27-34.) (in Chinese)
- [4] Wen, L: A Study on the Principle of Combination of Form and Meaning in Grammar. Journal of East China Normal University (Natural Science). 1, 73-78(1960). (文炼. 论语法学中“形式和意义相结合”的原则[J]. 华东师范大学学报(自然科学版),1960,01:73-78.) (in Chinese)
- [5] Shui, C: Evolution of Semantic Orientation Analysis and Its Prospect. Language Teaching and Linguistic Studies,1, 62-71(2004).(in Chinese)
- [6] Liu, N: Semantic Orientation of Preposition Structure “在……” at the Beginning of Sentence. Chinese Language Learning. 2, 27-31(1984). (刘宁生. 句首介词结构“在……”的语义指向[J]. 汉语学习,1984,02:27-31.) (in Chinese)
- [7] Wang, H: A Study on the Cause of Semantic Orientation Analysis. Journal of Shandong Normal University (Social Science Edition). 1, 72-77(1997). (王红旗. 论语义指向分析产生的原因[J]. 山东师大学报(社会科学版),1997,01:72-77.) (in Chinese)
- [8] Lu, Y: Discussion on the Research of Semantic Orientation. Chinese Teaching in the World. 3, 22-26(1995). (卢英顺. 语义指向研究漫谈[J]. 世界汉语教学,1995,03:22-26.) (in Chinese)
- [9] Chen, C: The Research of Semantic Components in Modern Chinese: History·Fact·Thinking. Journal of QingHai Junior Teachers' College. 1, 26-32(1999). (陈昌来. 现代汉语语义成分研究:历史·现状·思考[J]. 青海师专学报<社会科学>,1999,01:26-32) (in Chinese)
- [10] Shao, J: A Study on Adverbs of Semantic Orientation in Syntactic Structure. Chinese (First Edition). East China Normal University Press (1990). (邵敬敏. 副词在句法结构中的语义指向初探[A],《汉语论丛》[C].上海:华东师范大学出版社,1990.52-66.) (in Chinese)
- [11] Chen, B: Chinese Language Methodology in Twenty Century (1989-1998). Shandong Education Press (1999). (陈保亚. 20世纪中国语言学方法论(1898-1998)[M].济南:山东教育出版社,1999.) (in Chinese)
- [12] Fan, X and Hu, Y: Some Questions about Three Planes Theory in Grammar Research. Studies of the Chinese Language. 4,272-278(1992). (范晓、胡裕树. 有关语法研究三个平面的几个问题[J].中国语

- 文,1992,04:272-278.) (in Chinese)
- [13] Shui, C: On the Contents of Semantic Orientation. *Linguistic Sciences*. **6**, 20-32(2003). (in Chinese)
- [14] Zhou, G: On the Principle and Method of Semantic Orientation Analysis. *Linguistics Science*. **4**, 41-49(2006). (in Chinese)
- [15] Zhan, R: Semantic Orientation and grammatical relation. *Grammar research and exploration* (Ninth Edition). *Studies of the Chinese Language* (2000). (詹人凤. 语义指向与语法关系[A], 《语法研究和探索》: 九.北京: 中国语文杂志社, 2000.237-248.) (in Chinese)
- [16] Lu, Y: On the Semantic Orientation. *Journal of Zunyi Normal University*. **2**, 90-94+99(2016). (in Chinese)
- [17] Yin, S: Structural Relation and Semantic Orientation. *Linguistic Research*. **3**, 29-35(1988). (尹世超. 结构关系与语义指向[J]. 语文研究,1988,03:29-35.) (in Chinese)
- [18] Lv, S: Issues on Chinese Grammatical Analyses. The Commercial Press (1979). (吕书湘.汉语语法分析问题[M], 北京: 商务印书馆,1979.) (in Chinese)
- [19] Zhang, G: Semantic Orientation Analysis of resultative complement. *Chinese Language Learning*. **4**, 24-28(1988). (张国宪. 结果补语语义指向分析[J]. 汉语学习,1988,04:24-28.) (in Chinese)
- [20] Zhao, S: Brief Talk on the Semantic Orientation of Attribute. *Journal of Hubei University of Arts and Science*. **1**, 38-43(2001). (in Chinese)
- [21] Shui, C: Multi-probe into patterns of Semantc Orientation Configuration. *Journal of Zhejiang University (Humanities and Social Sciences)*. **3**, 94-102(2004). (in Chinese)
- [22] Ding, L: Semantic Orientation Analysis of attribute. *Journal of Hefei Normal University*. **2**, 61-63(1999). (丁凌云. 定语语义指向分析[J]. 安徽教育学院学报(哲学社会科学版),1999,02:61-63.) (in Chinese)
- [23] Jiang, J: Semantic Orientation and Method of Adjective Attribute. *Chinese Linguistics*. **1**, 82-88(2008). (蒋静忠. 形容词定语的语义指向与判定方法[J]. 汉语学报,2008,01:82-88.) (in Chinese)
- [24] Hao, L: Computer Identification of the Adverb Semantic Orientation: Path & Case. *Wuhan University Journal (Humanity Sciences)*. **4**, 459-463(2009). (in Chinese)
- [25] Lu, Y: Computer Semantic Identification On the Adverb of “Dou” In Modern Chinese. The 17th Chinese Lexical Semantics Workshop (CLSW2016). (in Chinese)