

摘要

本论文对英汉语篇回指中语法角色和语义角色的作用进行了对比研究，目的是：1) 考察这两种因素在回指中的相对表现；2) 研究如何将二者结合以提高消解准确率；3) 探究造成消解失败的原因。

为了研究上述问题，我们设计了两种指代消解算法：语法消解算法和语义消解算法。前一算法基于语法角色等级排序选定先行语，从而考察语法角色在回指消解中的作用。后一算法基于语义角色排序选定先行语，从而考察语义角色在回指消解中的作用。我们运用这两种算法来消解英汉叙述体语篇中的零形代词和代词，并对二者的消解结果进行了比较。此外，我们详细分析了语法消解算法或者语义消解算法单独可以消解的回指用例，以及那些两种算法均未能消解的回指用例，并且探究了造成消解失败的原因。最后，我们探讨了如何将语义角色的作用整合到语法消解算法中以提高准确率。

研究发现，两种算法的消解都非常成功。就英语语篇中的回指而言，语法消解算法的总体准确率是 95.3%，语义算法消解的总体准确率是 95.2%。就汉语语篇中的回指而言，语法消解算法的总体准确率是 92.9%，语义消解算法的总体准确率是 92.6%。在英、汉两种语言中，语法消解算法的消解结果稍微优于语义消解算法，但二者没有显著差异。

详细的对比考察显示，就英语语篇中的回指而言，两种算法均能成功消解的回指占 95.1%，语法消解算法单独可以消解的占 0.2%，语义消解算法单独可以消解的占 0.1%，余下的 4.6%是两种算法均未能消解的。就汉语语篇中的回指而言，两种算法均能成功消解的占 91.8%，语法消解算法单独可以消解的占 1.1%，语义消解算法单独可以消解的占 0.8%，余下的 6.4%是两种算法均未能消解的。

此外，英语语篇中语法或语义消解算法单独可以消解的回指，其候选先行语出现于被动结构、存现结构或者双宾语结构。汉语语篇中语法或语义消解算法单独可以消解的回指，其候选先行语出现于存现结构、句法话题结构、被动结构，或者位于主语和主语属格语位置。

就英语语篇中的消解而言，造成消解失败的原因有：合指、下指、语义选择限制、语篇指向、重复优选倾向、因果关系优选倾向以及常识优选倾向，其中常识优选倾向可以解释将近一半的消解错误。就汉语语篇中的消解而言，造成消解

失败的原因有：下指、语义选择限制、语篇指向、重复优选倾向、因果关系优选倾向以及常识优选倾向，其中语义选择限制可以解释将近一半的消解错误。

最后，我们发现，语义角色在指代消解中的作用可以通过生命度优选倾向整合到语法消解算法中，这样不需要借助语义角色就能够提升消解。该倾向可使语法消解算法在英语语篇中的消解准确率提高 0.1%，在汉语语篇中的消解准确率提高 0.5%。

因为语法消解算法的消解结果比语义消解算法更好，且语法角色标注比语义角色标注更容易也更客观，所以结论是，语法消解算法优于语义消解算法，语法角色比语义角色更适合应用到指代消解中。此外，应将生命度优选倾向纳入到指代消解中以提高准确率。

关键词：指代消解；语法角色；语义角色；生命度

Abstract

This dissertation conducts a contrastive study to investigate effects of grammatical and thematic roles on discourse anaphora resolution in English and Chinese texts. The purpose is threefold: 1) to explore their relative performance in anaphora resolution; 2) to investigate how to integrate them together to enhance resolution; 3) to probe into the underlying reasons accounting for resolution failure.

To investigate the issue, two resolution algorithms: the Syntactic Algorithm and the Thematic Algorithm are designed. The former employs the Syntactic Hierarchy in antecedent selection to examine grammatical role effects on anaphora resolution; the latter employs the Thematic Hierarchy in antecedent selection to examine thematic role effects on anaphora resolution. The algorithms are applied to resolve zero and pronoun anaphora in English and Chinese narrative texts. Comparison is made to explore their relative performance in resolution. Besides, detailed analysis is conducted on the case where anaphora is resolved solely by one algorithm but not by the other and the case where anaphora is resolved by neither algorithm. Furthermore, the underlying reasons accounting for resolution failure are explored. Finally, the study investigates the issue how to integrate thematic role effects to the Syntactic Algorithm to enhance resolution.

It is found that both algorithms perform very well in resolution. Specifically speaking, for resolution in English texts, the Syntactic Algorithm is 95.3% in precision rate, while the Thematic Algorithm 95.2%. For resolution in Chinese texts, the Syntactic Algorithm is 92.9% in precision rate, while the Thematic Algorithm 92.6%. In both English and Chinese, the Syntactic Algorithm performs slightly, but not significantly better than the Thematic Algorithm.

Besides, detailed comparison reveals that, for anaphora in English texts, the vast majority (95.1%) is resolved by both algorithms, 0.2% resolved solely by the Syntactic Algorithm, 0.1% resolved solely by the Thematic Algorithm, and a small minority (4.6%) resolved by neither algorithm; for anaphora in Chinese texts, the large majority (91.8%) is resolved by both algorithms, 1.1% resolved solely by the

Syntactic Algorithm, 0.8% resolved solely by the Thematic Algorithm, and a small minority (6.4%) resolved by neither algorithm.

Moreover, for the case where anaphora is resolved solely by one algorithm but not by the other, it is found that the diverging resolution in English texts occurs when candidate antecedents are in passive constructions, existential-presentative constructions or double-object constructions, and that the diverging resolution in Chinese texts occurs when candidate antecedents are in existential-presentative constructions, syntactic topic constructions, passive constructions, or in subject and subject modifier positions.

In addition, several reasons are found to account for resolution failure. For resolution in English texts, the reasons include plural reference, cataphora, selectional restrictions, context orientation, repetition-based preferences, causality-based preferences and general knowledge-based preferences, and near half resolution failure is owing to general knowledge-based preferences. For resolution in Chinese texts, the reasons include cataphora, selectional restrictions, context orientation, repetition-based preferences, causality-based preferences and general knowledge-based preferences, and near half resolution failure is owing to selectional restrictions.

Finally, it is found that with animacy preferences at work, thematic role effects can be integrated to the Syntactic Algorithm to promote resolution without resorting to thematic roles. For resolution in English texts, the Syntactic Algorithm can be enhanced with a 0.1% rise in precision rate by animacy preferences; for resolution in Chinese texts, the algorithm can be enhanced with a 0.5% rise in precision rate.

Because the Syntactic Algorithm resolves better than the Thematic Algorithm and grammatical role annotation is much easier and more objective than thematic role annotation, it is concluded that the Syntactic Algorithm is superior to the Thematic Algorithm and that grammatical roles are superior to thematic roles in application to anaphora resolution. Besides, animacy preferences should be integrated to the Syntactic Algorithm to promote resolution.

Key Words: anaphora resolution; grammatical roles; thematic roles; animacy