Handling Coordination in Tree Adjoining Grammars

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Motivation

• TAGs need a treatment which is structural and not string based.

• Imported into TAG despite being weakly equivalent the CCG analysis of coordination cannot be

• (Steedman 1996)

• CCG: function application interspersed with composition and type raising

• most successful accounts exploit string adjacency with coordination

• TAG: reconcile locality and endemic treatment of long distance dependency

Motivation
TAGs

TAG G:

\[ \begin{aligned}
\alpha & (\text{John}) \\
\beta & (\text{loudly}) \\
\end{aligned} \]

\[ \begin{aligned}
\alpha & (\text{laughed}) \\
\beta & (\text{loudly}) \\
\end{aligned} \]

Derived Tree

Derivation Tree
Coordination in a TAG: Problems

John laughed

John cried

John laughed and cried
Structure Merging (Joshi and Schabes 91)
Coordination in a TAG

Problems

Pre-requisites:

- Introduce a novel method of rewriting nodes as trees with following prerequisites:
  - Coordinate structures must be built from the elementary structures in a TAG.
  - Must have a precise notion of derivation.
  - Must respect TAG linguistic assumptions.
  - Some notion of "sharing" these dependencies has to be introduced.
  - Cases of coordination violate this notion of locality.
  - In a TAG, dependencies between predicate and arguments are made local with in a tree (the extended domain of locality).

Cases of coordination violate this notion of locality.

- Coordination in a TAG, dependencies between predicate and arguments are made local within a tree (the extended domain of locality).

Coordination in a TAG
The \textit{conjoin} Operation

\textbf{Derivation tree}

\textbf{Derived structure}

John eats cookies and drinks beer
Across the board movement

Who laughed and seemed to be happy?

Derived structure
Coordination as Adjunction

John eats cookies and drinks beer
I know who laughed and seemed to be happy
Parsing Issues: Ambiguity in non-coordinate sentences

John hates and Mary likes football
Parsing Issues: Attachment ambiguity and coordination

[Judge Curry] ordered [the refunds] which

began [Feb. 1] and said ...

NP

S

NP

VP

S

NP

Conjunction

NP

VP

S
A structural approach towards coordination.

Although motivated by the mechanisms of CCG, the treatment is distinct from CCG and 3D tree accounts.

Extended domain of elementary trees allows elimination of ambiguities in non-coordinated sentences.

Ambiguities while parsing sentences with coordination can be treated as attachment ambiguities.

Summary
Treatment of non-constituent coordination and gapping. (Sarkar and Joshi, 1996).

Further linguistic examples are presented in (Joshi and Schabes, 1991).

Distinguishing dependencies between predicate-arguments from the notion of constituency. (Sarkar, 1997).

1996)

Related Work