SYNTACTIC PROCESSING IN THE BBN SPEECH UNDERSTANDING SYSTEM

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The syntactic analysis system presented here is composed of
two parts, a modified augmented transition network grammar and a
parser which is designed for a speech understanding environment.

The parser operates on partial utterances called theories.
A theory may be thought of as a set of words which are hypothe-
sized to be in the utterance. The parser processes the words in
a theory by building partial syntactic paths using the words of
the theory. These paths do not depend on left context, which will
be missing if there are gaps in the theory. Syntactic constitu-
ents are built where possible and, whenever a constituent is
built, the parser can interface with the semantic component of
the total speech understanding system for guidance and verifica-
tion.

The parser tries to predict words and/or syntactic categories
to fill or reduce gaps in the theory, particularly small function
words which are difficult to detect reliably on acoustic grounds
alone. The parser does not follow all possible parse paths, but
attempts to select the most likely ones for extension. It uses a
judicious mixture of top down, bottom up, depth first, and breadth
first parsing strategies to take advantage of local, reliable in-
formation. It saves all the information gained while following
alternative parse paths, so that several parse paths which share
a common part, even if the paths are in different theories, can
share that portion without reparsing. This is true even if the
parse paths split before and/or after the common part and even if
the common section analyzes only part of a syntactic constituent.