

DERIVING PROSODIC SENTENCE STRUCTURE WITHOUT EXHAUSTIVE SYNTACTIC ANALYSIS

René Kager* and Hugo Quené*

ABSTRACT

The algorithm described here automatically selects words in texts to be accentuated. This takes place on the basis of prosodic sentence structure, derived without syntactic parsing.

INTRODUCTION

When constructing a text-to-speech system, proper accentuation and pausing are among the main factors contributing to the intelligibility, naturalness and acceptability of its speech output (ref 1). We have to accept that a significant portion of 'natural' accents, especially accents depending on pragmatic factors (discourse context) remain to a certain extent unpredictable for even the best algorithms. Abstracting from such factors, however, we aim at deriving the accents that are under more strict linguistic (i.e. syntactic, phonological) control. Using orthographic redundancy, we will try to keep the amount of syntactic analysis needed for this purpose to a minimum.

Recent phonological research (ref 6,7) points out that both the accentuation and the temporal organization of utterances (as well as many other processes of sentence phonology) depend on a level of 'prosodic structure' mediating between the syntactic surface structure and the phonetic realization. This level of prosodic structure is a hierarchical representation of constituents such as the word (M), the phrase (Phi), and the intonational phrase (I). The mapping of syntactic structure into prosodic structure is based on the syntactic key notions 'phrase', 'head of a phrase', and finally 'lexical' vs. 'non-lexical' items, classes which correspond approximately to content words (hence CW) and function words (hence FW). Applying these ideas to Dutch, Phi's are constructed by grouping together a phrasal head, its (pre-head) specifiers and the FWs to the left. In Phi's, the rightmost CW is the one carrying the phrasal accent.

Now if we can extract information on syntactic headship and on FW membership, we do not have to carry out a time consuming exhaustive syntactic analysis to approximate the prosodic structure. Essentially, we try to make full use of (a) the cues presented by the inflectional system of Dutch to extract word class information, and (b) the above mentioned connection between FW/CW membership and phrase structure.

The present approach has already proved its usefulness when applied to Dutch accentuation (ref 3,5), but its possibilities with regard to prosodic structure do not seem to be exhaustively examined yet.

GENERAL DESCRIPTION

The prosodic parser described here converts standard (Dutch) orthographic text into an enriched text, containing pause and accent markers. Although the algorithm is sentence-

* Institute of Phonetics, Utrecht University, Trans 14, 3512 JK Utrecht, the Netherlands.