Integrating Stress and Intonation into a Concept-to-Speech System

Georg Dorffner, Ernst Buchberger
Austrian Research Institute for Artificial Intelligence (ÖFAI)
Schottengasse 3, A-1010 Vienna, Austria
and University of Vienna

Markus Kommenda
Institut f. Nachrichtentechnik und Hochfrequenztechnik
Technical University of Vienna
Gusshausstr. 25/389, A-1040 Vienna, Austria

Abstract

The paper deals with the integration of intonation algorithms into a concept-to-speech system for German. The algorithm for computing the stress hierarchy of a sentence introduced by Kiparski (Über den deutschen Akzent. In: Studia Grammatica VII, Berlin, 3rd ed., 1973) and the theory of syntactic grouping for intonation patterns developed by Bierwisch (Regeln für die Intonation deutscher Sätze. In: Studia Grammatica VII, Berlin, 3rd ed., 1973) have been studied extensively, but they have never been implemented in a concept-to-speech system like the one presented here. We describe the back end of this concept-to-speech system: The surface generator transfers a hierarchical dependency structure of a sentence into a phoneme string by traversing it in a recursive-descent manner. Surface structures unfold while generation proceeds, which means that at no point of the process does the full syntactic tree structure exist. As they depend on syntactic features, both the indices introduced by the Kiparski (degrees of stress) and the Bierwisch (indexed border markers) formalism have to be inserted by the generator. This implies some changes to the original algorithms, which are demonstrated in this paper. The generator has been tested in the domain of an expert system that helps to debug electronic circuits. The synthesized utterances of the test domain show significant improvements over monotonous forms of speech produced by systems not making use of intonation information.

Note: The full version of this paper is no longer available by FTP. It has been published in Karlgren H.(ed.), *Proceedings of the 13th International Conference on Computational Linguistics (COLING-90)*, University of Helsinki, Finland, 1990. In case of difficulties in obtaining these proceedings, feel free to contact the authors at ernst@ai.univie.ac.at.