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Investigations on Prosodic Emphasis and Semantic Content of Word Categories for Speech
Technology Applications

In the present study we attempt to provide a differentiation between word categories whose semantic content may be determined by prosodic emphasis and word categories in which prosodic emphasis does not determine their semantic content. In the latter case, the semantic interpretation of the entire phrase or sentence may be determined by the type of element receiving prosodic emphasis, but the semantic content of the emphasized element itself is not effected.

In Modern Greek, previous studies have demonstrated an observed relation between prosodic information and the degree of precision and lack of ambiguity (Alexandris et al., 2005). Specifically, it was observed that emphasis as an extra-linguistic marker enables the distinction between indexical and vague temporal (Schilder & Habel, 2001) and spatial expressions, without any reference to the context. In previous studies, the prosody-dependent indexical versus vague interpretation of spatial expressions was accounted for in the form of additional [\pm indexical] features located at the end-nodes of the spatial ontology, where the level of the [\pm indexical] features may also be regarded as a boundary between the Semantic Level and the Prosodic Level (Alexandris, 2007a).

From the data collected from recorded corpora and from user-tests and questionnaires, we observe that in Modern Greek, the group of word categories whose semantic content may be determined by prosodic emphasis (Category A) involves (1) spatial and temporal expressions, (2) a sub-group of discourse particles identified as “politeness markers” (Alexandris and Fotinea, 2004a) and (3) a subgroup of quantifiers and numerals. An additional second group of word categories is identified, where prosodic emphasis may emphasize or intensify the semantic content, but where presence or absence of prosodic emphasis does not determine the type of semantic content (Category B). It is observed that this group involves (1) adjectives expressing quality and (2) adverbs expressing mode. The rest of the word categories are not effected by prosodic emphasis in respect to their semantic content (Category C). The presence or absence of prosodic emphasis on these word categories effects the semantic interpretation of the entire phrase or sentence in which they belong. For reasons of clarity, we name the group of word categories in Category A “Prosodically Determined” words, the group of word categories in Category B “Prosodically Sensitive” words and the rest of the word categories, namely Category C “Prosodically Independent” words.

The behavior of all three word categories is observed during the prosodic modelling of utterances recorded in a studio for the construction of the speech output produced by a Conversational Agent in a dialog system for consumer complaints (CitizenShield (“POLIAS”) system). The acceptable prosody to the target user-group, constituting the general public, is modelled with the use of emphasis as prosodic marker, placed on the appropriate elements of the utterance for achieving clarity and directness as well as user-group oriented user-friendliness and sense of control to the user. Prosodic emphasis on the word elements of Categories A and B is related to producing the correct semantics of the words and achieving clarity and directness, while prosodic emphasis on the word elements of Category C is related to achieving user-friendliness.