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Option b (1.presentation, 2.poster)
Linguistic vagueness: applying soft-computing to closed questions prosody.

The goal of this study is to improve the understanding of how linguistic vagueness makes interpersonal communication possible. Vagueness, the imperfect overlap of linguistic categories between idiolects, is a necessary feature of language [Russell, 1923, Black, 1937, Wittgenstein, 1953]. If language did not have this plasticity, communication would be impaired. The quantitative counterpart of vagueness is fuzzy or many-valued logic [Zadeh, 1965] and, because of prosody's physical (acoustic) nature, it is a domain where vagueness can be aptly examined through fuzzy logic.

I have developed methods to experimentally abstract prototypical prosodic contours (phonological level) from actual speech data sets (phonetic level). Prototypical prosodic contours are flexible cognitive categories whose definition and members are not directly accessible to speakers (i.e., they are vague). Data are systematically analyzed using an algorithm I have developed based on fuzzy logic and fuzzy set theory to extract prototypes and their range of variation. Following the principles of fuzzy set theory, a prosodic contour (closed questions here but also statement, continuation, doubt, irony, etc.) is defined as a category and the variation range of its components is expressed in terms of degree of membership to the category, from 0 (fully excluded/worst) to 1 (fully included/best). Subsequently, the algorithm evaluates the prosodic contour of each sentence in the data set relative to the obtained prototype by assessing their degree of membership to the category.

In the current study I have used closed questions obtained experimentally from native French speakers. Closed questions are the base of my intonation-modeling algorithm because they have a well-defined prosodic contour (a final rising tone) and a clear pragmatic role that make them easy to elicit. After all sentences have been manually segmented into syllables, they are processed through the algorithm. They are turned into values of F0 as a function of time and parsed into tonal movements. The membership of each tonal movement is assessed and grouped according to degree of membership. Fuzzy functions are computed twice: first by membership level and secondly into a finer scale category within membership. The output is an array storing the prototypical curve (defuzzification) and its range of variation in time, F0, and tonal movements. Fuzzy inferences between time and F0 are also computed to enhance the defuzzification process.

Linguistic vagueness is empirically captured and quantitatively analyzable: results show that most samples from the dataset match the middle range (0.5±0.1) of the prototype rather than its top (1). They clearly indicate that subjects favor efficient approximation over perfection by targeting the interpersonal shared zone of the prototype rather that its idiolectal hedges. My algorithm offers a systematic approach to model the plasticity of intonation (and of language in general) through the plasticity of soft-computing.

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