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PRUFâ€"a meaning representation language for natural languages

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PRUFâ€"an acronym for Possibilistic Relational Universal Fuzzyâ€"is a meaning representation language for natural languages which departs from the conventional approaches to the theory of meaning in several important respects.

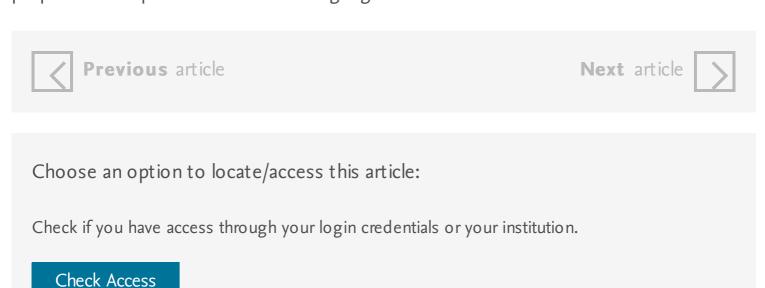
First, a basic assumption underlying PRUF is that the imprecision that is intrinsic in natural languages is, for the most part, possibilistic rather than probabilistic in nature. Thus, a proposition such as $\hat{a} \in \mathbb{R}$ inchard is tall $\hat{a} \in \mathbb{R}$ translates in PRUF into a possibility distribution of the variable Height (Richard), which associates with each value of the variable a number in the interval [0,11 representing the possibility that Height (Richard) could assume the value in question. More generally, a proposition, p, translates into a procedure, p, which returns a possibility distribution, \hat{p} , with p and p representing, respectively, the *meaning* of p and the *information* conveyed by p. In this sense, the concept of a possibility distribution replaces that of truth as a foundation for the representation of meaning in natural languages.

Second, the logic underlying PRUF is not a two-valued or multivalued logic, but a fuzzy logic, FL, in which the truth-values are linguistic, that is, are of the form true, not true, very true, more very true, very

Third, the quantifiers in PRUFâ€"like the truth-valuesâ€"are allowed to be linguistic, i.e. may be expressed as *most, many, few, some, not very many, almost all,* etc. Based on the concept of the cardinality of a fuzzy set, such quantifiers are given a concrete interpretation which makes it possible to translate into PRUF propositions exemplified by "Many tall men are much taller than most men,†â€œAll tall women are blonde is not very true,†etc.

The translation rules in PRUF are of four basic types: Type Iâ€"pertaining to modification; Type IIâ€"pertaining to composition; Type IIIâ€"pertaining to quantification; and Type IVâ€"pertaining to qualification and, in particular, to truth qualification, probability qualification and possibility qualification.

The concepts of semantic equivalence and semantic entailment in PRUF provide a basis for question-answering and inference from fuzzy premises. In addition to serving as a foundation for approximate reasoning, PRUF may be employed as a language for the representation of imprecise knowledge and as a means of precisiation of fuzzy propositions expressed in a natural language.



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