Ognjanović, Zoran; **Ikodinović, Nebojša**
A logic with higher order conditional probabilities. (English) Zbl 1203.68206
Publ. Inst. Math., Nouv. Sér. 82(96), 141-154 (2007).

Authors' abstract: We investigate a probability logic with conditional probability operators. This logic, denoted LCP, allows making statements such as $P_{\geq s}\alpha$, $CP_{\geq s}(\alpha \mid \beta)$, $CP_{\leq 0}(\alpha \mid \beta)$ with the intended meaning "the probability of α is at least s", "the conditional probability of α given β is at least s", "the conditional probability of α given β at most 0". A possible-world approach is proposed to give semantics to such formulas. Every world of a given set of worlds is equipped with a probability space and conditional probability is derived in the usual way: $P(\alpha \mid \beta) = \frac{P(\alpha \wedge \beta)}{P(\beta)}$, $P(\beta) > 0$, by the (unconditional) probability measure that is defined on an algebra of subsets of possible worlds. An infinitary axiomatic system for our logic which is sound and complete with respect to the mentioned class of models is given. Decidability of the presented logic is proved.

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MSC:

68T37	Reasoning under uncertainty in the context of artificial intelligence	Cited in **2** Documents
68T27	Logic in artificial intelligence	
03B48	Probability and inductive logic	
03B70	Logic in computer science	

Keywords:

probability logic; LCP

Full Text: DOI EuDML