The Role of Knowledge in Decision Support Systems

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Abstract

In this article, we propose a mathematical model, fundamentally based on evidence theory in order to process and to combine the information elements coming from different sources of information in a security system. These elements could be heterogeneous (qualitative, quantitative, ordinal, binary … etc.) and imperfect (imprecise, ambiguous, probable, missing values … etc.). Along with the heterogeneity and the imperfection, we must consider the case bases that contain security cases with solutions to help us to make decisions as supplementary sources of information (this is called in machine learning field ''case-based reasoning''). Furthermore, the proposed method must consider the conflict and the contradictory resulting from the different sources of evidence. The afore-mentioned issues will be explained through an illustrative numeric example to clarify the proposed model.

Keywords: Security Systems, Evidence Theory, Information Heterogeneity and Imperfection, Case Base, Credibility Degree, Plausibility Degree, Pignistic Probability.

For the abstract in Arabic see pages (325-337).

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