

Representing ignorance: a truth-functional approach

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Abstract

We present some ongoing work about the duality between the notions of knowledge and ignorance. In particular, we argue that these notions are not necessarily inter-definable. In order to defend this idea, we provide the logical tools to characterize ignorance independently of knowledge.

Traditionally, the notion of knowledge is represented in epistemic logic by the K -operator. The possible worlds semantics for this operator was provided by Hintikka (1962). In such a semantics the notion of ignorance is defined via the K -operator. An alternative characterization of this notion can be found in “Logic for ignorance” (van der Hoek, Lomuscio, 2004). This work introduces a logic (Ig) in which the I -operator represents the ignorance of an agent. The crucial point of the work is that the I -operator cannot be defined by the K -operator. This result provides a formal basis to challenge the idea that ignorance should be defined in terms of knowledge.

Along these lines we introduce a four-valued logic (LRA), in which the fact of knowing or ignoring some statement is formalized at the level of valuations, without the use of K - or I -operators. On the basis of this semantics, a sound and complete system is provided. Remarkably, the principles for ignorance that we accept in this logic are not dependent on the knowledge principles and vice versa. Thus, ignorance and knowledge in this logic are not inter-definable. In the final part of the talk, a translation from the system Ig to LRA is presented. This translation permits to compare these two logics and clarify the basic principles about the notion of ignorance.