
The Logical and Philosophical Foundations of the Open World Assumption

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Abstract

There has long been a debate between 'procedural' and logical formalisms in the history of the use of knowledge representation and artificial intelligence, and this debate has recently returned on the Web as a conflict between procedural scripting languages and the logical formalisms of the Semantic Web. Nonetheless, one of the deepest findings in logic is given by the Curry-Howard isomorphism, namely that programming languages can correspond to logical formalisms. The unique contribution of the Web in this debate is a firm commitment of Web architects like Tim Berners-Lee to the Open World Assumption. Informally, in an open-ended space of information like the Web one can never assume a statement is false without direct proof. Unknown to Berners-Lee, this particular intuition also underwrites intuitionistic logic and thus also the anti-realist philosophy of Dummett. Furthermore, a mapping between intuitionistic logic and the lambda calculus has been found in the Girard-Reynolds isomorphism. The full philosophical ramifications of the arguments over intuitionism need to be revisited in light of the Web. We surmise that the Open World Assumption in combination with the Girard-Reynolds isomorphism may even be the best computational and philosophical foundation to account for the generativity of the Internet.

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