
The history and philosophical significance of the analog/digital distinction

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Résumé

Short Abstract

According to *the received view* of the analog/digital distinction, analog representations are continuous, whereas digital representations are discrete. The received view originates in mid-twentieth century computing, but finds its clearest articulation and development in a series of influential philosophical accounts (Goodman 1968; Haugeland 1981; Dretske 1982). The received view is not without its critics, however: some have argued that it miscategorizes paradigmatic examples of analog representations as digital and vice versa; according to *the contrarian view*, analog representations systematically covary with what they represent, whereas digital representations represent integers via a positional notation (Lewis 1971; Fodor and Block 1972; Maley 2011). In this paper, I survey the history of debates over the analog/digital distinction, as a way of bringing out what is philosophically at stake in the distinction itself.

Long Abstract

The analog/digital distinction pervades contemporary discourse. According to *the received view* of this distinction, analog representations are continuous, whereas digital representations are discrete. The received view originates in mid-twentieth century computing (Von Neumann 1958; Goldstine 1980; Clymer 1993; Kline 2015), but finds its clearest articulation and development in a series of influential philosophical accounts (Goodman 1968; Haugeland 1981; Dretske 1982). The received view is not without its critics, however: some have argued that it miscategorizes paradigmatic examples of analog representations as digital and vice versa; according to *the contrarian view*, analog representations systematically covary with what they represent, whereas digital representations represent integers via a positional notation (Lewis 1971; Fodor and Block 1972; Maley 2011). In this paper, I survey the history of debates over the analog/digital distinction, as a way of bringing out what is philosophically at stake in the distinction itself.

One notable feature of the analog/digital distinction is how often it has been invoked *outside* of the context of computer science, and put to use as a way of illuminating a wide variety of seemingly disparate topics. It has been invoked to understand the structure of the brain (Von Neumann 1958; Eliasmith 2000; Shagrir 2010; Asaro 2011); to identify the boundary between perception and cognition (Dretske 1982; Matthen 2005; Quilty-Dunn 2017); to demonstrate the irreducibility of psychology to biology (Fodor and Block 1972); to explain the nature of mental imagery (Pylyshyn 1981; Maley 2011; Kulvicki 2015); and to make sense of the

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mind/body relationship in general (Haugeland 1985).

The frequency, and apparent fecundity, of these diverse invocations of the analog/digital distinction raise the stakes of the philosophical debate about its nature. Simply put: until we settle the debate about the nature of the analog/digital distinction, we cannot assess whether or not these invocation are, or are not, illuminating. It is with these stakes in mind that a more conciliatory or accommodating view becomes appealing: according to *the pluralist view*, it is possible to overcome the debate between the received and contrarian views by, first, articulating a neutral conception of the received view that accommodates many of the contrarian view's criticisms, and, second, evaluating non-standard invocations of the distinction on a case-by-case basis, with the goal of articulating the distinct senses of "analog" and "digital" at play in these invocations and whether they are, or are not, usefully thought of extensions of the neutral conception of the received view (Schonbein 2014).

In spite of its eminent reasonableness, in this paper I argue against the pluralist view, for two reasons. First, I argue that its putatively neutral conception of the analog/digital distinction fails to overcome the substance of the debate between the received and contrarian views. Second, I argue that the fecundity of the distinction is based, in part, upon the specificity and contentiousness with which it is formulated. Accordingly, it is precisely the accommodating nature of the pluralist view that speaks against its acceptance. I conclude the paper with some general observations about the philosophical significance of transplanting distinctions from their home contexts into new and novel contexts.

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Mots-Clés: continuous/discrete distinction analog/digital distinction