

Explaining computation without semantics: keeping it simple

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Abstract

This paper deals with the question how computation is best individuated.

1. The semantic view of computation: computation is best individuated by its semantic properties. On this view, there's no computation without representation, because computation is individuated in the same way that mental states are.
2. The causal view of computation: computation is best individuated by its causal properties. On this view, the relevant formal structure of computation is mirrored by the causal structure of its implementation without appealing to any semantic properties.
3. The functional view of computation: computation is best individuated by its functional properties. On this view, functional properties are insensitive to content and needn't presuppose semantics.

Some scientific theories explain the capacities of brains and computers by appealing to the computations they perform. The reason for that is usually that computation is individuated by its semantic properties. I criticize the reasons in support of this view and its presupposition of representation and semantics. Furthermore, I argue that any representational view of computation (e.g. the semantic view) can be no more than first order representation (i.e. limited to the availability of representational states to first order cognitive processes, like belief-forming, practical reasoning, etc.).

Keywords: computation; causal properties; semantic properties; functional properties; semantics; representation; first order representation; cognitive processes

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