

Actions on belief

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Abstract

This paper shows how to represent actions on belief (such as deducing and evaluating) in a language in which it is also possible to represent actions on the world (such as putting one block on top of another). It is done by combining modal logics of belief and of action in such a way that actions on belief can be represented as perfectly respectable modals with standard and well-motivated semantics, obeying sensible rules.

One basic action is proposed, representing finding that a fact S is true; it has a variant, representing finding that S is true given a fact (or theory) T . These can be used to define other, more usable, actions: finding whether S , finding an object with property ϕ , and evaluating a term.

1 Introduction

1.1 Motivation

This paper is about representing actions on belief, such as deducing and evaluating, in a language in which it is also possible to represent actions on the world such as putting one block on top of another. Why is this interesting?

The first reason is that representing actions on belief is still not properly understood. The second is that I have a long-term programme of building a reflexive planner — that is, a planner that is able to plan to plan as well as plan to act. Such a planner would need to be able to reason about actions on belief — deciding what to do — as well as actions on the world. I want to show that such actions are legitimate and well-behaved. I shall try to do that by showing how modal logics of belief and of action can be combined. I can then describe what it is for an action to be informative or to lose information. The basic idea turns out to be that of Moore (Moore 85), but re-expressed and extended. An action preserves information or ignorance iff it obeys certain simple rules.

