

Knowledge, action, and the frame problem

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Outline

1 Introduction

Situation calculus provides a framework for reasoning about actions.

This work presents an expansion to handle the *knowledge* possessed or acquired by the agent, and allow it to shape the agent's decisions.

- Knowledge is represented by one additional fluent
- Uniform axiomatization with the rest of sitcalc
- Ordinary actions and knowledge-producing ones are strictly separated
- Easy expansion of regression as defined in [Reiter2001]
- Desirable properties are direct consequences of the axiomatization (e.g. knowledge persistence / memory)



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1 Introduction

Opzionale

Un paio di azioni ordinarie e un paio di azioni di conoscenza di esempio, giusto per inquadrare il discorso



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The K fluent

2 Knowledge as a fluent

$K(s', s)$

Defines an accessibility relation between situations.

Informal definition: $K(s', s)$ is true if, an agent in situation s could mistake the current situation for the other s' , given its current knowledge.



Knowledge

2 Knowledge as a fluent

A fluent is known to be true (false) in a situation s if and only if it is true (false) in all situations accessible from s .

Shorthand notation: $\mathbf{Knows}(\phi, s) \stackrel{\text{def}}{=} \forall s' K(s', s) \rightarrow \phi(s')$



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Thank you for listening!
Any questions?