Logic of Agency and Relating Semantics

Piotr Kulicki

The John Paul II Catholic University of Lublin, Lublin, Poland
piotr.kulicki@kul.pl

We are interested in the logic of agency in the style of [1]. Its syntactic presentation seems to be clear and natural but it is not easy to find a standard modal semantics for it. Recently a semantical account of the monadic and dyadic *brings it about* operators using neighbourhood semantics was given in [7].

We present an alternative semantics for agency logic, especially *brings it about* operators. Our approach is based on relating semantics first introduced in [2] and recently developed in [3, 5, 6, 4]. The semantics makes use of the classical valuation for propositional operators in combination with an additional relation R between propositions. A compound proposition is accepted if it is classically true and its arguments are related by R. The specific properties of R define a particular logic.

From the set of relating operators analysed in [3, 6] for the tasks of the present work, we choose the relating conjunction, represented symbolically by: $\wedge^w$. The meaning of it is that a complex proposition built with the use of it, say $\phi \wedge^w \psi$ is true if and only if both ϕ and ψ are true, and ϕ is related to ψ by the relation R appropriated for a speciffic system.

We reconstruct the monadic and dyadic *brings it about* operators of Elgesem in a language containing a connective of relating conjunction and special action propositions of the form α_i stating that an agent i is in some way active. Then, the monadic ($BA_i(\phi)$ meaning that an agent i brings it about that ϕ) and dyadic ($BA_i(\psi, \phi)$ meaning that an agent i brings it about that ϕ by bringing about ψ) *brings it about* operators are defined respectively:

$$BA_i(\phi) \equiv \alpha_i \wedge^w \phi$$

$$BA'_i(\psi, \phi) \equiv (\alpha_i \wedge^w \psi) \wedge (\psi \wedge^w \phi)$$

The main subject of the present talk will be the properties of the semantic relation that defines $\wedge^w$ in such a way that the resulting brings it about operators have the desired properties. That is especially interesting in the case of the dyadic operator, where $\wedge^w$ is used twice in the definition.

Literatura

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