Logics as Levels of Abstraction: the Situated and Relational Nature of Information

The background of this talk is the development of an informational conception of logic that is based on the methodology of the philosophy of information, and in particular on the thesis that information is always assessed at a given level of abstraction. Here, I wish to specifically explore the similarities and dissimilarities between an informational perspective on logic based on situation semantics, and my own approach.

The method of levels of abstraction is one of the methodological pillars of the philosophy of information, and stipulates that by adopting a level of abstraction, we build a model of the system we're interested in by focusing on an explicitly defined set of features of the system, and ignoring the remaining features. Through this process, data obtained from the system (constraining affordances) become information about the system (Floridi 2011c, Chapters 3, 8 and Floridi 2011b). When applied to the use of formal languages, the choice of a level of abstraction is best understood as the choice of a signature (the extra-logical part of a formal language) and its intended interpretation. As such, the choice of a level of abstraction fixes how finely the state of a system can be characterised: if more features of a system can be identified, its state can be characterised more finely.

An informational conception of logic (Allo & Mares 2012, Allo 2016) takes this idea one step further, and takes the choice of an underlying logic to be an integral part of the choice of a level of abstraction. This is motivated by the fact that the choice of a logic and the choice of a signature have a similar effect on how finely the state of a system can be characterised, and is supported by the existence of an inverse relationship between the deductive strength and the discriminatory power of a logic (Humberstone 2005). As such, intuitionistic logic trades in the full strength of the classical reduction for the ability to distinguish between weak (i.e. doubly negated) and strong truths, and paraconisistent logic trades in classically valid argument-forms like the disjunctive syllogism for the ability to distinguish between different inconsistent theories. This allows one to think of the adoption of a sub-classical logic in terms of an enhanced ability to make distinctions instead of a weakened inferential engine.

Accommodating finer distinctions, e.g. for characterising meanings and intensional states, is also what motivates situation semantics. Situation semantics, however, traditionally seeks to combine fine linguistic distinctions with the standard coarse account of logical equivalence based on classical logic (Kratzer 1989: §3.3). This is not the only distinction between the informational conception of logic I advocate and the stance adopted by situation semantics. In the remainder of this talk I will focus on the contrast between the situated nature of information and the relational nature of information favoured by the method of abstraction, and inquire how this affects their respective approaches to partial information.

As a neutral starting-point, it is instructive to think of partial information relative to questions and their answers (see Perry 1986, but also Floridi 2011a). As such, the partiality of information results from the fact that not all questions are relevant in every context, and not all questions can be answered in every context. In both cases, we could think of partial information relative to a restriction on the set of questions that can be formulated in a given formal language, or even as a restriction that results from the set of questions that can be formulated in a given formal language (i.e. by positing a local language).

According to situation semantics, partiality results from a limitation on the questions that can be answered; a limitation that is best understood in realist terms: situations may convey information about themselves, and often convey information about accessible situations, but typically do not convey information about the world as a whole. This highlights the situated nature of information: it's not everywhere, and not uniformly accessible.

The relational account of information is quite different, as it does not speak of information being *in* certain situations, but instead of information being *for* certain agents, purposes or goals. This immediately relates information to questions that are asked. It also indicates a different source of partiality; namely one based on limitations and opportunities that are created by the adoption (and design) of a level of abstraction. On this account, the limitations that support the partial nature of information do not result from pre-existing limitations in how we access information, but from how we choose to conceptualise a given system.

The above considerations suggest that a relational account of information could be further developed on a mathematical basis that is similar to situation semantics (e.g. Barwise & Seligman 1997), but without having to accept its distinctive brand of realism. In addition, a relational account takes both limitations and opportunities into account, and allows one to think of how information is obtained from a system or from certain data as a process that is based on the negotiation of a trade-off between fine-grained and content-full information-contents.

References

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