A colloquium on some theoretical and practical interactions between computing and philosophy

Freie Universität Berlin, Silberlaube
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Making Construals: a new kind of Computer Modelling

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Many kinds of current modelling and simulation are fundamentally mathematical. They use the computer to visualise and animate an instance of applied mathematics. This presupposes a significant understanding of a phenomenon and consequently the existence of some associated theory that can be put into a mathematical form. In domains where such theory has not yet been achieved (for example learning and design or complex physical phenomena such as climate modelling or mechanisms for ant navigation or malarial infection) a different kind of modelling is typically developed by humans: a partial, provisional 'construal' of the phenomenon is made in an open-ended, personal attempt to make sense of the available evidence. Such ill-defined, informal models are difficult to express, manipulate or communicate using the tools of conventional programming (data abstractions, algorithms, objects etc).

In at least some cases mathematical modelling and human modelling of a domain or problem can co-exist and thus demonstrate their complementary nature. Their contrast, however, paves the way for an approach to computing which is conceptually quite unconventional. Empirical Modelling (EM) is a re-thinking of programming and computing that results in a broader perspective on both in which interactive experience and construal play central roles. The motivations are *technical* (e.g. to assist the specification of contexts and dependency relationships as perceived by many different agents), *philosophical* (e.g. to accommodate provisional knowledge) and *personal* (e.g. to give greater priority to the direct experience of human participants in the development process). Among the consequences are applications to learning, design, and human-computer collaborations which are unusually open and flexible.

The primary activity in EM is making construals - interactive artefacts that serve a role in sense-making - rather than programs. Such construals embody the interactive characteristics associated with a phenomenon as identified through exploratory experiment. Building a construal in EM requires the identification of the *agents* – both human and automated – that we deem to be responsible for state change, the *observables* we regard as mediating their interaction, and the chains of spreadsheet-like *dependencies* that link changes to these observables and that characterize the views of the agents. The current values of the observables, and their dependencies, reflect the state of the phenomenon as experienced 'moment-by-moment' by the modeller. The modeller constructs, in an open-ended and incremental fashion, the construal that represents the modeller's current personal understanding.

The fundamental methodology in EM is for model construction to be driven by the comparison of interactive experiences of the model with similar experiences in the referent. This promotes a close experiential correspondence between model and referent: any discrepancy between the two which can be identified through interaction becomes the target for further refinement. The principles of EM may be seen as rooted in William James's radical empiricism (RE) wherein the relationship between a construal and its referent is itself given in experience. The premiss of RE is that all knowledge is ultimately grounded in the "conjoining of experiences within experience". There is a closer conceptual association of EM with phenomenology rather than with the traditions of analytic philosophy. A loose analogy for EM is the kind of modelling developed on a spreadsheet, which is always open to changes reflecting new interpretation, understanding, requirements, context etc. Such modelling is aligned well with human cognitive processes and integrates with them more closely than is possible through programming pre-conceived functionalities. We shall demonstrate some of our models and invite detailed questioning and discussion with participants.

Useful background for the colloquium can be found by following the link 'Introduction' from the EM webpage (see the URL above) as well as other links from that page. For further information, see links to publications and software.

We are grateful for the co-organisation of this colloquium with Prof.Hans-Joachim Petsche (Institut für Philosophie, Universität Potsdam) and Dr Gabriele Gramelsberger (Institut für Philosophie, Freie Universität, Berlin).