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Abstract

This paper will consider the potential significance of William James's philosophic attitude of 'Radical Empiricism (RE)' [4] in relation to contemporary problems of knowledge representation in the information sciences. Current trends in computer technology and use provide a strong motivation for reviewing RE in this light. For instance, as Gooding relates in [5], our understanding of how scientific knowledge relates to interaction with the natural world and with our peers is challenged by the development of Virtual Reality environments, and the role that virtual experiments have come to play in science. Such considerations have prompted a reappraisal of the fundamental assumptions that inform the logicist approach to knowledge representation in AI, and called into question the extent to which knowledge is mediated by language rather than engagement with the world (cf. Cantwell-Smith [6], Turner [7]). In this connection, the relevance of RE stems from the priority it ascribes to 'pure experience', and its contention that (to paraphrase William James) the whole of the nature of knowing can be put into experiential terms ([4], p56). The problematic aspect of RE, as identified by Bird in [5], is that it is of its essence inarticulate: "... James's pure experience has to be such that nothing can be said about it, if it is to fulfil the role for which it is cast". This distances RE both from the mainstream philosophical traditions, and from the received views of computer programming as intrinsically bound up with formal languages and logical specification.

Empirical Modelling (EM) is an approach to computer-based modelling that has been developed by Beynon, Russ and their collaborators at the University of Warwick over several years (for background, see [1,2,8]). The product of an EM exercise is first and foremost to be regarded as a source of experience whose interpretation by the modeller is not preconceived, but is to be established in the mind of the modeller through an association between experience of the model and experience external to the model. Knowledge in such a context has the qualities that James attributes to knowledge in [4]: it is a personal awareness on the part of the modeller that one experience stands in a particular relation to another. To borrow James's expression, experience of interaction with the model is 'an experience that knows another' and as such 'can figure as its representative, not an any quasi-miraculous "epistemological" sense, but in the definite practical sense of being its substitute in various operations, sometimes physical and sometimes mental, which lead us to its associates and results' ([4], p61).

EM is based on the concepts of observable, dependency and agency. Observables are represented in practical model-building by variables whose values may be explicitly defined or implicitly defined as functionally dependent upon the values of other variables within a script of definitions (a 'definitive script'). Within EM, a definitive script is the most primitive representation available for what is empirically given to the human interpreter: it represents "state-as-experienced". The distinction between state as determined by the current values of a family of procedural variables, and state as expressed in a definitive script, closely parallels the distinction between traditional empiricism and RE. The explicitly defined variables resemble the discrete sensory particulars of traditional empiricism, but the association of variables within a script, and the dependencies that link the way that their values are perceived as correlated in change, have the character of the 'conjunctive relations' that are fundamental to James's radical empiricism.

The paper will explore the extent to which, building on the foundation of modelling with definitive scripts, it is possible to track James's exposition of the empirical roots of knowledge, with its emphasis on the fundamental significance in sense-making of our capacity to experience conjunctive relations between things. This exploration touches on many issues topical in modern computing that are addressed in James's account of RE, such as the nature of consciousness ([4], p.132-3), agency ([4], p.178-80, 185-6) and reality ([4], p.159-60). In what sense, and to what extent, it is possible to establish meaningful connections between James's philosophic attitude and EM is itself potentially a controversial issue. The author's justification for proposing such connections stems from his own direct experience - in particular from the way in which James's discussion of "pure experience" in [4] resonates with the issues involved in a detailed exposition of modelling with definitive scripts. In James's terms, the thrust of the exposition will be to make it plausible that the experience of EM 'knows' pure experience.

The paper will be in three sections. Section 1 will review Empirical Modelling (EM) principles and practice. Section 2 will discuss William James's philosophic attitude of Radical Empiricism and the parallels that may be drawn between James's account of 'pure experience' and experience of EM. Section 3 will briefly consider how James's experiential characterization of knowledge relates to contemporary concerns in computer science, with particular reference to the distinction between data, information and knowledge, and the role of tacit knowledge in human decision-making and problem-solving.

#### References

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