

question-answering systems, fact retrieval systems, and other advanced types of information systems which must 'understand' to some extent the information they manipulate. In the received taxonomy, the shallow and deep ends of information science correspond (more or less) to theoretical bases for designing 'reference retrieval' and 'data retrieval' systems respectively.

If the swimming-pool characterization of information science is accepted, a case can be made that the 'shallow' part of the science is largely an application and elaboration of decision theory. To maximize the collective utility to its users of a literature search system, one must first define 'utility'; one must next find ways of predicting the probabilities of certain future events; and finally one must somehow put the utility and probability predictions together and come up with design decisions. Classical decision theory stands available as the currently received logic for how to do these kinds of things. The 'deep' regions of information science involve utility and probability considerations too, but now these emerge as just two of the elements of a far more extensive theory which is partly linguistic, partly logical, in character. Logical considerations are becoming more prominent in the work of some descriptive linguists, and it is reasonable to expect that the study of logical inferences among linguistic expressions will eventually be seen as central to 'deep' information science. It has been demonstrated many times over that systems of deductive and inductive inference are indispensable to the design of most advanced information systems, and if the inferences are to take place in rich languages, the essentially logico-linguistic nature of the underlying theory becomes clear.

M. Kochen

'What kind of science is information science?' My brief answer to that question is that it is meta-science, or the science of science. It should not be forced into the existing typology of science, though it draws heavily on both the

social sciences and the sciences of the artificial (engineering). It may well intersect strongly with the life sciences and the physical sciences as well. It is a mathematical science as well. I will try to substantiate and illustrate some of these points and to shed some light on specific issues that motivate the concern about the kind of science it is.

Information science as an emerging discipline

K. Samuelson

The emerging nature of information science is explained through the impact of knowledge growth, telecommunication, computer technology and new media. The paper gives an analysis of the other disciplines and scientific fields from which certain paradigms have been lifted to form a true science of information. It appears to be a trans-science and a constitutive outcome with derivatives of general systems research and cybernetics with epistemological frames of reference. The gist of information science stems from pragmatism and a need for measurement and evaluation of sufficient observable or controllable phenomena. A formalization is presented which includes the majority of related subjects and activities such as: classification, management systems, networks, library operations, information storage, retrieval and dissemination, organizing, recycling and cost assessment. The overall approach of the presentation is based on ten years experience of running and improving an interdisciplinary university program in information science and a five-year evaluation of the graduates' work activities and professional career.