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Knowledge and Information in Nutrition Software Design

Nikitas N. Karanikolas *

Dept. of Informatics, TEI of Athens, Aigaleo 12210, Greece

Abstract

The intension of this paper is to point out that both Knowledge and Information can be persisted within ordinary database management systems. It is a well-known demand for codifying the knowledge versus of embedding it inside the business logic (the source code). The consequences are that knowledge can be extended, utilization of knowledge can be extended and that the application's evolution can be achieved, almost without programming. To achieve such a goal, database and system designers should distinguish what is information and what is knowledge for the system's domain of application. They should also foresee an abstract knowledge representation that will be able to hold the future knowledge in the domain. Our approach is based on an interesting domain of software technology, the nutrition software design.

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1. Introduction

1.1. What is Data

Data is information in raw or unorganized form. The letters of an alphabet are data. The numbers (for example decimal numbers – 123) are data. Data are used to synthesise Information.

In Computer science parlance, data are symbols or signals that constitute the input in some processing (program or process) and can be stored (kept for future use) in volatile (e.g. RAM) and non volatile (e.g. magnetic disks)

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* Corresponding author. Tel.: +30-210-538-5737; fax: +30-210-5910975.
  E-mail address: nnk@teiath.gr

devices. The result of computer processing of data (by some program) is communicated to the users in a usable form that is called information.

1.2. What is Information

Information is data that are accurate and timely. Information is specific data, organized for a purpose. Information is data presented within a context that gives them meaning and relevance. Information contributes to increase in understanding and decrease in uncertainty of some topic. For the people (Cognitive Agents), the Information is valuable because it can affect their behavior and can support them for getting decisions. Information is an influence which leads (but not necessarily) to a transformation. However, Systems theory assumes that information does not necessarily involve any conscious mind.

1.3. What is Knowledge

The philosopher Plato defined knowledge as "justified true belief" (JTB). According to the Plato's definition, a statement must meet three criteria in order to be considered knowledge. It must be justified, true, and believed. Someone can say that (s)he knows something under three conditions:

- (s)he believes the statement to be true,
- the statement is in fact true,
- (s)he is justified in believing the statement to be true.

Many philosophers reject the JTB formulation altogether and others think that JTB needs to be "fixed up" somehow. We remain to the Plato's definition and complement that knowledge involves concepts and abstractions in our brains. Consequently knowledge is interwoven with a conscious, living being.
According to some approach (Control-Z), there are three general categories of knowledge:

- Factual or Propositional Knowledge: it permits a conscious mind to make statements which are factually correct,
- Procedural Knowledge: it is when we know how to go about doing something (actually being able to do it),
- Knowledge of Personal Experience: knowledge drawn upon personal experiences (not available to others).

Factual and Procedural Knowledge are further explained elsewhere (Anderson, 2001).
According to another approach (Steve Denning), the human mind is capable of two kinds of knowledge:

- Rational Knowledge: must have demonstrable, provable, fact-based information to support it,
- Intuitive Knowledge: the ability to acquire knowledge without inference.

The Rational and Intuitive Knowledge are further explained elsewhere (Spencer Carr, 1978).
It is worthwhile to mention the term Tacit Knowledge, introduced by Michael Polanyi (Polanyi, 1958; Polanyi 1966). This term recognizes the inherent difficulties in transferring knowledge from one person to another.

1.4. From Data to Wisdom

Knowledge is not the highest-grade content existing in the human mind. Wisdom is the highest grade content. Detailed knowledge regarding the pyramid of content, in the human mind, can be found in (Gene Bellinger, et al). They discuss the Russell Ackoff's article (Ackoff, 1989) for the pyramid of content in human mind. We shortly summarize the levels of pyramid: Data (lower), Information, Knowledge, Wisdom (upper).