Chapter 3
Information Representation

ABSTRACT

The data from the supplier of the supply chain provides relevant information for the customers only when presented in the appropriate form. The data is to be modeled for to be meaningful and make sense. In this chapter, the semantic web is introduced to bring out the meaning for the data. Hierarchical organization is proposed for the data to provide meaning for different players along the supply chain.

INTRODUCTION

The last chapter provides the definition of the information and explains how it is modeled and measured using signal processing tools. The qualitative and the quantitative measurement of the information may be enhanced with a structured representation of the information. It consists of two components: the syntax and the semantics. Here, the data representation and organization for maximizing the value of the information is discussed.

Inside a storage device as well as during the transmission over a channel, digital data from any source, including the video, audio or machine data, is represented as a string of well demarcated logic levels. Depending up on the context, application and the rendering device, the string gains the appropriate meaning. A group of bits, called “code word” would provide the appropriate meaning to the program.

The representation of data (Chu, 2005) is closely linked to the storage and retrieval devices. The data storage pattern on a magnetic disc available today will be binary with a specific magnetic orientation representing the logic “high” and another orientation representing the logic “low”. If the device can

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Information Representation

afford, a multi valued logic symbol can be stored. In a ‘qbit’ memory based on quantum mechanical principles, the spin of electrons represents various logic levels making the storage density very high.

Bit is the unit for the measurement of information. In the context of digital information, it represents the binary values “0” or “1”. A bit must be either a “0” or a “1” at a time. However, a ‘qbit’ can be “0” or “1” or a combination of both (i.e. weighted sum of “0” and “1”). A discussion on qbit is found in (David Mermin.N, 2003).

Information models provide a vital clue on the type of the information to be included in a particular information product. Information models are to consider all the possible scenarios with the users of the information. Hence it is required to understand the need of the users of the information down the line, well in advance.

An alternative architecture of information representation as multiple abstraction levels is provided in this chapter. The information system (IS) architects and IS managers would find it useful to put the content in multiple abstraction levels as explained here. It provides a firm footing for the enterprise data integration, data marts etc. The concepts discussed here are expected to handle semantic web and natural language processing as well.

BACKGROUND

The goal of information representation is to use minimum space or symbols for representing maximum data and convey maximum meaning. Often, it is in the form of familiar icons that the user can easily interpret and understand. E.g. Symbols used to distinguish ladies and Gents toilets. Especially, in dialog boxes, it conveys instant message to the user compared to the associated text. A picture is worth thousand words. For the same reason, interactive software GUI make use of icons very frequently. In the digital world, the representation of information is in the form of bits. In the analog world, it can be a graph, a picture, number etc.

Information representation has a say on the information lifecycle comprising of storage, retrieval and rendering of the information. The information serves no purpose unless it is rendered to the intended user in the anticipated format. The figure 1 shows how the data is organized in to information and knowledge.

Systems making use of artificial intelligence for knowledge or information representation (Gleb Frank, Adam Farquhar, and Richard Fikes, 1999) employ symbolic languages. The usage of intelligent elements is explained in detail in a separate section of this book.

Figure 1.

1.a Data                1.b Information              1.c Knowledge
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