Chapter 8
Knowledge Representation-Based Hemispheric Specialization of the Brain

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ABSTRACT

Knowledge is an essential ingredient for the development of the majority of human cognitive skills. The subject of how to define knowledge is a challenging one. Knowledge is an organised collection of information that may be acquired by learning, perception, or the application of reasoning. This chapter focuses on human brains and computer knowledge models. Concepts and categories are offered as a paradigm for storing information, followed by semantic networks and a description of how individuals store and interpret information. The authors also explore artificial methods to store and retrieve information and make quick judgments, as well as biological features. After studying how information is stored and accessed in artificial and human systems, they analyse hemisphere specialisation. This chapter reviews trials that have advanced research in this area and examines if they interpret information differently.

INTRODUCTION

Knowledge is a familiarity, understanding, or comprehension of someone or something, such as the facts, information, descriptions, or skills of that person or thing (Zagzebski, 2017). Knowledge may be acquired by perception, discovery, or study. As it serves as the foundation or medium for most of our cognitive functions,

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we refer to it as knowledge. How do different people navigate their environments? How do people come up with answers to problems, how do they get an awareness of their surroundings, and what criteria do they use to draw conclusions and make decisions? The expansion of one's horizons, the acquisition of new knowledge, and the development of one's mental picture of the world are both components of the answer to all of these issues (Leonard, 1995).

Because they are in close contact with the world around them, people with knowledge are considered to be in a very desirable mental state. Therefore, there is a link between the two. One side of a connection consists of a knower and some component of reality with which they are connected or otherwise associated. Even though directness is a relative concept, it is common practice to regard knowledge of things as being more direct than knowledge about things (Bhuyan et al., 2021). Knowledge of the former is typically referred to as "knowledge by acquaintance," given that the subject has direct personal experience with the component of reality that is known. Knowledge of the latter is referred to as "propositional knowledge," given that the subject's knowledge is a genuine proposition about the universe. Knowing Roger personally falls under the category of "knowledge by acquaintance," while comprehending that Roger is a philosopher falls under the category of "knowledge by the proposition." The concept of familiarity involves factual information about the world and myself, and the inner workings of my body. It is a commonly held belief that the most directly knowable element of reality is the one that pertains to the knower's mental state (Ji et al., 2021).

The neural networks in our minds are compared to those in our computer models in this chapter, and we discuss the similarities and contrasts between the two sets of networks (Chakraborty et al., 2019). An attempt is made to explain how people organize and keep track of information. The first step in doing so is to provide ideas and categories as a model for storing and sorting data, which is then followed by the presentation of semantic networks. In addition to the biological aspect, we will also go over the representation of knowledge in artificial systems, which may be helpful tools for storing and retrieving information and making snap decisions.

After analyzing the similarities and differences between how the human brain and artificial systems store and retrieve information, the next topic of discussion will be the specialized functions of the human brain's hemispheres (Bartolomeo et al., 2019). This notion is significant not only to the chapter on knowledge representation but also to a wide variety of other chapters within this book due to the fact that the two hemispheres of the brain store distinct types of information. Where in the brain are different processes like memory, emotion, and motivation carried out, for example? In this part of the discussion, we will examine the fundamental differences that exist between the two hemispheres. We discuss the likelihood that they process information