Summary Post

by Anastasia Rizzo - Tuesday, 5 September 2023, 3:47 PM

As I mentioned in my previous post, knowledge representation serves as the indispensable foundation for reasoning. In the absence of well-structured and suitably represented knowledge, the process of reasoning would lack its essential groundwork (Brachman & Levesque, 2004). It is imperative for systems to offer knowledge in a manner conducive to reasoning, thus enabling the examination, juxtaposition, and formulation of conclusions based on that knowledge.

Let's explore further into two examples from ancient sciences and fields, and how, in my view, Knowledge Representation and Reasoning (KRR) could have been applied, becoming crucial predecessors to more contemporary KRR methods employed in modern artificial intelligence systems.

Example 1: Ancient Philosophy.

The application of KRR in ancient philosophy can be interpreted as the utilisation of logical structures and methods to formalise knowledge and reasoning. One notable example is the use of Aristotle's syllogism, which formalised logical reasoning:

Knowledge Representation: In ancient philosophy, knowledge and ideas were documented through texts, dialogues, and documents. For instance, Aristotle created a formal logical structure to represent knowledge, known as the syllogism. This syllogism had a structure that allowed for the formal representation of logical relationships between statements (Stanford Encyclopedia of Philosophy, 2007).

Reasoning: Reasoning in ancient philosophy involved using the syllogism to derive new statements based on existing ones. Aristotle's syllogism had the following structure:

- All men are mortal (Statement A).
- Socrates is a man (Statement B).
- Therefore, Socrates is mortal (Conclusion C).

In this example, Knowledge Representation involves presenting statements A and B, while Reasoning encompasses the use of these statements to derive statement C.

Syllogisms provided a formal way of organising knowledge, enabling logical reasoning (Stanford Encyclopedia of Philosophy, 2007). The application of syllogisms and formal

logical structures in ancient philosophy aided philosophers in conducting logical arguments, developing theories, and analysing concepts.

Example 2: Ancient Mathematics

Ancient mathematicians often employed knowledge and reasoning to solve various mathematical problems (Boyer & Merzbach, 1991).

Knowledge Representation: In ancient mathematics, knowledge was represented through mathematical notations, diagrams, tables, and texts. For instance, the Babylonians used cuneiform script to record numbers and mathematical operations on clay tablets (Spanish Ministry of Education, 2001).

Reasoning: Reasoning in ancient mathematics involved using the represented knowledge to solve mathematical problems. For instance, Babylonians could use their records of numbers and knowledge of mathematical methods to solve problems related to trade, agriculture, or astronomy.

Example:
Suppose a Babylonian merchant wants to calculate how many goods he can purchase in exchange for a certain amount of gold.

Knowledge Representation: Here, knowledge consists of records of gold units and prices of goods, kept on clay tablets.

Reasoning: Reasoning involves using these records and knowledge of mathematical operations to calculate the quantity of goods that can be purchased for a specific amount of gold.

In summary, it is my conviction that KRR possesses profound historical origins within diverse ancient sciences and disciplines. These instances vividly demonstrate how ancient philosophers and mathematicians employed structured knowledge and logical reasoning to formulate cogent arguments, cultivate theories, address pragmatic challenges, and promote the enrichment of human comprehension within their particular domains.

References:

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