**Initial Post**

by <u>Georgios Papachristou</u> - Monday, 12 May 2025, 4:16 AM

Number of replies: 3

Knowledge representation is the method used to represent information, facts, relationships, and concepts. Though it is widely used in computer systems, it is not a recent phenomenon. Knowledge Representation has been existed since the ancient times; evidence from ancient civilizations such as Egyptians and Sumerians prove the existence of writing systems to document and transmit knowledge (Weststeijn, 2011). In addition, Greek philosophers such as Aristotle used logical structures to analyse human reasoning and Chinese used pictograms as their language system (Stock and Stock, 2013).

Reasoning and knowledge representation are two concepts linked to one another, given the fact that reasoning is using KR to produce new insights. For example, taking symbols "10" and "2" and produce symbol "8"; in this case the initial symbols were manipulated through the process of subtraction and in turn a new symbol was produced. However, it should be noted that KR can exist and is useful even without reasoning support (David et al., 1993; Brachman and Levesque, 2004).

To sum up, even though the development of computing technology has led to getting KR in the spotlight, KR is not a recent phenomenon but has been existed since ancient times. Reasoning is another concept that uses KR to produce new insights through logical processes, but it is not a prerequisite for the existence and value added of KR.

**References**

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**Peer response**

by <u>Guilherme Pessoa-Amorim</u> - Monday, 12 May 2025, 6:00 PM

Georgios argues against the notion that knowledge representation (KR) is a modern development, highlighting its roots in ancient civilizations such as the Egyptians and Sumerians, who used writing systems to document and communicate knowledge (Weststeijn, 2011). He extends this historical continuum by discussing the logical structures employed by Greek philosophers like Aristotle and the use of pictograms in Chinese language systems (Stock & Stock, 2013). Georgios further explores the relationship between reasoning and KR, explaining that while reasoning utilizes KR to generate new insights, the utility of KR is not solely dependent on reasoning capabilities (Davis et al., 1992; Brachman & Levesque, 2004).

While Georgios effectively underscores the historical aspects of KR, his analysis could be strengthened by considering the contributions of Modern and early-Modern philosophers and thinkers to KR, even before the development of computing systems. For instance, George Boole's Boolean Algebra laid the groundwork for computer logic, forming the basis of binary systems used in digital computing today (Huntington, 2003). Additionally, Gottlob Frege and Bertrand Russell contributed to the development of formal logic systems crucial for the

comprehension of complex propositions, influencing both mathematical logic and linguistic analysis (Wehmeier, 2004; Griffin, 2014). Moreover, exploring the practical applications of KR without formal reasoning, such as its role in aiding human decision-making and organizing information efficiently, could underscore KR's enduring utility, even in non-computational contexts, as explored in previous discussions (Davis et al., 1992).

In conclusion, Georgios effectively illustrates KR's deep historical roots and its integral role in reasoning. Expanding on how digital advancements have amplified KR's applications could offer a more comprehensive understanding of its evolution and current significance.

**References**

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**Peer Response**

by Jaco Espag - Thursday, 15 May 2025, 4:28 PM

Knowledge Representation (KR) can be incredibly useful even when there's no need for complex reasoning. For example, when dealing with large amounts of information, having a structured way to store and organise data makes it much easier to find what you're looking for. Chandrasekar and Ramani (1998) pointed out that the real strength of their proposed KR approach is in how it improves retrieval, offering a more reliable matching process than basic keyword searches. While reasoning, like drawing conclusions or linking concepts, is important for more advanced, intelligent retrieval, even just having a well-organized system to match information shows how valuable KR can be on its own.

**References**

Chandrasekar, R. and Ramani, S. (1998) 'Knowledge Representation and Information Retrieval', *Proc.Indo-USWkshponS&SP*,2.

**Summary Post**

by Georgios Papachristou - Friday, 16 May 2025, 4:45 AM

In my initial post, I briefly presented Knowledge representation as a method used to represent information, facts, relationships, and concepts. In addition, I presented the history of KR that has its roots back in ancient times, as well as its relationship with reasoning. Such analysis gave me the opportunity to understand in depth the concepts of Knowledge representation and reasoning, their interconnection, and their contribution to computing technology (Brachman and Levesque, 2004; Davis et al., 1992; Stock and Stock, 2013; Weststeijn, 2011).

As a response to my initial post, Guilherme apart from acknowledging the facts the KR has its roots in ancient times, provides additional information with regards to the contribution of Modern and early-Modern philosophers and thinkers to KR, such as George Boole, Gottlob Frege, and Bertrand Russell (Huntington, 2003; Wehmeier, 2004; Griffin, 2014). Additionally,

by providing the example of KR's role is decision-making and information management, he highlights the existence of KR without formal reasoning (Davis et al., 1992).

In addition, Jaco provided some examples of the utility of KR without reasoning such as data management, storage, and retrieval, highlighting the fact that KR can exist without reasoning for simple tasks, but in case there is a need for further analysis in order to reach conclusions, reasoning is a prerequisite (Chandrasekar and Ramani, 1998).

To sum up, this discussion made a reference to the historical existence of Knowledge representation and shed light on the interconnection between KR and reasoning.

**References**

Brachman, R. J., & Levesque, H. J. (2004). *Knowledge representation and reasoning.* Morgan Kaufmann.

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