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Chapter 1.1 Summary

From Eden to ENIAC: Attitudes toward Intelligence, Knowledge, and Human Artifice

In Chapter 1.1 of George F. Lugers *Artificial Intelligence: Structures and Strategies for Complex Problem Solve 6e,* Luger provides an in depth historical account of the developments and ideologies from which Artificial Intelligence (AI) has arisen as a scientific discipline. Luger details the fundamental discussions, strategies, and tests which have shaped the fields accomplishments and remaining work necessary. Luger takes a broad perspective in describing these events as there is rich historical context up to the fields current state, he begins by describing early notions and discussions of the mind/body problem.

The mind/body problem dates far back, as early as Aristotle. Many have philosophized on the relations between the mental and physical. Descartes and others have established that their ideas about the world were not necessarily the same as the subject matter. Luger emphasizes a fundamental idea held in the mind/body discussion, “mind & body are not fundamentally different entities at all,” Luger states. “Mental processes are achieved by physical systems”. (Luger, 7) This fundamental idea shapes the underlying methodology in AI and forms the foundation for further discussion. It allows thought to be viewed as computation. From this methodology, a formalization is needed.

Formalizing, or expressing the methodologies in mathematical and provable terms, is a necessary next step from the results of the mind/body discussion. Some notable formalizations Luger mentions are the State Space Graph (which was used to formalize the structure of a problem as a graph in which the nodes are model stages of problem solutions and solving the

problem then becomes a graph search) and Boolean Algebra (which encapsulates the entirety of human logic using three simple operators, AND, OR, NOT). Formalizations laid the groundwork for the study of AI but it wasn't until the introduction of digital computers that it became a scientific discipline.

Around the introduction of computing machines, there were lots of questions regarding whether a machine could be made to think. British mathematician, Alan Turing proposed that the questions of intelligence be replaced by a clearly defined empirical test, the turing test or imitation game. The turing test measures the performance of an allegedly intelligent machine against that of a human by having a human interrogator blindly question both a human and a machine. If the interrogator cannot distinguish between the human and the machine, then the machine may be assumed intelligent. As Luger notes, the pros to this test are that it attempts to give an objective notion of intelligence, avoids unanswerable questions (ex: is the machine conscious of its actions), and eliminates bias as the interrogator solely focuses on the content of the answers received (Luger, 14). Luger also notes some cons, he notes that this test does not consider perceptual or dexterous ability and it tends to evaluate relative to human intelligence (Luger, 15). These rationalist systems which focus solely on human intelligence often miss on the intelligence rooted in culture & society or the intelligence as reflected by collective behaviors of interacting agents (ex: individual ant versus ant colony).

In closing, Luger notes the progress made thus far and the work that lies ahead "We must maintain a reasonable perspective. It is easy to overlook the accomplishments of artificial intelligence when honestly facing the work that remains" (Luger, 19). The scope of research and development in AI and the needed remaining work may seem daunting, however, incredible developments have been made throughout history.

Works Cited

George F. Luger, Addison-Wesley. *Artificial Intelligence: Structures and Strategies for Complex Problem Solving.* 6th Edition. 2009. Pearson.