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Learning Theory: History, Formalisms, and Perennial Issues

Concern with how people learn goes back over 2,000 years to the speculations of Greek philosophers such as Plato and Aristotle. However, the scientific study of human and animal learning started just over a century ago with the work of Bechterev, Pavlov and Thorndike, and for at least a half century after that learning theory became the major area of experimental psychology. In the 1950s, mathematical psychologists proposed formal models of learning that were capable of predicting detailed statistics of learning data, and later this work was extended into the closely related areas of concept learning and memory. The first major introduction of computational approaches in learning theory occurred in the late 1940s with the work of McCulloch and Pitts, and after that a variety of formal computational ideas began to play an important role in learning theory such as production systems, the theory of grammars, learnability theory, perceptrons, and parallel distributed processing. This talk will cover selected aspects of this long history, and it will pay special attention to several enduring scientific and philosophical issues that have emerged and reemerged in various guises.