ACT-R

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ACT-R is a cognitive theory and simulation system for developing cognitive models. It assumes cognition emerges through the interaction of a procedural memory of productions with a declarative memory of chunks and independent modules for external perception and actions. The ACT-R 4.0 version of the theory was detailed in the book "The Atomic Components of Thought" by John R. Anderson and Christian Lebiere, published in 1998 by Lawrence Erlbaum. Since its release in 1997, ACT-R 4.0 has supported the development of over 100 cognitive models published in the literature by many different researchers. These models cover topics as diverse as driving behavior, implicit memory, learning backgammon, metaphor processing, and emotion. We have recently developed a new version, ACT-R 5.0 that extends ACT-R 4.0 to be more interruptible, to achieve greater across-task parameter consistency, to have better mechanisms of production learning, and to be more in correspondence with our knowledge of brain function. While the new system extends the capabilities of ACT-R 4.0, it involves relatively few changes and is actually simpler. This short tutorial will provide an overview of ACT-R, as it is specified in the 5.0 version, and some of its applications. It will not assume a prior background in ACT-R 4.0.

Christian Lebiere is a Research Scientist in the Human-Computer Interaction Institute at Carnegie-Mellon University. He received his B.S. in Computer Science from the University of Liege (Belgium) and his M.S. and Ph.D. from the School of Computer Science at Carnegie Mellon University. During his graduate career, he worked on the development of connectionist models, including the Cascade-Correlation neural network learning algorithm. Since 1990, he has worked on the development of the ACT-R hybrid cognitive architecture and is co-author with John R. Anderson of the 1998 book "The Atomic Components of Thought". His main research interest is cognitive architectures and their applications to psychology, artificial intelligence, human-computer interaction, decision-making, game theory, and computer-generated forces.