Chapter 5

Memory and Emotion in the Cognitive Architecture

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Abstract

This chapter explores issues in memory and affect in connection with possible architectures for artificial cognition. Because memory and emotion are evolutionarily and developmentally rooted in social interdependence, a new understanding of these issues is necessary for the principled design of true intelligent systems. We treat emotion not as an optional extra or as a brief episode of feeling, but as the underlying substrate enabling the formation of social relationships essential for the construction of cognition. We treat memory not as the storage and retrieval of immutable data, but as a continuous process contingent on experience and never fully fixed or immutable. Three converging areas of research are identified that hold some promise for further research: social constructionism, reconsolidation memory theory, and memory models based on the nonlinear dynamics of unstable periodic orbits. We argue that the combination of these ideas offers a potentially more substantive approach to understanding the cognitive architecture.
Introduction

This chapter is concerned with memory and affect in connection with possible architectures for artificial cognition. The work described in this chapter represents a departure from the traditional ways in which memory and emotion have been considered in artificial intelligence (AI) research and is informed primarily by two strands of thought emerging from social and developmental psychology. First, there has been increasing concern with personhood: with persons, agency, and action, rather than causes, behaviors, and objects (Shotter & Gergen, 1989). Second, there is an emphasis on the self as a social construct (Gergen, 1999), that persons are the result of interactions with significant others, and that the nature of these interactions is, in turn, shaped by the settings in which these interactions occur (Levine, 1992).

There is a tradition in cognitive science of teasing the cognitive architecture apart into components, so that their features and characteristics may be better understood. Examples of such components are memory, perception, problem solving, attention, and emotions. The reductionist method of decomposing a complicated problem into subproblems that can be studied individually has a long and distinguished history and has well served the physical sciences. However, it is important to remember that cognition takes place within communities and cultures and is found within a complex matrix of interactions and reciprocities of needs and desires. Although the nominalist philosophy that has been the prevailing thoughtway for more than 300 years has privileged the individual mind as the centre of being and the locus of meaning-producing processes (Churchland, 1995), it is well to remember Weizenbaum’s premise (1976) that intelligence is manifested only within a cultural and social milieu. As Aubé concludes elsewhere in this book, it is incoherent to try to design emotional systems for artifacts that do not belong to communities.

It is possible that an understanding of cognition rich enough to provide a computational basis for artificial intelligence will need to depend on understanding the human person, which in turn, depends on understanding the propinquity of interaction between persons. The reductionist and nominalist projects do not offer adequate means of obtaining a conceptual grasp of the complex ecosystem of interactions within communities of persons. As Fraser Watts (2000) said, the human emotions illustrate very well the way in which the biological and social aspect of personhood are intertwined. Emotions have both biological and social aspects, and any attempt to explain one aspect without the other leads to an impoverished account.

The main objective of this chapter is to show how ideas from three different research areas might be caused to converge in order to form a new way to think
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