Emotion in Artificial Intelligence and Artificial Life Research: Facing Problems

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Abstract

In last decades, neuroscience and psychology research findings about emotion have been increasingly attracting the attention of many researchers in Computer Science and Artificial Intelligence (AI) areas. AI, interested in cognitive processes modeling and simulation, clearly see that emotion is a crucial element to model perception, learning, decision processes, memory, behavior and others functions. Currently, two Computer Science areas use emotion concepts on their research: Human-Computer Interaction and systems whose internal architecture is emotion-based.

Even considering current state-of-art projects, theoretical aspects of emotion to be employed in computational systems projects are scarcely discussed. Our research intends to discuss these problems and propose tentative directions to solve them.

First, (i) the lack of a well defined scientific framework to approach 'Artificial Emotion', with few advanced attempts been published suggesting one.

Besides that, a close look at some projects provides a non-exhausted list of (ii) important questions they might face to achieve trustworthy results. They can be grouped in two types, theoretical-conceptual or computational questions. Examples are: How to integrate emotion with other mechanisms, such as: sensory, learn, selection and communication? Can artificial emotion be an emergent property? What kind of data structure and computational mechanisms should be used to both capture and represent the complexity of emotion processes? What kind of experimental test allows to better explore emotion-based models? Moreover, an essential question to be answered is related to which extent supposed structural complexity involved in emotion phenomenon can be abstracted and modeled, not missing important brain structure interactions and not being too complex to impair computational representation.

Last, these facts mainly contribute to a third noticeable problem: (iii) lack of comparative analysis between projects and also within same project, with beneficial comparisons of emotion and non-emotion-based experiments.

Positively, overcome these challenges can be an important step to field progress goes beyond engineering applications and towards a more scientific discipline.