Towards a Psychologically Plausible Comprehensive Computational Theory of Emotion

by

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ABSTRACT

For centuries, philosophers and psychologists alike have pondered the pervasiveness of emotion. Many theories exist regarding almost every aspect of this concept, for example: its causes, its structure, its role in decision making, etc. Furthermore, decades of research has gone into developing a myriad of detailed computational models of this phenomenon. However, even with the seemingly overwhelming quantity of theories and models, little consensus seems to exist about the precise nature of this nebulous thing known as emotion. On top of that, few meaningful attempts have been made, to date, to provide an extensive validation of these perspectives against existing psychological findings. For this dissertation, a novel computational interpretation for emotion is proposed, which is integrative, comprehensive and psychologically plausible. To that end, this interpretation takes into account the large body of literature in order to posit three basic principles by which the emotional experience may collectively be defined. Each principle is then actualized into a domain-independent computational model of emotion based on a well-established, dual-representational, motivationally-based cognitive architecture – CLARION. The model, known as CLARION-E, is then validated (via simulation) against several aspects of the psychological landscape. These simulations provide a detailed "bottom-up" justification for the model's implementation of each principle of emotion. The overarching goal of this research is to provide a novel, comprehensive, psychologically plausible, computational foundation for future studies on emotion, with the hope of encouraging an expansion in computationally-based explorations of emotion into new areas, disciplines, and applications.