Chapter 3

Representing Emotions as Dynamic Interactions of Symbols:
A Case Study on Literary Texts

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ABSTRACT

This chapter proposes an emotional architecture organized around three pairs of antithetic universal symbols, or archetypes, derived from analytic psychology and anthropological accounts of mythical thinking. Their functions, relationships and interactions, on different levels of complexity within a dynamical system that mimics human emotional processes, are described by a formal model and a constructed ontology. The aim of the model is characterizing symbolic reasoning and figurative and analogue mechanisms of mental imagery associated with the internal representations of events. An automatic method for metaphor recognition and interpretation is proposed, targeting the identification of the proposed universal symbols in literary texts.

INTRODUCTION

While the compelling demand for emotional intelligent machines that would contribute to a realistic human – computer interaction appears to benefit from current developments in artificial intelligence, the matter of affects still lacks consensus in its own field. Foucault’s (2002) observation on human sciences, first published in 1966 is ever today prevailing: “it will be possible to speak of human sciences when an attempt is made to define the way in which individuals or groups represent words to themselves, utilize their forms and their meanings, compose real discourse, reveal and conceal in it what they are thinking or saying, perhaps unknown to themselves, more or less than they wish, but in any case leave a mass of verbal traces of those thoughts, which must be
deciphered and restored as much as possible to their representative vivacity.” (pp. 385). Straightforward models of emotions and cognition have proved their applicability and statistical relevance, but when an effort is put towards building machines that predict the affects of humans and react in a similar way, the problem of “restoring the vivacity” of human thought cannot be overlooked. Models such as those underlining emotion – attention mechanisms, or the relation of affects with decision making or interpersonal communication, because they describe only parts of reality, however sufficiently apparent to account for specific fields of interest, are not comprehensive enough as to render all implications of the above definition.

Some questions arise naturally when considering the implementation of human sciences as described previously in the framework of synthetic emotions: Can emotions be replicated in a computational model so generic that it can be adapted to any emotional theory is considered appropriate for the application being designed? Can it include connections to cognitive processes that are not linear, irrational or non-literal? Or, how Foucault puts it, can it represent what is concealed or unknown? If such a model can be constructed, what units would compose it, so universal that their action accounts for the most diverse mental processes?

While not implying that our proposal is, on its own, a solution that answers all above questions and the implications of Foucault’s definition, we have identified a series of premises we consider to be necessary for such an attempt and have constructed an illustrative model. Further research is needed, especially from the point of view of human sciences, in order to increase the model’s accordance to real-life, observed phenomena.

We propose a general framework for modeling psychological processes that integrates aspects such as the dynamics of affects and cognitive mechanisms with a systemic perspective of reality. The complexity of the representation can be adapted as to fit the particular requirements of each application.

The central concept of our approach, that of archetypal symbols, has the advantage of a double correspondence. First, because of the universal character of such symbols, a thorough psychological analysis can identify and attribute specific functions that each archetype has within a system that simulates human thinking and feeling. In this way, their precise structural role can be defined, together with the relations by which they operate. This Top-Down strategy requires, besides the comprehensive study of the mind, a systemic representation of reality, or the world model of each application, in such a way that different complexity scales can be achieved. Secondly, bearing a strong symbolic and conceptual character, the archetypes can be recognized in the phenomena related to human mental acts, making the model prone to language processing applications of identifying the patterns in which they appear. However, it needs to be pointed out, in the case of this Bottom-Up strategy, that the correspondence between symbol and word is not direct, at least in the sense implied by our perspective, as a symbol implies a higher degree of abstraction.

We have constructed a functional model to illustrate our understanding of the method of representing mental processes for both these approaches, yet we would like to draw attention on the fact that, depending on the subject of research or application, a mixed strategy can also be applied.

In our view, universal symbols such as these indicated here are present in the whole of human experience. Accordingly, we will not argue whether emotions have a regulatory role on cognition or vice versa, we suggest that a realistic model can be created in which both have the common root of symbolic images.

BACKGROUND

As mentioned previously, several roles of emotions have been identified, and while we do not intent in providing an extensive list of such functions, we