Artificial Emotion Elicitor Based on Sequential Check Theory*

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Abstract. Emotion elicitor is used to generate emotions in real time for agents, and is undoubtedly the basis of affective computing. To afford support from emotion sciences for the design of artificial emotion elicitor, Sequential Check Theory (SCT) was selected. Under the guidance of endogenesis strategy, relevance strategy, and operation strategy, the general emotion elicitor was built up through the construction and reduction of the decision tree. And in the process, information ratio was used for attributes selection. With the flexibility of each attribute’s evaluation logic, and the close tie SCT has with emotion experiment evidence, the emotion elicitor is of universality and worth further study.

Keywords: Emotion elicitor, Sequential Check Theory, Decision tree, Agent.

1 Introduction

Just as Marvin Minsky wrote, the question is not whether intelligent machines can have any emotions, but whether machines can be intelligent without any emotions[1]. With the need to deal with emotion-related affairs such as HCI (Human-Computer Interaction), and the need to migrate emotional functions to improve the system performance in decision making, action selection, behavior control and etc, an upsurge in the study of emotional agents is taking shape.

The mechanisms of how emotions are elicited are basic problems not only in original emotion sciences, but in the implementation of affective computing. Researchers in either domain have to face different and even controversial theories. If it is believed that the two domains should be closely connected with mutual benefits, just as this paper has advocated, then it is worth getting support from the former domain while considering the design of artificial emotion elicitor in the latter one.

Appraisal theories based approach has become a very popular source of inspiration for computational models, in particular the more ‘cognitive-oriented’ ones[2]. A kind

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of appraisal theory named Sequential Check Theory (SCT) [3] was introduced, and based on it, the emotion elicitor that is easy to implement in affective computing has been built up through the construction of an emotion decision tree.

2 Three Principles in Design of Emotion Elicitor

Three principles, that is, the endogenesis, relevance and operation strategy of emotion modeling in affective computing has been introduced by us in [4]. They are also basic principles for the design of emotion elicitor. For the sake of convenience, they are listed in the following.

1) **Endogenesis strategy**: Concerned about the endogenesis of emotion means the construction of emotion model should get clues from and be inspired by emotion-related subjects such as emotion physiology, emotion psychology, emotion sociology. This strategy provides additional testimonies and verification, and gives sustainable power to the further development of the mode.

2) **Relevance strategy**: Only emotions that are related to the objects being studied is worthy of more attention. This strategy puts a practical eye on emotion modeling.

3) **Operation strategy**: This strategy usually means the elicitation of emotion should be quantified, bear clear mechanisms and meet the requirements of business logic. Operation strategy tends to lay a good foundation for further processing.

3 SCT–Based Emotion Elicitor

3.1 SCT: A Simple Introduction

Since the early 1980s, Sequential Check Theory (SCT) was committed by Scherer as part of his Component Process Model (CPM) to differentiate emotions. The theory has been developed over 20 years with support and evidence from psychological experiments.

The core of SCT is to use a series of Stimulus Evaluation Checks (SECs) to appraise the importance of events. The objects of the appraisal come from four kinds of information, that is, *relevance, implication, coping potential* and *normative significance*. It was pointed out by Scherer that the fundamental tenet of appraisal theory is that people evaluate events in terms of the perceived relevance for their current needs and goals, including considerations of their ability to cope with consequences and the compatibility of the underlying actions with social norms and self-ideals [5].

In SCT, besides the overall four dimensions, every dimension has its own sub-dimensions. It can be seen from table 1 that the number of sub-dimensions totaled 16 in SCT. The existence of the sub-dimensions entitles extensiveness of the theory. Thus, if started from Scherer’s theory, there is less chance of missing some important dimension than started with a simpler, possibly less complete theory [6]. In this paper, the sub-dimensions are selected concerning implementation matters based on SCT.