An Affective Agent for Studying Composite Emotions

(Demonstration)

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ABSTRACT

Using an affective agent to estimate humans’ composite emotions is important for creating believable interactions in human-agent collectives. However, there is a lack of suitable platforms for building large scale datasets on this topic to help researchers improve the accuracy of estimations. In this paper, we design and implement an affective agent, which uses explicit emotion appraisals and a historical group emotion dataset to study a user’s hidden emotion compositions.

Categories and Subject Descriptors
I.2.11 [Artificial Intelligence]: Distributed Artificial Intelligence - Intelligent Agents

Keywords
Affective agent; composite emotion; human-agent interaction; human-agent collectives

1. INTRODUCTION

In social interactions, peoples’ actions are more driven by emotions (e.g., trust for someone [4, 9, 10]) than by logic. Hence, emotion is an important factor in human-agent interaction that needs to be closely studied. As computing devices become ubiquitous, artificial companions are becoming a viable emerging mode of human computer interaction [8, 11]. Endowing artificial companions with affective analysis and estimation capabilities has now become increasingly useful in many application domains [1, 2, 3, 7].

In this paper, we describe a demonstration of an Affective Agent (AA), its architecture, and its test-bed platform. Our work first focuses on the group emotion data collection and analysis. Then, the AA estimates a user’s current composite emotion as a result of reading a given online article based on a combination of self-report emotions, qualitative appraisals of the events in the article, and historic emotion data.

2. THE AA ARCHITECTURE

The AA Architecture consists of four major components, including: 1) the Knowledge Base (KB), which stores historical emotional data; 2) the Sensory Processor (SP), which accepts the input of explicit emotion appraisals reported by users; 3) the Analytics Unit (AU), which executes the emotion estimation logic; and 4) the Emotional Space (ES), which presents the estimated composite emotion to user.

These components work together in a complex network of information gathering, processing, and decision-making. As shown in Figure 1, external events (e.g., reading a news article) may cause composite emotions in a user. The agent implemented using the AA architecture receives those emotion triggers. It compares them with the internal historical emotion data in the KB and derives possible composite emotions the user is currently experiencing. The SP and the ES integrate the same types of emotion data into the agent’s KB. Sensory inputs received by the SP activate AA’s predefined goals and are processed by the AU to estimate the user’s composite emotions. The appropriateness of the suggested composite emotions are then verified by the user.

3. THE DEMONSTRATION

An interactive platform has been developed to act as a gamified system for motivating users to provide labelled data on composite emotions triggered by news reports in order to facilitate affective computing research. We collected Sina society news articles from 1 Jan. 2013 to 30 Jun. 2013 as our data source1. Sina society news allows a reader to cast his/her vote for one of six basic emotion labels after reading. These six choices describe the feelings of Touched, Shocked, Curious, Angry, Funny, and Sad. Based on the OCC emotional model [5] and emotional space theory [6], we define a six dimensional emotional space.

For each news article, the strength of each emotion can be reflected by the percentage of votes it received among all six basic emotions. Based on this, we store the emotion votes

1http://news.sina.com.cn/society/
for users who only reported the strength of one principle emotion. The 2-Appraisal curve reflects the similarity of estimated composite emotions to real voting data for users who reported the strength of two principle emotions. It can be observed that when $N > 8$, the similarity measure can reach 87% for 1 appraisal and 92% for 2 appraisals.

5. SUMMARY

Predicting user’s composite emotions are important to designing believable artificial companions. In this demonstration, we showcase an Affective Agent, including its architecture and an online test-bed platform for this purpose. Compared with real emotion voting data collected from Sina society news website shows our AA can achieve high estimation accuracy.

Acknowledgements

This research is supported by the National Research Foundation, Prime Minister’s Office, Singapore under its IDM Futures Funding Initiative and administered by the Interactive and Digital Media Programme Office.

REFERENCES


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