

Emotion Estimation System Based on Emotion Occurrence Sentence Pattern

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Abstract. The approach of emotion estimation from the conventional text was for estimating superficial emotion expression mainly. However emotions may be included in human's utterance even if emotion expressions are not in it. In this paper, we proposed an emotion estimation algorithm for conversation sentence. We gave the rules of emotion occurrence to 1616 sentence patterns. In addition, we developed a dictionary which consisted of emotional words and emotional idioms. The proposed method can estimate emotions in a sentence by matching the sentence pattern of emotion occurrence and the rule. Furthermore, we can get two or more emotions included in the sentence by calculating emotion parameter. We constructed the experiment system based on the proposed method for evaluation. We analyzed weblog data including 253 sentences by the system, and conducted the experiment to evaluate emotion estimation accuracy. As a result, we obtained the estimation accuracy of about 60 %.

1 Introduction

Recently, there have been some attempts to simulate human sensibility using computers in the research field of affective information processing. One aim is to realize an affective computer which can behave as a human. The human aspects of AIBO [1] and Ifbot [2] are the results of similar attempts. This research tries to make artificial behavior of robots more acceptable to people by copying animal behavior or human facial expressions. These robots focus on representing human emotions rather than understanding them. The emotional state of one party in a conversation is also an important condition for eliciting emotional responses from another party. For example, we might sympathize for unhappiness of an intimate friend as if we experience the same unhappiness. In such empathy, the other party's emotional state affects the occurrence of our emotion. In other words, the emotion recognition and the emotion expression have interacting relations. This paper proposes an emotion estimation method designed primarily more for conversations. Interactive relation between one party's emotions and another party's emotions combine with traditional methods which mainly focus on extracting emotional meaning of words and sentences.

2 Algorithm for Estimating Human Emotions

This Section proposes an emotion estimation algorithm and describes the estimation flow produced by the algorithm. By inputting conversations, an "emotion dictionary," "image value database," and "favor value database" are identified and "emotion attribute," "attribute image value" and "likability" are decided for each word in the conversations. Next, the "modifier dictionary" enlarges or reduces an emotion attribute for each noun or verb. The sentence pattern is searched for in the "emotion occurrence phenomenon dictionary." When the same pattern is found in the dictionary, the emotion attribute value is set for the sentence according to the emotion occurrence rule. The emotion parameter is calculated and one emotion out of 12 emotions (Table 1) is judged.

Table 1. 12 Emotions

Joy	Pleasure	Anticipation
Reception	Adoration	Surprise
Sadness	Disgust	Anger
Fear	Regret	Anxiety

3 Emotion Dictionary

Section 3 explains the emotion dictionary constructed in our research. Emotional evaluation (emotion attribute) for each semantic attribute of words included in the "Japanese Lexicon"[3] was used to construct the emotion dictionary. Table 2 shows 19 emotion attributes. Table 3 shows the total number of emotion word and emotion idiom.

3.1 Emotion Attributes of Words

The semantic attributes of general nouns defined in the "Japanese Lexicon"[3] are classified as "Emotion," "Personal Emotion," "Interpersonal Emotion," "Sentiment," "Mood," etc. Extracted general nouns from the "Japanese Lexicon" were 1) nouns belonging to the subordinate semantic attributes from the category of "emotion" and 2) nouns belonging to the semantic attributes expressing emotions from the categories: "facial expression" and "disposition." There was

Table 2. Emotion Attributes

Joy	Anger	Sadness	Fear
Shame	Like	Dislike	Excitement
Relief	Surprise	Approbation	Appreciation
Reception	Regret	Boast (Pride)	Respect
Contempt	Hope	Equilibrium	