

Processing the Contextual Appropriateness of Emotions

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1. Introduction

This research presents a method for estimating contextual appropriateness of speaker's emotions. The method is using an affect analysis system to estimate the speaker's emotions and a Web mining technique gathering from the Internet associations about emotional common-sense. The Web mining technique is using the contents of blogs, as a source rich in evaluative information. A conversational agent equipped with this system can choose an appropriate conversational procedure.

2. Affect Analysis

For affect analysis we use Ptaszynski's et al. [1] ML-Ask (Emotive Elements / Emotive Expressions Analysis System), which analyses the emotive content of utterances in two steps: 1) Analyzing the general emotiveness of utterances; 2) Recognizing the particular emotion types. The system is based on Ptaszynski's idea of two-part analysis of realizations of emotions in language into:

- **Emotive elements**, indicating that emotions have been conveyed, but not detailing what specific emotions there are, e.g. interjections (*sugee* /great!/), mimetics (*wakuwaku* /heart pounding/), or vulgarities (*-yagaru* /a vulgarization of a verb/) {907 items in total};
- **Emotive expressions**, parts of speech or phrases, that in emotive sentences describe emotional states, e.g. nouns (*aijou* /love/), verbs (*kanashimu* /feel sad/) or adjectives (*ureshii* /happy/) {2100 items in total};

2.1. Contextual Valence Shifters

However, keyword-based extraction of emotive expressions caused misinterpretations in valence polarity determination. To solve this problem, we applied an analysis of Contextual Valence Shifters [2]. Examples of CVS negations in Japanese are: *-nai* (not-), *amari -nai* (not quite-), *-to wa ienai* (cannot say it is-), or *-te wa ikenai* (cannot+[verb]-). The flow chart of ML-Ask system is presented in Figure 1.

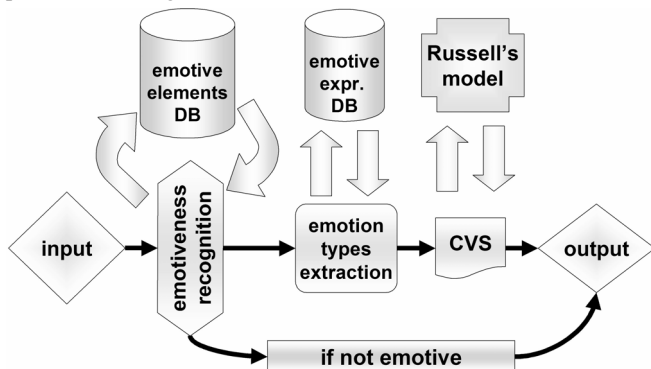


Figure 1 Flow chart of the ML-Ask system.

3. Web mining

As a verifier of appropriateness of the speaker's affective states recognized by ML-Ask we apply Shi's Web mining technique for extracting emotive associations from the Web based on causality [3]. The technique is made up of three stages: 1) extracting n-gram phrases from an utterance; 2) modification of phrases ending with adjectives and verbs by

the use of causality morphemes to perform semantically deeper Web mining; and 3) extraction of emotion associations from the Web using the prepared n-gram phrases as query phrases in *Yahoo! Japan - Blogs* web service and cross-referencing them with the emotive expressions database. If no associations are found on the blogs, the system performs the same query on the whole Web using Yahoo search engine (see Figure 2).

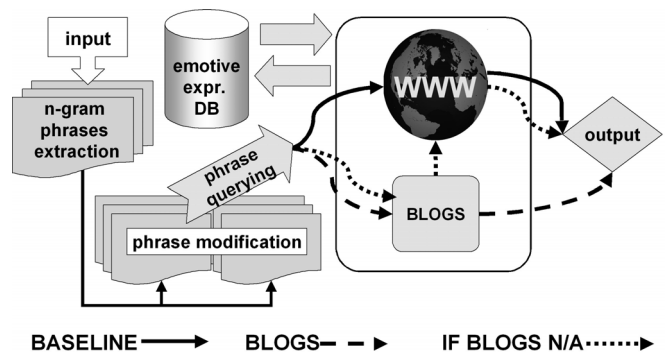


Figure 2 Flow chart of the Web mining technique.

4. Experiments and Results

In the evaluation experiment 13 users (undergraduate students) performed a ten-turn conversation with two conversational agents developed in our laboratory [4, 5]. All conversations were then analyzed by ML-Ask and for the ones containing emotive sentences with specified emotion types, the Web mining procedure was carried out to determine whether the emotions expressed by the user were contextually appropriate. Next, we evaluated every conversation set by 10 people. The accuracy in determining the contextual appropriateness of emotions reached 60%.

5. Future Work

Our plans for the near future include disambiguating emotive elements to improve affect analysis system and building an emotive associations database to improve the performance of the Web mining procedure.

References

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