日本語の感情推定を支援するための極性変化子

Contextual Valence Shifters Supporting Affect Analysis of Utterances in Japanese

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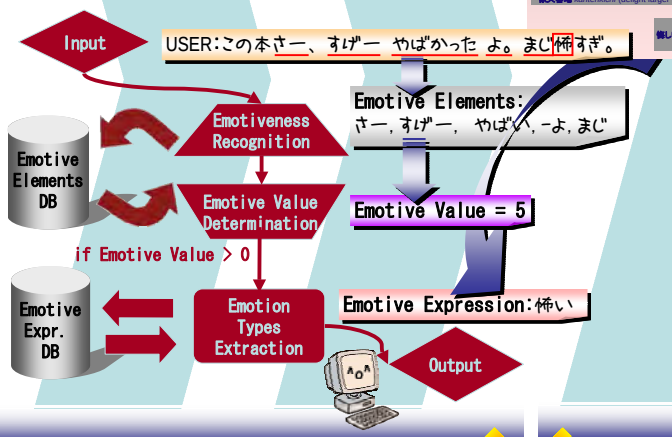
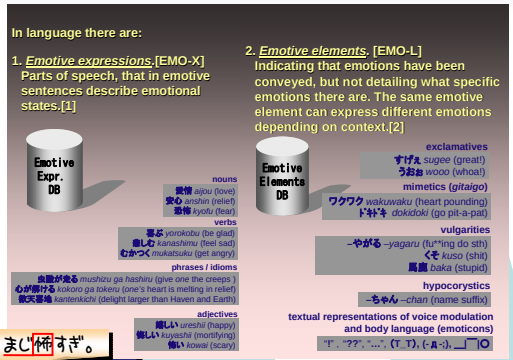
Abstract

The paper presents a support method for affect analysis of utterances in Japanese. One of the problems in the system for affect analysis developed by us before was confusing the valence of emotion types in the final stage of analysis. The cause of this problem was extracting from the utterance only the emotive expression keyword without its grammatical context. To solve this problem we enhance the emotion types extraction procedure in the baseline system with grammatical analysis using Contextual Valence Shifters (CVS). CVS are words, or phrases such as "not", "very much" "not quite", which determine the semantic orientation of the valence of emotive expressions.

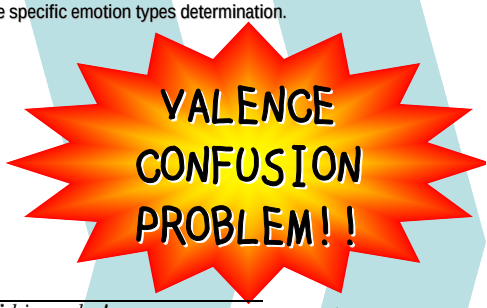


ML-Ask - Basic System



Valence Confusion

One of the problems with the basic system [2] was confusing the valence polarity of emotive expressions in the last step of analysis. To solve this problem we decided to apply the idea of Contextual Valence Shifters to the baseline system to enhance the specific emotion types determination.



Kyo wa nante ***kimochi ii*** *hi nanda !*
…[EMO-L:nante] [EMO-X:joy] …[EMO-L:nanda] [EMO-L:!]
(Translation: Today is such a nice day!)

Akirame *cha ikenai yo!*
[EMO-X:dislike] … [EMO-L:yo][EMO-L:!]
(Translation: Don't cha give up!)

Sorehodo ***omoshiroku*** *mo nakatta yo.*
…[EMO-X:joy] … [EMO-L:yo].
(Translation; It wasn't that interesting.)

Contextual Valence Shifters

Original idea of Contextual Valence Shifters (CVS) proposed first by Polanyi and Zaenen [3]. Two kinds of CVS:

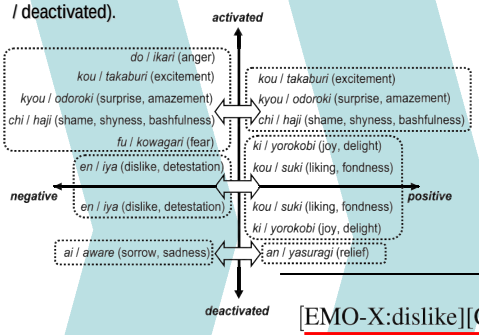
Negations: words and phrases like "not", "never", and "not quite", which change the valence polarity of semantic orientation of an evaluative word;

Intensifiers: words like "very", "very much", and "deeply", which intensify the semantic orientation of an evaluative word;
The idea of CVS analysis was so far was successfully applied to Sentiment Analysis of texts in English [4], and also in Japanese [5]

Examples of Japanese CVS:
Negaitons: grammatical structures such as: *-nai* (not-), *amari -nai* (not quite-), *mattaku -nai* (not at all-), or *sukoshi mo -nai* (not even a bit-)
Intensifiers: grammatical structures like: *totemo-* (very much-), *sugoku-* (-a lot), or *kiwamete-* (extremely).

2-dimensional Model of Affect

The main assumption of the idea of a 2-dimensional model of affect [6,7] is that all emotions can be described in a space of two-dimensions: the emotion's valence polarity (positive negative) and activation (activated / deactivated).



CVS Procedure

1. When a CVS structure is discovered, ML-Ask changes the valence polarity of emotion conveyed in the sentence.
2. The appropriate emotion after valence shift is determined in line with the Russell's model as the one of valence polarity parameters different to the contrasted emotion but with the same activation parameters. (If an emotion was located in only one quarter, e.g. positive-activated, the contrasting emotions would be determined as negative-activated.)

Akirame *cha ikenai yo!*
[EMO-X:dislike][CVS:cha-ikenai{→joy}][EMO-L:yo][EMO-L:!]
(Translation: Don't cha give up!)

Sorehodo ***omoshiroku*** *mo nakatta yo.*
…[EMO-X:joy][CVS:-ku(mo)nai{→dislike}][EMO-L:yo].
(Translation; It wasn't that interesting.)

Conclusions

Problem with: confusing the valence of emotion types in baseline system. Reason: The emotive expression keywords were extracted without their grammatical context. Improvement method: 1. enhance the emotion types extraction procedure in the baseline system with grammatical analysis using Contextual Valence Shifters (grammatical structures such as "not", "very much" and "not much", which determine the semantic orientation of the valence of emotive expressions). 2. To determine which types of emotions are the most probable to appear instead of the contrasted ones we applied a 2-dimensional model of affect. Effect: ML-Ask was able to determine all of the sentences containing CVS phrases correctly.

Accuracy:
62,5% → 65,3%

Future Work

1. Evaluate ML-Ask on a larger corpus, including not only the separate utterances, but also a natural dialogue corpus containing emotive taggings.
2. This research is also a step towards a more contextual Affect Analysis and implementing a full scope of Emotional Intelligence Framework proposed by Mayer and Salovey [8].
3. As the next step in this research we plan to develop a technique for computing the contextual appropriateness of emotion types conveyed in utterances, to which improving the ML-Ask baseline system is a vital point.

References

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