Effective Analysis of Emotiveness in Utterances
Based on Features of Lexical and Non-Lexical Layers of Speech

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For a long time emotions were treated as not material or tangible enough to be accurately described in detail, or processed by machines.

But...

Hypothesis: analysis of emotions, narrowed to specified borders, should give results comparable to those of humans.

Our approach

Narrowed approach to affect analysis
=
analysis of emotiveness

assumptions

1. The approach towards emotions narrowed to textual surface of speech analysis.
2. Analysis conducted on dialogue-like utterances appearing usually in speech.
3. Determining step-by-step: emotiveness → emotive value → emotion types.

In language there are:
1. Expressions not always used in emotive context, but in emotive context describing emotional states (emotive expressins).

A. Nakamura, *Kanjō hyōgen jiten* (Dictionary of Emotive Expressions), Tokyodo Publishing, Tokyo (2004)

2. Elements informing that emotions have been conveyed, but do not expressing specified feelings or, more precisely, expressing different feelings depending on the context of the sentence (emotive elements).

M. Ptaszyński, *Moeru gengo - Intānetto kei-jiban no ue no nihongo kaiwa ni okeru kanjōhyōgen no kōzō to kigōronteki kinō no bunseki – "2channeru, denshikejiban o rei toshite –* (Boisterous language. Analysis of structures and semiotic functions of emotive expressions in conversation on Japanese Internet bulletin board forum - 2channel -), UAM, Poznań (2006)

Emotive Elements / Expressions Analysis System (ML-Ask)

emotive expr. DB

emotive elements DB

nouns
愛情 *aijou* (love)
安心 *anshin* (relief)
恐怖 *kyofu* (fear)

verbs
喜ぶ *yorokobu* (be glad)
悲しむ *kanashimu* (feel sad)
むかつく *mukatsuku* (get angry)

phrases / idioms
虫酸が走る *mushizu ga hashiru* (give *one* the creeps)
心が解ける *kokoro ga tokeru* (*one's* heart is melting in relief)
歓天喜地 *kantenkichi* (delight larger than Haven and Earth)

adjectives
嬉しい *ureshii* (happy)
悔しい *kuyashii* (mortifying)
怖い *kowai* (scary)

exclamatives
すげえ *sugee* (great!)
うおお *wooo* (whoa!)

mimetics (*gitaigo*)
ワクワク *wakuwaku* (heart pounding)
ドキドキ *dokidoki* (go pit-a-pat)

vulgarities
–やがる *–yagaru* (fu**ing do sth)
くそ *kuso* (shit)
馬鹿 *baka* (stupid)

hypocorystics
–ちゃん *–chan* (name suffix)

textual representations of voice modulation and body language (emoticons)
"!" , "??", "...", (T_T), (-д-;), ＿|￣|○

An example of analysis

この本さー、すげー やばかった よ。まじ怖すぎ。
Kono hon saa, sugee yabakatta yo. Maji kowa sugi.
That book, ya know, it was a killer. It was just too scary.

emotive elements:
さー, すげー, やばい, -よ, まじ

emotive value = 5

emotive expressions:
怖い

System Flowchart

input

emotiveness recognition

emotive value determination

emotive elements DB

if emotive value >0

emotions recognition

emotive expr. DB

output

Evaluation

3. Emotions recognition accuracy

Evaluation data:
30 emotive sentences evaluated by humans

Conditions:
1. Recognizing at least one of the emotion types classified by evaluators per sentence. or
2. The systems' classification coincide with the majority.

Accuracy of recognizing specific types of emotions:
45% of the human level.

2. Emotive value determination accuracy

Level of unanimity with human evaluators of evaluation data:
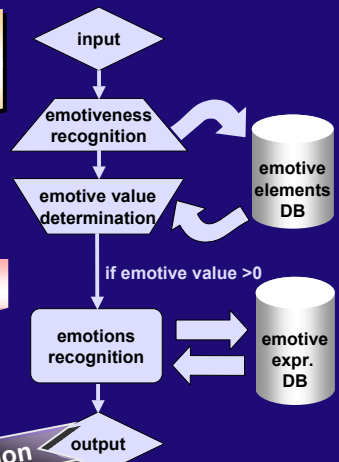**50% - 88%**

(unanimity between human evaluators: 37% - 74%)

1. Emotiveness recognition accuracy

Evaluation data:
60 sentences tagged by authors

Accuracy of emotiveness recognition: **93%**

Conclusions & Future Work

- Emotiveness is computable on lexical level.
- System designed in a specified way can determine emotiveness effectively in specified borders, giving results comparable to those of humans.
- Eliminating lacks in databases prognoses further increase of accuracy.
- In the next step of the research we plan to implement ML-Ask into a conversation system.
- For using ML-Ask in conversation systems it is reasonable to upgrade the algorithm for recognizing emoticons.
- Implementing in CS will help to gather a large database of sentences for analysis.
- On the base of a large DB analysis it will be possible to design an algorithm recognizing emotiveness of specified words by their appearance in either emotive or non-emotive sentences.
- ML-Ask is also perfect for filling the lacks in systems of recognizing emotions from facial expressions and voice or speech.

Abstract:

We propose a highly effective method of analysis of emotiveness in utterances, which clearly outperforms present ones. The method is based on analysis of emotive features of the lexical layer of user's utterances and is supported by analysis rf non-lexical emotive features conveyed in text. The system based on this method acquired 93% of accuracy in recognizing emotiveness of user's utterances and was able to propose emotive value and extract specific emotion on a level comparable to human evaluators.