When Should Computers Joke?
- Concept of Emotiveness Analysis Based Timing Algorithm
for Humor-Equipped Conversational Systems

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Abstract: In this paper we introduce our idea of emotiveness-analysis-based timing algorithm, aimed to detect conditions in which it is appropriate to tell a joke in a conversation. We briefly summarize existing works concerning correlations between emotions and humor and describe the outline of proposed algorithm. The concept is to be used in our research on joking conversational systems.

Keywords: humor processing, jokes, puns, timing, emotions, conversational systems

1. Introduction
The content of this paper is a part of our research on joking conversational system for Japanese. We focus on possibilities of creating emotiveness-analysis-based algorithm for detecting proper conditions for the usage of humor during conversation.

Freely Talking System with Humor
In our previous works [1] and [2] we investigated the role of humor in non-task oriented conversational systems. We constructed a joking conversational system “Pundalin” and proved that implementing a simple pun generator into a chatterbot can visibly enhance its performance. Evaluation experiments explicitly proved that humor-equipped system was seen as more human-like, easier to familiarize with and generally better than a similar system without humor [1]. Emotiveness analysis of conversation chat logs between users and two systems showed that the humor-equipped system elicited more emotions in users, and most of them were positive [2]. Thus, we provided scientific proof for the beneficial role of humor also in non-task oriented human-computer interaction.

Timing Problem
In our research system (described above), we confronted several difficulties, one of which was the problem with joke timing. In order to swiftly use humor, the system should be able to detect appropriate situations in which it is plausible to tell jokes. As the aim of our previous works [1] and [2] was to investigate the role of humor in the HCI in general, we decided to apply a very simple timing rule: the system would tell jokes at every third turn of conversation. In other words, it responded with humor to every third user’s utterance. This allowed us to study the influence of humor on conversation – however, if we are aiming to construct more sophisticated engine, it obviously needs to be changed. In this paper we propose a concept of emotiveness analysis based timing algorithm, in
which user’s utterance is to be analyzed to detect
his/her emotional states, and on this basis the
system would decide if it is appropriate to tell a
joke.

2. Background
Timing is generally heavily neglected subfield of
humor processing, and, to our knowledge, there is
no existing study concerning timing features for
conversational systems. Obviously, the entity called
“timing” is very complex and many of its aspects
have to be taken into consideration. In this research
we focus on correlation between emotions and
timing in order to propose to base the timing
detection algorithm on user’s emotional states.

2.1 Existing Literature
As mentioned above, there are not many
publications directly concerning the feature of
humor timing. Some of existing studies, however,
do investigate the connection between humor and
emotiveness. Most of them focus on the emotions
elicted by humor, induced in humans after being
exposed to humorous stimuli. However, more
important to this research are works that investigate
changes of subject’s mood and emotions, triggered
by humor.
There is considerable amount of research (e.g. [3],
[4] or [5]) proving that humor can be used as a
mean to deal with stress in life. By exposing human
subjects to different stress stimuli, the stress-
buffering potential of humor was explicitly proved
in many experiments. Lefcourt and Martin, for
example, investigated the role of humorous
narration during watching a stressful movie. They
proved that those subjects who used humor in the
experiment reported less negative emotions and
fewer indicators of distress [3].
Humor was also showed to be a countermeasure for
depression. Danzer et al. [6] proved that exposing
humans to funny video can reduce the effects of
laboratory inducted depression moods.
Humorous contents can also be efficient in dealing
with widely defined “mood disturbances”, which
was proved by Labott and Martin [7]. Dienstbier [8]
discovered that the presence of humor can turn
boring contents into interesting, which means that
not only does it hold the possibility of changing
negative emotions into positive, but can also be a
factor that activates humans in a positive manner.
There are also some robust scientific proofs to the
beneficial role of humor in medicine. It was
discovered that exposing hospital patients to
humorous stimuli can increase their feeling of hope
[9] and even their pain tolerance [10]. Humor can
also help patients and their families to deal with the
difficult consciousness of illness [11].
Some of studies investigating the influence of
humor on human emotions concern quite extreme
cases. It was proved that the sense of humor helped
concentration camps prisoners deal with the tough
reality [12]. According to Hennman [13], it was
humor that allowed Vietnamese camp prisoners
mentally endure tortures, beating and starvation.
Bonanno and Keltner [14], in turn, claimed that
sense of humor can help people cope with such
tragic life events as death of a spouse.
Studies listed above focus on changing negative
emotional traits into positive ones under the
influence of humor. The opposite direction –
humor’s influence on positive emotions – still needs
to be explored scientifically.
To summarize this section – it can be stated, that:
1) Humor can help us deal with negative
emotions and mental states;
2) It holds the potential to change negative
emotions into positive and generally elicit positive emotions.

Basing on these conclusions, in following sections we propose an idea of emotiveness-analysis-based joking timing algorithm for humor-equipped conversational systems.

3. Timing Algorithm

As mentioned above, joking conversational system presented in our previous works [1] and [2] tells jokes (puns) at every third turn of dialogue. We propose to replace this rule with the timing algorithm, based on emotiveness analysis of users’ utterances. To perform the analysis, we decided to use Ptaszynski’s et al. Emotive Elements/Emotive Expressions Analysis System (ML-Ask) [15], that detects users’ emotional states from the textual layer of speech.

3.1 Emotiveness Analysis System

ML-Ask system performs utterance analysis in two general steps:
1) Determining its general emotiveness (emotive/non-emotive);
2) Specifying types of found emotions (in emotive utterances only).

As a result of step 2, it can be stated if the emotions in user’s utterance are positive, negative or neutral. At its current shape, the system recognizes emotions at the level of 65 % [15].

3.2 The Concept of Algorithm

The flow of proposed timing algorithm continues as follows (see also Figure 1):
1) During conversation with the humor-equipped talking system, each user’s utterance will be analyzed with ML-Ask System;
2) Basing on the analysis results, the system will decide if it is appropriate to tell a pun.

The decision about appropriateness of pun telling will be made basing on conclusions drawn from researches described in section 2:
1) If user’s emotive state is negative (stress, depression, anxiety etc.) – a pun can be told to help him/her deal with it.

For example, if the user says:
“- You know, I’m feeling kind of under the weather today...”

-the system, after detecting negative emotion (sadness), could tell a joke to make user’s mood better.

2) If user’s state is neutral – a pun can be told to induce a good mood.

These rules, however, should be limited to situations in which it would be no risk of inducing negative instead of positive reaction (non-aggressive jokes?).

![Figure 1. Concept of emotiveness-analysis-based joking timing algorithm for humor-equipped conversational system “Pundalin” – outline.](image)

3.3 Need for Experiments

Applying above two rules is obviously not enough. The rules are too general and must be specified. It is especially important to determine which emotions are NOT appropriate to tell jokes. For there is very little literature on this subject, it is necessary to conduct preliminary experiments in
order to study users’ reactions to jokes, said in response to various emotive states and moods. Obviously, not all negative emotions can be reduced by humor – therefore, rules described above must be specified for each type of emotion.

In addition, we presume that the degree of emotional arousal (activation/deactivation) can also be of high importance here – this hypothesis, however, still needs to be verified experimentally.

4. Conclusion

In this paper, we introduced the general idea of emotiveness analysis based joke timing algorithm for humor-equipped conversational system. Although the concept is very innovative, still much effort needs to be made, especially in order to specify the rules of making decision about “appropriateness” of user’s emotional state for pun telling. Necessary experiments investigating this issue are to be conducted in the near future. When succeeded, the results will not only allow us to construct a functional timing algorithm, but will also provide us with important data about correlations between emotion types and humorous stimuli. Therefore, the research on this subject can be seen as an important contribution to the fields of humor processing, natural language processing, human-computer interaction and psychology in general.

Reference:


