

HOKKAIDO UNIVERSITY

Title	Humoroids: conversational agents that induce positive emotions with humor
Author(s)	Dybala, Pawel; Ptaszynski, Michal; Rzepka, Rafal et al.
Citation	AAMAS '09 Proceedings of The 8th International Conference on Autonomous Agents and Multiagent Systems, 2, 1171-1172 https://doi.org/10.1145/1558109.1558196
Issue Date	2009-05-10
Doc URL	https://hdl.handle.net/2115/63991
Rights	© 2009 ACM. This is the author's version of the work. It is posted here by permission of ACM for your personal use. Not for redistribution. The definitive version was published in AAMAS '09 Proceedings of The 8th International Conference on Autonomous Agents and Multiagent Systems, VOL2, Pages 1171-1172, 2009-05-10. http://doi.acm.org/10.1145/1558109.1558196
Type	conference paper
File Information	Humoroids - Coversational Agents That Induce Positive Emotions with Humor.pdf



Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

Humoroids – Conversational Agents That Induce Positive Emotions with Humor (Extended Abstract)

Pawel Dybala
Hokkaido University
Kita 14 Nishi 9, Kita-ku,
060-0814 Sapporo,Japan
tel. +81-11-706-7389
paweldybala@media.eng.hokudai.ac.jp

Michal Ptaszynski
Hokkaido University
Kita 14 Nishi 9, Kita-ku,
060-0814 Sapporo,Japan
tel. +81-11-706-7389
ptaszynski@media.eng.hokudai.ac.jp

Rafal Rzepka
Hokkaido University
Kita 14 Nishi 9, Kita-ku,
060-0814 Sapporo,Japan
tel. +81-11-706-7389
kabura@media.eng.hokudai.ac.jp

Kenji Araki
Hokkaido University
Kita 14 Nishi 9, Kita-ku,
060-0814 Sapporo,Japan
tel. +81-11-706-7389
araki@media.eng.hokudai.ac.jp

ABSTRACT
In this paper we propose a definition of "Humoroids" – a new class of humor-equipped talking agents. We summarize existing research, discuss the concept of Humoroids and introduce our pun-telling agent, which (as shown in an evaluation experiment) induces positive emotion in human interlocutors.

Categories and Subject Descriptors
I.2.11 [**Artificial Intelligence**] Distributed Artificial Intelligence - *intelligent agents*; I.2.7 [**Artificial Intelligence**] Natural Language Processing – *language generation*

General Terms
Performance, Human Factors

Keywords
Description: experimental; Inspiration: Artificial Intelligence; NLP; Focus: Agent-Human Interaction. Other: humor processing, conversational agents

1. INTRODUCTION
The research described in this paper is partially based on algorithms and data from previous research [1, 2]. However, the idea of Humoroids as a new class of agents is completely new and innovative.

2. HUMOROUS TALKING AGENTS
The necessity of creating a joking conversational agent was pointed out and motivated by Nijholt [3]. However, not much has been done to actually construct such an agent.

Probably the first attempt of implementing humor generator into a talking agent was made by Loehr [4], who combined Binsted's joking system JAPE [5] and talking agent Elmo (designed to act as a player in a text-based virtual game) to form a joke-telling talking engine. The results of the evaluation experiment were relatively poor, for there was barely any relevance between user's input and the agent's humorous output.

Another attempt at creating a humor-equipped agent was made by Tinholt and Nijholt [6], who implemented a cross-reference ambiguity-based joke generator into an AIML based chatterbot. However, the opportunities for generating cross-reference jokes in daily conversation turned out to be quite rare. Thus, the impact on human involvement in the conversation could not be evaluated.

Also worth mentioning are experiments conducted by Morkes et al. [7], in which the impact of preprogrammed (not generated) humor on a task-oriented conversation was checked. The results showed that a humor-equipped agent was evaluated as better and easier to socialize with by human participants.

3. HUMOROIDS
Although not completely untouched (see **2**), the research field on humor-equipped talking agents still needs to be precisely defined. In this paper we propose the definition of a new class of agents called "Humoroids". We propose to define them as **talking agents that are able to use humor during the dialogue**. It may be advisable to define two major subclasses: task-oriented (Morkes et al. [7]; Loehr [4]) and non-task-oriented (Tinholt and Nijholt, [6]) Humoroids. The agent we present in this paper (see **4**) belongs to the latter type. In fact, we believe that the presence of humor is of higher importance in non-task-oriented agents, for their main purpose is to entertain human interlocutors and socialize with them during the conversation. Therefore, in our research we focus on the non-task-oriented class of Humoroids – however, the role of humor and its impact on task performance should not be neglected either.

We also have to decide if Humoroids can use preprogrammed (not generated) humor. In fact, this is what Morkes's et al. [7] agent did, still visibly performing better than without humor. The agent described below also sometimes uses human-created jokes from a database. Therefore, we are far from excluding preprogrammed joke telling agents from the Humoroid class – however, relevance to the human interlocutor's utterance is important and can be facilitated by having the joke at least partially generated, using human's utterance as an input.

Finally, as we postulate in the title of this paper, Humoroids should convey positive emotions in humans. Constructing an agent which makes us feel worse is rather pointless, and misused humor can induce negative emotions – therefore, we would like to open a discussion on the subject of proper (positive emotions inducing) ways of using humor.

In general, the definition of the Humoroid class is still open for further specifications and we will be happy if this paper triggers a thorough discussion on this matter.

Cite as: Humoroids – Conversational Agents That Induce Positive Emotions with Humor, (Extended Abstract), Pawel Dybala, Michal Ptaszynski, Rafal Rzepka, Kenji Araki, *Proc. of 8th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2009),* Decker, Sichman, Sierra and Castelfranchi (eds.), May, 10–15, 2009, Budapest, Hungary, pp. 1171–1172

4. OUR HUMOROID

In our research [1] we developed "Pundalin" - a humor-equipped conversational agent for Japanese. It was created by merging two agents: 1) "Modalin" - a text-based conversational agent which uses the Internet to extract word associations for interlocutor utterances and adds modality to generated responses [8] and 2) "Punda" – an Internet-based pun generator which generates pun-including response to input utterances [1]. When no possibility to tell a pun is found, a joke from our pun database is selected randomly. In this experiment we used a simple version of the algorithm, which tells puns every third turn of the conversation. Currently we are working on an emotiveness analysis based joke timing algorithm.

Detailed algorithms of both agents can be found in [1] and [8].

4.1 Human Evaluation

In the first experiment, human evaluators were asked to perform a 10-turn dialogue with Modalin then and with Pundalin. No topic restrictions were made, so that the talk could be as free and human-like as possible. There were 13 participants in the experiment, 11 male and 2 female; all of them were university undergraduate students. After chatting with both agents, they were asked to fill out a questionnaire regarding each agent's performance. The questions concerned agents' linguistic quality as well as naturalness, human-likeness and general impression of the interaction. Here we present only the latter part, as it is of higher relevance to our topic: 1) Do you want to continue the dialogue?; 2) Did you get an impression that the agent was human-like?; 3) Do you think the agent tried to make the dialogue more funny and interesting?; 4) Did you find the agent's talk interesting and funny?; and 5) Which agent do you think was better? Answers were given on 5-point scales. Statistic significances of the results were calculated using the Student's t-test. Table 1 shows the results of the human evaluation.

Table 1. Human evaluation – results for Modalin (non-humor-equipped) and Pundalin (humor-equipped agent)

Question	Modalin	Pundalin	Difference	P value
1	2.62	3.38	**0.76**	<0.06
2	2.38	3.31	**0.93**	**<0.05**
3	1.92	4.15	**2.23**	**<0.05**
4	2.46	4.08	**1.62**	**<0.05**
5	15%	85%		

4.2 Automatic Evaluation – Emotive Analysis

In the second experiment, chat logs from the first evaluation were analyzed using Ptaszynski's et al. Emotive Elements/Emotive Expressions Analysis System (ML-Ask) [2], to check affective states of humans that interacted with the Humoroid. This idea is based on the "affect-as-information" approach, proposed by Schwarz and Clore [9]. Figure 1 shows the results of the automatic evaluation experiment for specified types of emotions.

5. CONCLUSIONS

As shown in **4**, we have constructed a Humoroid which was evaluated as more human-like, funny, likeable and generally better than the non-humorous agent by the users, as it received higher scores in all categories. The results of emotiveness analysis showed that Pundalin conveyed generally more emotions towards Pundalin (on average 60% of users' utterances were emotive) than towards Modalin (42% of emotive utterances). Most (75%) emotions induced by Pundalin were positive, while in case of Modalin the proportions are opposite (78% vs. 22%). Thus, we constructed a Humoroid that not only is appreciated by the users, but also makes them feel better by inducing positive emotions.

This paper can be seen as a contribution to the field of humor processing and human-agent interaction in general; however, we would like it also to become a first step towards defining and regulating a new class of humor-equipped talking agents, as well as the methodology of research and evaluation of such agents. We believe that Pundalin will not be the last of the kind, and hope that some day we will find the name "Humoroids" on a topic list of an agent-related conference.

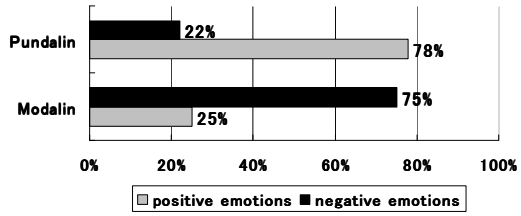


Figure 1. The total relation of positive emotions to negative conveyed in the utterances of human evaluators with Pundalin (humor-equipped) and Modalin (non-humor-equipped agent)

REFERENCES

[1] Dybala, P., Ptaszynski, M., Rzepka, R., Higuchi, S. and Araki, K. 2008. Humor Prevails! - Implementing a Joke Generator into a Conversational System. LNAI 5360, Springer-Verlag, Berlin, pp. 214-225

[2] Ptaszynski, M., Dybala, P., Shi, W., Rzepka, R. and Araki, K. 2008. Disentangling emotions from the Web. Internet in the service of affect analysis. KEAS'08, Nagaoka, Japan pp. 51-56

[3] Nijholt, A. 2007. Conversational Agents and the Construction of Humorous Acts. Chapter 2 in: Conversational Informatics: An Engineering Approach, John Wiley & Sons, Chicester, England, pp. 21-47.

[4] Loehr, D. 1996. An integration of a pun generator with a natural language robot. In: Proc. Intern. Workshop on Computational Humor, Twente, Netherlands, pp. 161-172

[5] Binsted, K. 1996. Machine humour: An implemented model of puns", University of Edinburgh, UK

[6] Tinholt, H.W. and Nijholt, A. 2007. Computational Humour: Utilizing Cross-Reference Ambiguity for Conversational Jokes. LNAI, Springer-Verlag, Berlin, pp. 477-483

[7] Morkes, J., Kernal, H.K. and Nass, C. 1999. Effects of humor in task-oriented human-computer interaction and computer-mediated communication: A direct test of srct theory. Human-Computer Interaction, 14(4), pp. 395-435

[8] Higuchi, S., Rzepka, R. and Araki, K. 2008. A Casual Conversation System Using Modality and Word Associations Retrieved from the Web. EMNLP, October 2008, pp. 382-390, Honolulu, USA

[9] Schwarz, N. and Clore, G. L. "Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states.", Journal of Personality and Social Psychology, 45, 1983, pp. 513–523