Are Body Movements Really Important for Joke Systems? Comparing Different Styles of Joke Performance

Dai Hasegawa, Jonas Sjöbergh, Rafal Rzepka and Kenji Araki

Graduate School of Information Science and Technology,
Hokkaido University, Sapporo, Japan
{hasegawadai, js, kabura, araki}@media.eng.hokudai.ac.jp

Abstract. In this paper, we introduce our findings on how effective a humanoid robot's body movements are for a joke system. We implemented a joke telling system into a robot, and evaluated funniness presenting 15 puns either with text, with a non-moving robot, or a moving robot. We found that an embodied joke system makes jokes funnier.

1 Introduction

Research on humor and humanoid robots, like ASIMO[1], has been done independently but rarely combined. In the field of humanoid robots, although there are various particular subfields, recently some researchers try to develop humanoids that work on universal tasks in the same environments as humans[1–4]. In such cases, robots and humans have to co-exist and co-work, interacting with each other as smoothly as possible. We believe that for such a multi-purpose system, humor is an important factor for achieving a higher level of mutual trust between machine and human. When it comes to computer implementations of humor reseach, there are quite only few joke generation systems[5][6][7] and they generally work on text only. The above mentioned systems can generate rather simple types of jokes, for example puns. To our knowledge there are only a few embodied agents that can perform body movements and gestures while telling jokes[8]. This paper introduces our experiments on an embodied joking system using a low cost humanoid robot, and our investigation on the relationship among textual jokes, joke telling robots, and robot movements resembling those of humans when they talk. In this research, our target language is Japanese, and we will use *italics* when giving Japanese examples.

[1] ASIMO: http:/www.honda.co.jp/ASIMO

2 System

2.1 Humanoid Robot

For our experiments, we use a humanoid robot of type MANOI PF01[2]. The robot is equipped with 17 motors, where states are readable. It does not have any other sensors.

We do not make the robot perform comedian-like funny motions but instead natural body movements similar to what humans make when they speak. Most of these motions are acted out by humans using the upper body. Therefore we use 7 motors of the upper half of the robot's body.

Fig. 1. MANOI PF01, a low cost humanoid robot used in our experiment.

2.2 Jokes

Although there are many types of joke, we chose to use puns. We used the top 15 textual puns (see Table 1) created and ranked by humans through a pun collection website[3]. We converted the puns into audio to be told by our robot during the experiment using the AquesTalk text-to-speech tool[4].

2.3 Movements

To make natural motions for these puns, we conducted a preliminary experiment. We asked three subjects to create natural motions for the puns. The subjects illustrated the motions by moving the robot's body on accordance with the audio puns. Each subject made one motion per pun, and made five motions in sum total. The resultant movements were very simple, for example a movement raising the right hand before shaking the head. The acting times were shorter than or equal to the playing times of the audio puns.

[2] KYOSHO Corporation: http://www.kyosho.com/jpn/index.html
[3] Dajakura: http://dajakura.with2.net/point0.html
[4] AQUEST CORP.: http://www.a-quest.com/company.html

Table 1. Puns : Japanese puns used in the experiment.

No.	Puns
1	*Kuso, kagi-ga mitsukaran. Kii.*
2	*Geiru, nageiru. Baasu, katto baasu.*
3	*Gokiburi-no ugokiburi.*
4	*Kono masukara yoku tsukimasu kara.*
5	*Tsubame-ga suwarou-to shite iru-zo.*
6	*"maa, haiji-ttara nani-wo shite iru-no?" "Ha ijitteru-no"*
7	*Budou-wo tabete odoroita. Kyohoo.*
8	*Hoteru-de hoteru.*
9	*"Ponzu aru? Mitsukan nai-yo."*
10	*Monaka tabeyou-to omottara mou nakatta.*
11	*Monjayaki-ga tabetai monja.*
12	*Ian ryokou-ni iku-no iyaan.*
13	*Gou Hiromi-ga umi-ni ochita. Japaan.*
14	*"Jiko syokai. Watashi-ha kyou kuruma-ni hanerare mashita. Jiko syokai deshita."*
15	*Ii mise tsukurou. Kyabakura Bakuhu.*

3 Experiment

3.1 Overview of Experiment

We conducted an experiment to evaluate the funniness of the puns using three presentation methods. In the first we used text only puns, in the second the puns were told by the robot using no movement, and in the third the puns were told by the robot while acting out the movements from section 3.1. The puns said by the robot were outputted in audio. The evaluation was done using a five-point scale, with five as the funniest grade.

Since the same pun told twice is not very funny the second time, we showed each pun only once to the same subject. The puns where shown to the all subjects in the same order. The same pun was then presented to different subjects using different presentation methods. What presentation method would be used for what subject was decided by rotation, so for instance the first subject had the first pun told by the robot, the second subject had the same joke presented using only text, and the third using a robot with movements, etc. All subjects had five jokes presented in text, five told by the robot, and five by a robot with movements.

3.2 Result

46 subjects participated in the evaluations. Puns told by the robot and by the robot with moving were 0.23 and 0.22 respectively points funnier on average than puns presented using text. However, there was no difference between the puns told by the robot with no movement and with movements (see Table 2).

Table 2. Evaluation result on an average.

Puns	Text	With No Movement	With Movements
1	2.56	2.27	1.87
2	2.69	2.67	2.73
3	2.88	3.07	2.73
4	2.56	2.93	2.73
5	2.13	2.80	3.20
6	2.67	3.13	3.33
7	2.87	3.00	2.67
8	2.47	2.38	2.13
9	3.27	3.69	3.20
10	2.67	2.57	2.67
11	2.07	2.13	2.44
12	2.00	2.80	3.56
13	2.67	3.47	3.31
14	2.73	2.53	3.06
15	3.33	3.60	3.31
All	2.66 ($\sigma = 1.19$)	2.87 ($\sigma = 1.20$)	2.86 ($\sigma = 1.22$)

3.3 Discussion

From the results of the experiment (see Table 2) we can conclude a few things. Firstly, a humanoid robot makes people percieve puns as funnier. The difference in average scores between textual puns and not textual puns is 0.21 points. The difference is significant using the student t-test, $\alpha = 0.05$.

Secondly, as for the influence of movements on the funniness of the puns, it can be seen that puns with a low score when told by the (non-moving) robot (less than 2.87 which is the average of the puns with no movements; eight out of the fifteen puns) became funnier when movements where added. For these puns, the average score increased by 0.20 points when using a robot with movements compared to non-moving one (see Table 3). On the other hand, for the six funniest puns, adding movements decreased the score compared to using a non-moving robot, by on average 0.23 points (see Table 4). However, as the results of student t-test, these differences have high P-values (0.18, 0.17). Therefore, we need to increase the number of samples to confirm the results. Furthermore, Figure 2 shows the correlation between the evaluation scores of all 15 puns using text only and using a robot with movements. The correlation coefficient was low, 0.12. In total, we conclude that movements have an influence on the impression of jokes, but what kind of influence it will have on a particular joke was no clear in our experiment.

Table 3. Evaluation results for the puns that scored less than 2.87 (the average of the puns with no movements) using a non-moving robot.

Puns	With No Movement	With Movements
1	2.27	1.87
2	2.67	2.73
5	2.80	3.20
8	2.38	2.13
10	2.57	2.67
11	2.13	2.44
12	2.80	3.56
14	2.53	3.06
All	2.52 ($\sigma = 1.10$)	2.72 ($\sigma = 1.20$)

Table 4. Evaluation results for the puns scored higher than 2.87 (the average of the puns with no movements) using a non-moving robot.

Puns	With No Movement	With Movements
3	3.07	2.73
4	2.93	2.73
6	3.13	3.33
7	3.00	2.67
9	3.69	3.20
13	3.47	3.31
15	3.60	3.31
All	3.28 ($\sigma = 1.20$)	3.05 ($\sigma = 1.21$)

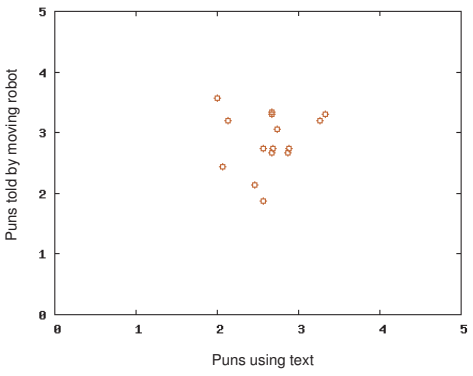

Fig. 2. Correlation between text and robot with movements

4 Conclusions and Future Work

We chose 15 human-generated puns and had them performed by a humanoid robot to check how its movements would influence the funniness of puns. As the results, puns told by the robot were on average 0.21 points funnier than the same puns using only text. However, the results also indicate that in some cases the robot's movements significantly decrease the funniness of the puns. Decreased funniness occurred mainly for really funny puns, while for less funny puns the funniness increased. We plan to perform a larger experiment to confirm the findings of this smaller study. If these are verified then we also plan to investigate what kinds of motions change the impressions of the jokes, and how they change them.

References

1. Asada, M., Karl F. MacDorman, Ishiguro, H., Kuniyoshi, Y., Cognitive developmental robotics as a new paradigm for the design of humanoid robots, Journal of Robotics and Autonomous System, Vol.37, pp.185-193, 2001
2. Brooks, R. A., Intelligence without representation, Artificial Intelligence, Vol.47, pp.139-159, 1991
3. Iwahashi, N., Language acquisition by robots? towards a new paradigm of language processing, Journal of Japanese Society for Artificial Intelligence, Vol.48, No.1, pp.49-58, 2003
4. Y.Sugita and J.Tani, Learning samentic combinatoriality from the interaction between linguistic and behavioral processes, Adaptive Behavior, Vol.13, No.1, pp.33-52, 2005
5. Binsted, K.: Machine Humour: An Implemented Model of Puns. PhD thesis, University of Edinburgh, Edinburgh, United Kingdom, 1996
6. Binsted, K., Takizawa, O.: BOKE: A Japanese punning riddle generator, Journal of the Japanese Society for Artificial Intelligence, Vol.13, No.6, pp.920-927, 1998
7. Yokogawa, T.: Generation of Japanese puns based on similarity of articulation, In Proceedings of IFSA/NAFIPS 2001, Vancouver, Canada, 2001
8. K.Hayashi, T.Kanda, T.Miyashita, H.Ishiguro, N.Hagita: Robot Manzai - Robots' conversation as a passive social medium -, IEEE International Conference on Humanoid Robots (Humanoids2005), 2005.