Does an infectious laugh occur between a robot and humans?

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1. Background

In our aging society, there is a growing need for robots capable not only doing simple works such as industrial robots building cars in factories but also supporting human daily life in hospitals or nursing homes. This kind of robot should support humans both in a physical and psychological sense. This support will be done through "Social interaction" in a natural way. In order to achieve that, robots should interact on a psychological level with their human partners. Researchers have been developing several robots aiming to achieve communication with us. However, almost no robot tries to affect human's psychological state through its active behavior.

2. Social Interaction through "laughter"

There are many ways for a robot to affect human's psychological state through interaction, but we are focusing on "laughter" in this research. There are three reasons for that. First, "laughter" can be easily detected by physiologic measurement. This helps us to clearly understand the robot's influence. Second, humans change their psychological state positively when they laugh. That suggests for us that if robots make people laugh with their behavior, robots can affect humans' psychological state. Third, we can see "infectious laugh" between humans. This occurs when a human watches another laughs, he imagines the other's positive psychological state, and laughs. It can be seen as a typical example of social interaction. In this research, we especially focused on that robot can build social relationship with human through "infectious laugh".

3. Experiment

3.1 Experimental Setup

In this research, we conducted an experiment in order to examine if a robot can induces human laugh and how the embodiment of the robot affects the human's impression. In the TV show when comedian says something funny, laughter voice streams as a "laugh-track" to induce audience laugh. In this experiment we use a same way we streams a funny video in front of the robot and subjects the robots laughs to induces human's laugh. 40 funny videos about 1 minute long were used in the experiment. First we removed the robot with the wall and streamed random 20 videos with laughter voice in random 10 videos. Then we put the robot next to the subject (Fig. 1) and streamed random 20 videos with robots laugh in random 10 videos.

3.2 Result

The video of the experiment, we could find "infectious laugh" between robot and subjects. We also conducted a questionnaire after showing the videos. Subjects evaluate their subjective impression on a scale of 1 to 10 degree. The figure 2 to 4 show the results. These results show that funniness of the atmosphere increased with robot's embodiment. Subjects answered this reason as they feel excitement and come to laugh when robot laughs and they feels as if they were at home watching TV with their family.

4. Conclusion

In this research, the possibility that robot can interact with human through "infectious laugh" with the human was shown. It is also shown that the robot's embodiment makes the empathy between subjects and a robot.
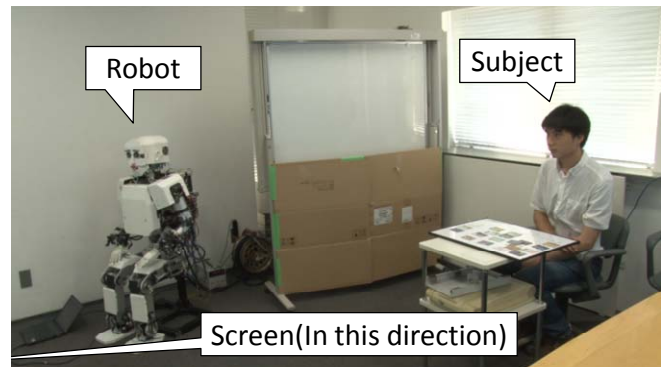
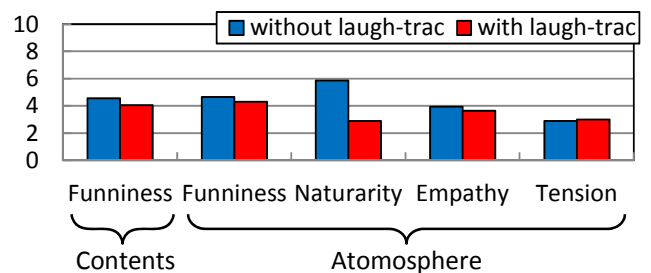(500 words)

Fig. 1. Experiments setup

Fig. 2. Subjects' impression to the "laugh-track" with only voice. 21subjects(10 men and 11 women are joined) are joined
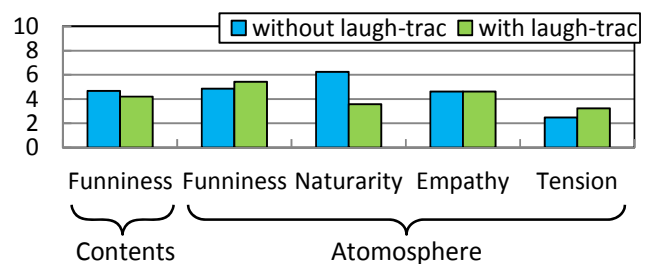

Fig. 3. Subjects' impression to the "laugh-track" with robot's behavior. 21subjects(10 men and 11 women are joined) are joined
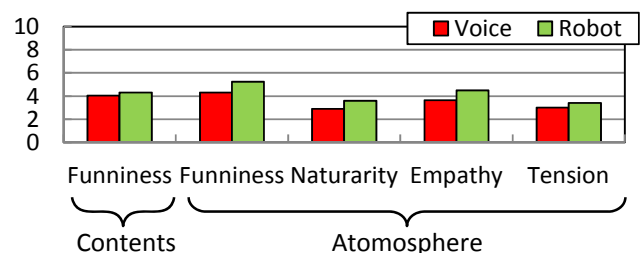

Fig. 4. Comparing the result of the impression of the results between "laugh-track" of only voice and robot's behavior. 21subjects(10 men and 11 women are joined) are joined