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# A Presentation Robot for Promoting Model-based Self-Review

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**Abstract:** It is difficult for unskillful researchers to self-review their own presentation. In generally self-reviewing their presentation video, they would feel quite uncomfortable due to their looks and voice on it. They would also have difficulties in minutely self-reviewing their own presentation. Towards these issues, we propose a presentation robot that reproduces the presentation researchers make, and that allows them to self-review their presentation including not only slide contents and oral explanation but also non-verbal behavior with less uncomfortableness. We also propose a model of presentation behavior with slides, whose purpose is to design a checklist including points to be reviewed. It allows model-based self-review of presentation. This paper also reports a case study with the system, in which we have compared self-review with the presentation robot and self-review with a virtual character on PC. The results suggest the potential of the presentation robot for promoting model-based self-review of presentation behavior particularly non-verbal behavior.

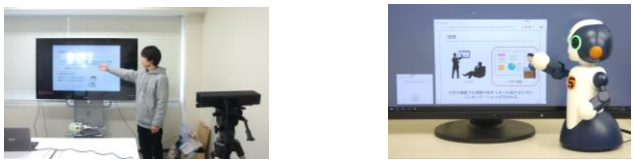
**Keywords:** Presentation robot, Presentation model, Avatar, Self-review, Rehearsal, Non-verbal behavior

## 1. Introduction

Presentation is one of the most important activities for researchers. They often conduct rehearsals in lab for improving their presentation. There are two types of presentation rehearsals, which are rehearsal with peers and self-rehearsal. In rehearsal with peers, researchers could receive reviews from the peers (Okamoto, Miyoshi & Kashihara, 2006). In self-rehearsal, on the other hand, they review their presentation by themselves to find out points to be modified.

The main issue addressed in this work is how to promote self-review. In general, researchers self-review their presentation with PC before rehearsals with peers. But, they often miss finding points to be modified since they need to concurrently make and review their presentation. On the other hand, there is another way for self-review, in which they could make a video of their presentation and then check it out. Although it allows them to direct more efforts to review, they would feel quite uncomfortable due to their looks and voice on the video. In our previous work, we have helped unskillful researchers with presentation avatar (P-Avatar for short) (Inazawa & Kashihara, 2017). P-Avatar acts as a virtual character for reproducing the presentation researchers make so that it allows them to self-review their own presentation with less uncomfortable sense. From the results of the case study, we ascertained that P-Avatar promoted self-review more significantly than presentation video (Inazawa & Kashihara, 2017). However, we also ascertained that unskillful researchers still had difficulties in finding out points to be modified particularly about nonverbal behavior such as pointing gesture and eye direction. In addition, they would also have difficulties in minutely self-reviewing their presentation since they have insufficient knowledge about what to review.

Towards these issues, we propose a presentation robot, which reproduces the presentation researchers make with more embodiment of non-verbal behavior. The robot is expected to enhance awareness of points to be modified including not only slide contents and oral explanation but also non-verbal behavior such as paralanguage and gesture. In particular, continuous motion of gestures made by learners is segmented and transformed into the robot gestures. The robot could accordingly



(a) Capturing and Recording (b) Reproduction with P-Robot

*Figure 1.* Presentation Robot

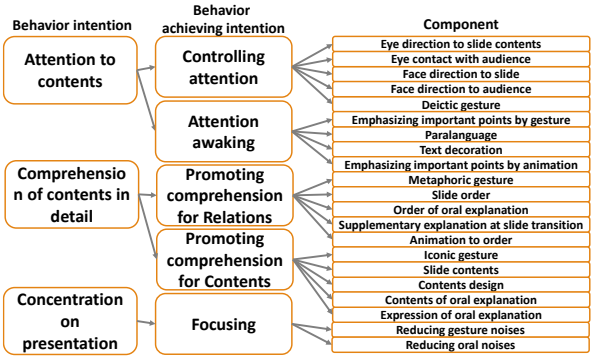



*Figure 2.* Model of Research Presentation Behavior

make the original gestures more discriminable, which contributes to enhancing their awareness about gestures. We also propose a model of presentation behavior with slides, whose purpose is to design a checklist including points to be reviewed. It allows model-based self-review of presentation.

## 2. Presentation Robot

### *2.1 Overview*

Presentation behavior generated by unskilled researchers as learners is first captured and recorded with Kinect, and then reproduced by P-Robot. The learners are expected to review the reproduced presentation with the checklist including points to be reviewed, which is obtained from the model of research presentation behavior.

We have developed a P-Robot system. It captures and records presentation learners make with Kinect as shown in Figure 1 (a). P-Robot reproduces their presentation behavior with the recorded data, in which the recorded gesture and utterance are kept, and in which the voice tone is changed. Such reproduction allows P-Robot to enhance embodiment of their gestures to promote their awareness of points to be modified.

### *2.2 Model of Research Presentation Behavior*

Referring to related work on presentation for research, we have designed a model of presentation behavior as shown in Figure 2 (Ishino, Goto & Kashihara, 2017; Goto et al., 2017). The model illustrates how behavior intentions could be accomplished with behaviors involving a number of components. Following this model, we have designed a checklist including points to be reviewed. Referring to such checklist during self-review, learners can ascertain their behavior in presentation. They can also ascertain the suitability of the slide contents depending on their intention. Such self-review allows them to minutely review their presentation and to enhance their awareness of points to be modified.

## 3. Case Study

### *3.1 Preparation and Procedure*

We have conducted a case study whose purpose was to ascertain whether P-Robot could promote model-based self-review more than virtual character reproducing the same body motion as the P-Robot system.

The participants were 8 graduate and undergraduate students. We set two conditions: self-review with the virtual character, and self-review with P-Robot. This study included 2 sessions referred as Session I (presentation) and Session II (self-review). Before Session I, all participants were required to prepare their PPT document including the contents of their research. In Session I, they were first required to make presentation, which was recorded by Kinect. In Session II, each participant conducted self-review twice with the checklist under two conditions.

In order to ascertain whether P-Robot could enhance awareness of points to be modified more than the virtual character, we compared the numbers of found points to be modified in Session II. We also ascertained which self-review had more authenticity of their original presentation, and which self-review enhanced awareness and concentration on review with a questionnaire.

### *3.2 Results*

The results suggest that P-Robot contributes to enhancing awareness of points to be modified, particularly about gesture. From the results of the questionnaire, the embodied gesture of P-Robot could enhance awareness of points to be modified about behaviors for controlling attention and for focusing, although the virtual character had more authenticity of their original presentation. Actually, some participants commented eye direction, pointing gesture or gesture habit were clearer in self-review with P-Robot.

Sota as P-Robot shown in Figure 1(b) currently has some shortcomings about the small shaking, motor sound, restricted arm motion, and slide animation. We accordingly need to resolve these, or we can consider the use of alternative P-Robot except Sota.

## 4. Conclusion

In this work, we have proposed P-Robot and developed the P-Robot system for enhancing awareness of points to be modified in presentation. We have also designed the model of presentation behavior to design the checklist for self-review, which allows minute self-review of presentation. From the results of the case study, P-Robot could enhance awareness of points to be modified particularly about gesture. In future, we need to refine the P-Robot system, to consider what kind of robot is more suitable for self-review.

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