Interaction between a Conversational Agent and Multiple Users: A Group Counseling Agent

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Abstract. We describe the design and evaluation of an animated conversational agent that can interact with a small group users by means of handheld, RF-based communication devices. The agent currently functions in the role of a group facilitator for health behavior change counseling. The agent is projected as a life-sized person in a room, programmed with the names of the group members. Results from preliminary evaluations indicate the agent is accepted as a meeting facilitator.

Keywords: embodied conversational agent, group interaction.

1 Introduction

Most conversational agents are designed to interact with only a single user at a time, simulating one-on-one interaction with another person. However, many applications, such as facilitating meetings or group counseling sessions, require the agent to be able to interact with several users at the same time.

We have developed a software framework to provide this functionality using Audience Response System (ARS) technology. This system uses small handheld devices that allow several people to give enumerated responses to a central computer through radio frequency communications (Figure 1).

2 The System and Setup

The system consists of an animated conversational agent, projected as a life-size person in a meeting room, integrated with an ARS. The agent uses synthetic speech and synchronized animation to talk to users. Users push buttons on their ARS devices to interact with the agent, with possible user responses displayed on the right side of the agent (Figure 1), updated dynamically during an interaction. The users sit in front of the agent in a circle so that they can see the agent as well as the other users in the room.
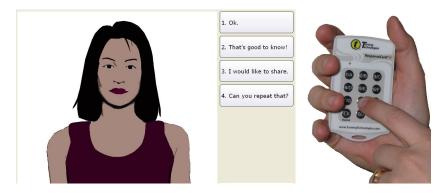
Fig. 1. Input device with keys corresponding to displayed possible response options.

3 Interaction Modes

We have designed several interaction modes for a group of users to interact with the agent.

ALL RESPONSE. The first mode requires a response from all users before the agent continues. The agent's response is contingent upon the overall input from the users (e.g., if most users ask a particular question, the agent can prioritize the associated response).

ONE RESPONSE. The second interaction mode involves asking a question of a particular user. The agent responds only to that user's device; all other response devices are ignored.

VOLUNTEER RESPONSE. Finally, individual users are also allowed to volunteer information to the group. The agent gives them the floor until they indicate they are through talking.

4 Pilot Study

In a pilot study, two groups of participants held 30 minute discussions about exercise behavior change led by the group counseling agent. Participants gave the agent generally positive ratings, with average ratings of 5 out of 7 for its ability to promote group interaction and its effectiveness at running the meeting.

5 Future Work

We are continuing to enhance the agent's effectiveness by giving it the ability to gaze at each user when addressing them individually, and the ability to determine when a user has stopped talking, using audio threshold detection.