Avatar-based Kiosk with Interpersonal Sensors

Douglas C. Derrick, *University of Arizona* dderrick@cmi.arizona.edu
Dr. Jay F. Nunamaker, Jr., *University of Arizona* jnunamaker@cmi.arizona.edu

Description

We have created an automated kiosk that uses embodied intelligent agents (avatars) to interview individuals and detect changes in arousal, behavior, and cognitive effort by using psychophysiological information systems. We initiated this research stream from intelligent agent architectures, embodied conversational agent studies, influence tactic literature, and interpersonal deception research. One of the embodied intelligent agents that we created is shown in figure 1 and the kiosk is shown in figure 2.

Figure 1 - Sample Embodied Agent

This research closely relates to well-known intelligent agent architectures with some key distinctions. Like most intelligent agent systems, our embodied-avatar agent perceives its environment through sensors, influences its environment via effectors, and has discrete goals. However, dealing with human behavior in a real world environment is stochastic, continuous, dynamic, and difficult to succinctly represent to a computer.

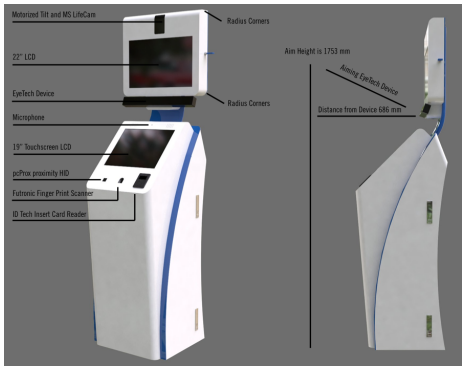

Figure 2 – Avatar-Based Interviewing Kiosk

Goals of Prototype

The goal is to naturally interact with people, conduct a screening interview, and process user responses. In the current context, we are evaluating detecting truth versus deception. Our intelligent agent senses human behaviors and human states and the kiosk captures the following data streams:

- Kinesics and facial emotion – captured via computer vision algorithms (video)
- Vocalics – captured via computer aural perception algorithms (audio)
- Saccade, gaze duration, and pupillometry – captured via eye-tracking (near infrared)
- Linguistic content – captured via natural language processing (dragon naturally speaking)

The agent must utilize novel effectors to affect both humans and the environment. These effectors include human influence tactics, impression management techniques, communication messages, agent appearance, agent demeanor, and potentially many other interpersonal communication and persuasion strategies.

Intended Impact

The kiosks have been repeatedly tested experimentally. The goal is to use these new embodied agents to interact with people in a variety of contexts. In the near future, these kiosks will be evaluated as tools for conducting screening interviews for jobs, border crossings, etc. In the future, this research may affect the nature of human-computer interaction as the agents become more able to detect and react to human states.

Acknowledgements: This research is supported by the US Department of Homeland Security (DHS) under grant number 2008-ST-061-BS0002. However, any opinions, findings, and conclusions or recommendations herein are those of the authors and do not necessarily reflect views of DHS. The views, opinions, and/or findings in this report are those of the authors and should not be construed as an official U.S. Government position, policy, or decision.