Title: Embodiment Awareness, Mathematics Discourse, and the Blind

Time & Location:
12:00pm, Monday, February 22, 2010
Tec 205 (Vislab), Bobby Chain Technology Building

Presenter:
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Abstract: Humans are embodied beings. When we speak, our embodied behavior of gesture, gaze, posture, and facial expression are brought into the service of the communicative process. The extent to which one’s interlocutor is aware of such embodied behavior and utilizes it to maintain the interaction and comprehend the material conveyed is still an open question. Mathematical reasoning, especially, is rich in spatial imagery that is revealed in gesture. The communication of mathematical concepts seems especially to engage such co-speech behavior. When a graphic/illustration is available for math instruction the discourse stream is typically situated with gestures of spatial reference into the graphic. Research with individuals who are blind suggest that they have remarkable capacity for visual imagery, memory, and conceptualization. However, students who are blind tend to lag sighted students in mathematics education. We posit that a significant impediment to math instruction for students who are blind lies in the lack of visual access to the embodiment of the instructor. We have in such students, a population that is able to access the graphical content (through tactile image technology) but are not visually aware of the embodied behavior of their interlocutor.

We describe a system for bi-directional embodiment awareness between the instructor and blind student in fluid situated discourse. The system conveys information of the deictic gestures of the instructor to the student using computer vision and a haptic glove. We discuss the design of the system, the use of gaming to encourage embodied skill in the use of assistive technology, and the use of the system in instructional discourse.