Social Floor

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ABSTRACT
This paper demonstrates a system that uses knowledge of social relationships and social distance between people to create an entertaining context-aware floor. This work is an experiment with ambient displays at one's feet to predict, display, comment on, and possibly improve or effect social experiences. The Social Floor presents visual annotations and information based on ambient events and individuals' interactions. People's conversations and interactions are annotated in the form of merging projected identities, footprints, and residual identities of people they have met.

Keywords
Person to Person Interaction, Social, Ambient Display, Virtual Environment

INTRODUCTION
We are always walking on floors; we are well-attuned to their surface qualities and any irregularities in them. We see a dollar on the floor, we notice it and pick it up. Floors might then be good venues for displaying information. Examples of this include textured surfaces to facilitate mobility for the visually impaired and colored lines in public spaces to assist point-to-point navigation. Many people have experimented with displaying interactions on floors including: social space delineation, museum exhibits, reactive fountains, etc. One example is Bill Keays and Ron McNeil's labyrinth, in which a virtual representation of the familiar children's toy, labyrinth is projected onto the floor[1]. As one walks around on the labyrinth it tilts a virtual ball rolls on the labyrinth, and the sound of the ball running into walls can be heard. If the ball falls through a hole, it also makes a sound. This is a very effective presentation of interactive information displayed on a floor.

Other people including Aaron Bobbik have created systems such as Kids Room, which uses buttons on the floor to allow children to interact with virtual characters projected on the walls[2]. Justine Cassell and Kimiko Ryokai's Story Mat is another example of research into responsive floors in which children tell stories through interactions[3].

A blanket placed on the floor is sensitive to the placement of objects on top of it, and elicits stories from the children based on the interaction. The context-aware computing group at MIT Media lab has developed a system which is activated by steping on sensitive tiles allowing the floor to become a virtual threshold assistant[4]. This work deals with social demarcation at the threshold.

Social interaction among individuals is a central component of society. People use clothing, settings, games, entertainment, art objects, food, drinking, etc. as social lubricants. We explore systems supporting person-to-person interaction in the form of the Social Floor. This work explores systems supporting and involving person-to-person interaction. The National Arts Council has supported earlier work in this area such as the music conducted by Bill Patterson at Brown University in the early 1970s. In his system, people wore encumbering socks, helmets and electronics, and lights placed on their heads. They stood on a metal floor, which allowed them to interact with each other through optical and auditory communication channels to create music together. Myron Kruege's Video Space [5] work on interactive walls has been copied and expanded to be part of museum pieces and other public spaces. In these pieces a person faces a wall and gestures, these gestures affect something that is projected on the wall. Our goal is to create a more ambient use of computers to comment on social context. We embed sensors and displays in the environment rather than encumbering the users. The goal of the system is to display imagery to make a person aware of the condition of the social environment and his or her relationship to other people in it.

DESCRIPTION
The Social Floor is an interactive system which annotates a person's presence on a floor with a video projection of a graphic identity on the floor. The floor uses Computerboard, Inc.'s 96 Pin I/O Board connected to 2'x2' pressure activated floor panels. A ceiling-mounted video projector is used to create visual annotation. The Social Floor was prototyped in Macromind Director then programmed in Java 1.1.

SCENARIO
A person walks into a room. The outline of a star appears encircling his or her feet. The individual likes the star, so he or she continues to walk across the floor. His or her star keeps pace. As he or she approaches another person, his or her star taps against the circle around that person's feet. As

the two engage in conversation, the circle and star take on characteristics of each other, the circle incorporating tiny stars into its outline, and the star forming tiny circles at its points. Over time, as the two continue to talk, both the circle and star grow to encompass the two individuals as a conversational entity. As this conversation ends and the individuals move on to other conversations, their annotations return to the original form, but retain a marker (a small color facsimile) of the other individual's annotation.

Calling another person to join you through foot position gesture recognition is another scenario we have developed. Person A is in a conversation with Person C. Person A wants to invite Person B, with whom he or she has had a previous conversation or interaction, to join the conversation with Person C. Person A places his or her foot over the residual identity of Person B. Person A's residual identity in Person B's space is activated or highlighted. Additionally, a projected path, made up of Person A's and Person B's annotations, appears between their two physical positions, helping Person B locate the conversation.

EXPERIMENTAL RESPONSE

The system is if anything to noticeable. Our experience is that it is quite visceral. This degree of distraction is easy to fix, certainly dimmer projection displays are available, ultimately displays would be imbedded in to the surface of the floor and the artifacts of the projection will be eliminated. People were eager to move around on the floor and converse with others to collect diverse annotation and enjoyed creating paths from one conversation to another. We haven't used it yet in a full blown party. We will be using it to run many of the aspects of the context-aware computing lab.

FUTURE WORK

The social floor will begin to run several programs for the context-aware computing group. It will be able to give people a tour of the lab, comment on peoples interactions., be part of teaching them to dance, etc.

We will develop new light shows for dance floors that will use smarts to mix it up. As a person moves the floor can encourage exchange of partners or initiate other interesting social commentary as people dance. Store fronts already use pads to open the door, could they do more; perhaps they can tell you how long a wait will be, or provide information about promotions.

We would like to annotate conversations based on voice analysis. Laughter, pitch variability, speed, and energy can be graphically displayed within a person's annotation. The style of conversation can be suggested by these annotations. For example, a third party encountering a conversation can interpret the participants' annotations in order to appreciate the emotional quality of the conversation and its history. An angry conversation might be represented by a spiky border, while a calm conversation could be represented by soothing waves.

CONCLUSION

Ambient displays like mirror balls and light shows have here-to-for involved assessing the music or having an internal clock that drives them. This work begins creating interactive social commentary as a social and user model based light show approach. In such systems a computer assesses the social context and creates a social commentary style display. Our interest in the understanding of 1) the social environment and 2) the social condition one is in is reflected in the Social Floor. The floor presents feedback to enhance information retention and display it in new and interactive ways. The initial response to this work is promising enough to motivate future development in the area of acoustical and tactile feedback.

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