FIGURE 1: A series of 5 images consisting of 4, 10x10 inch “pixels”
Because of the dynamic nature of this display, it can convey information that goes beyond the original series of images designed by the artist. There are two distinct ways in which the computer can affect the user's viewing experience.

First, a pixel can be mis-aligned such that parts of two different pixels are both visible at once (see Figure 2). Second, a pixel can be mis-matched (see Figure 3). Here, pixels from different coherent images are shown (such as the head of the child with the body of the older woman). In either of these cases, the user tends to experience a sense of dissonance. The strength of that reaction is related to the number of pixels which are mis-aligned or mis-matched (compare Figure 2 to Figure 4). Dissonance can be used to indicate, for example, that there has been a significant change in the information driving the display.

TECHNOLOGY

Each of the four “pixels” is painted on its own canvas panel alongside four other versions of the same pixel. These canvas panels are looped and connected end-to-end to form a belt, and are placed on the mechanical frame over a pair of rollers (See Figures 5 & 6). One roller drives the movement of the belt, the other is a spring-tensioned idler that keeps the belt taut. Alignment of the belts is maintained by means of physical guides. The drive roller is itself connected to an inboard mounted, uniphase stepper motor by a belt.

CONCLUSIONS & FUTURE WORK

As described in [1], the mechanics of ambient displays are difficult to design and this effort was no exception. In our case, the inexact nature of the painted panels led to problems with registration. We plan to mount the strips on carefully cut backings. Additionally, we will add wires between each pixel. Contact between these wires and wires mounted on the frame will signal registration.

We want to incorporate motion as an active ingredient in the display. We are currently creating continuous, un-pixelated panels that are well-suited for using motion to convey meaning. For example, the display can “pulse” by moving the panels back and forth in sync. It can also “flow” by moving one or more panels in a constant direction. We built the mechanism so that the panels can be easily replaced with new panels.

The display can also make the transition from ambient to interactive in several ways. First, by increasing the number of “pixels” from 4 to 16, we can display letters, charts and symbols. We built our mechanical system with this scaling in mind. Second, by mounting an LCD display inside the frame and cutting out a portion of the panel, the display can “open up,” transforming into an interactive picture.

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