Ghost Line
By Jeff Snyder

General Information

This piece creates audio synthesis using a direct mapping of pixel brightness to audio waveform deflection away from zero. Therefore, all the sounds heard are created directly from the scanning of video information, without any further processing, and without any mapping to a software "instrument"; The video is the instrument. The performers have control over the image content (by moving their bodies) and various effects that they can apply to the video using a joystick, such as reducing the horizontal resolution or adjusting brightness. The conductor has control over the fundamental frequencies at which each performer's video is scanned, and can therefore create four-note chords from the combination of these scanning frequencies. The conductor steps through the chords in the course of the piece, and can choose for any chord whether the frequency transitions are sudden or smoothed (for slow glissandos). The conductor also signals when the performers should move from one "lettered" section to the next (i.e. section A to section B). These major section changes can be activated by the performers with "preset number" buttons on their joysticks. Video from each performer is composited onto a screen behind the stage, and the audio from each performer should be sent to a separate speaker within the hall (i.e. quadraphonic sound).

Performance Notes

Four performers are seated in chairs in a semicircle, facing the audience. Each performer has a laptop, a flight simulator joystick in their lap, and an external webcam (with manually adjustable focus) pointing at him or her. Only one performer should be visible in the frame of each webcam. A conductor is in front of them, signalling when to move between the sections of the piece, and sending messages over a network that updates the scanning frequencies for their video synthesis patches (to move the chord progression forward). Ethernet cables run from the performers' and conductor's computers to a 5-channel network switch. Wired ethernet is necessary for the bandwidth of the data, since the performers' computers are sending 640X480 video frames to the conductor's computer, where they will be reconstructed into the full video for projection behind the performers. Due to the use of a network switch rather than a router, the performers' and conductor's computers must have manual IP addresses set (192.168.0.1 through 192.168.0.5 will work fine). Performers open the Max/MSP patch titled "GhostLine_player" and the conductor opens "GhostLine_conductor".

Detail about each section:

A:
        Technical info: Image is a difference between the current frame and the last frame, so that only motion is detected, and non-moving figures fade into black. The "scan line" is vertically

stationary, but can be positioned by the performers using the throttle control on the joystick. Image is black and white.

Performer info: All performers position the scan line slightly above their heads. Performer 4 leads the group, doing simple motions that the others copy at a delay of their own choosing. These motions should explore placing the fingers of one hand into the path of the scan line. After three motions, all performers position their scan lines over their eyes. Then performer 4 sends a "wave" of head motion down the line, which reflects back at performer 1 and then performer 4 again, ending at performer 1.

B:
Technical info: Image is now simply the current frame, no longer differenced. The scan line now moves vertically when its horizontal scan is finished, at a rate set by the fundamental scan frequency and a frequency scalar controlled by the joystick. Still black and white.

Performer info: All performers now cease physical motion and face the camera. With the joystick, they can adjust the following video parameters ad libitum: brightness, contrast, horizontal resolution, vertical resolution, scan line frequency scalar.

C:
Technical info: Color is introduced. In addition to the standard color space (which is a mis-rendering of an RGB space as YIQ format), the player can momentarily shift to two additional alternate color spaces (RGB -> L*HoC* and RGB-> RGBcie).

Performer info: Performers experiment with occasionally adjusting the manual focus on the camera. They can also adjust ad libitum the following parameters on the joystick: brightness, contrast, saturation, horizontal resolution, vertical resolution, scan line frequency scalar, and alternate color space, and octave shift.

D:
Technical info: Black and white, and differenced as in section A. Conductor can control lighting on the performers to allow solos and duets to form (by darkening the image on certain performers to force them to rest).

Performer info: all the previous ad libitum joystick controls are active, but the performance during this section should be calmer and have more space. No more focus adjustment.

E:
Technical info: Back to color and no longer frame differencing. Alternate color spaces are now RGB->XYZ, RGB->U*V*W* and RGB->xyY.

Performer info: all previous ad libitum joystick controls are active, and the mood should be intense and frantic.

F:
Technical info: Black and white. Scan line is vertically stationary. Frames are differenced (motion sensitive).

Performer info: mood should be calm. Concentrate on resolution alterations and brightness/contrast controls. End on low vertical and horizontal resolutions.