SONIFICATION OF DIGITAL IMAGE PIXEL DATA

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Abstract

This paper presents the development of a Max/MSP/Jitter tool that allows for the musical sonification of digital images. The Max tool sonifies the individual pixel data of 32x32 pixel digital images for composition, performance, and analysis. This paper summarizes the history of sonification, presents several relevant applications of sonification, further developments in data interpretation for performance, and manifold compositions. The second portion of this paper explores the aesthetics of electronic music and presents a defense for the medium of sonification in music.

The project demonstrates how the Max/MSP/Jitter environment can be used to create a sonification tool that imports a preexisting digital image or live video capture and outputs an audio representation of the data. The proof of concept for this project was limited to a small image covering a 32x32 pixel grid with a limit of 1024 unique colors. Once the image is loaded into the Max/MSP/Jitter environment the program then reads the digital image's pixels line by line; the data is transferred to a button matrix where the color may be transformed into sound. The sonification of the data is created through a mathematical equation that turns 256bit color into fractions of the pitch spectrum using defined frequency limits. The process can be reversed to find representative colors for specific pitch frequencies. Once the color and pitch data is matched, the audio output may be presented using various wave functions that may then be sculpted or processed further.

This project explored the aesthetic contrasts between organic photography (digital camera or web camera) and created image (Microsoft Paint and Photoshop) sonifications. The second approach explored a mixed method where the user applies

photo filters to organic photographs or edits the photo to create a more aesthetically pleasing sonification. Alternatively, the user may arrange pixels with calculated color presence values using a transposition chart or color calculator tool to create predictable compositional outcomes.

Development of this project took place over 16 weeks beginning with the creation of the individual Max/MSP/Jitter components that comprise the sonification environment. Once the working prototype was created, simple 32x32 pixel images were uploaded to the environment for testing. Both organic photos and created images were tested in the environment. The best representatives of successful sonifications and compelling images were chosen for beta testers to use. The project was evaluated through a beta test of a Windows and Macintosh prototype released to volunteer users. These users were given a restricted sonification environment to test the individual components and overall effectiveness of the project.