Biometrics Project

Inspiration

The integration of biometric measurement technology into a live music show creates a unique and immersive experience that transcends traditional forms of entertainment. As spectators engage in the rhythmic movements of dance, their emotions are translated into a visual spectacle through the use of wearable biometric sensors.

At the heart of this innovative concept is the symbiotic relationship between the audience's emotional responses and the computer-generated video images. Each spectator wears a discreet sensor capable of capturing their biometric data, reflecting the electric patterns associated with various emotions. These sensors then feed the data into a system equipped with pre-selected algorithms.

As the music pulsates through the venue, the system interprets the emotional cues from the spectators' biometric data in real-time. The result is a stunning display of computer-generated visuals that mirror the collective emotional energy of the crowd. The images could range from vibrant bursts of color and intricate patterns to dynamic shapes and forms that evolve with the ebb and flow of the music.

The display can be presented through multiple screens strategically placed around the venue or on a single massive wall of screens, enveloping the audience in a mesmerizing panorama of synchronized visuals. The immersive nature of the experience fosters a deep connection between the music, the audience, and the visual representation of their emotions.

Furthermore, the system could be designed to adapt and evolve based on the overall mood of the crowd. For example, during upbeat and energetic segments of the performance, the visuals might become more dynamic and vibrant, with rapid transitions and bold color schemes. In contrast, during slower, more emotional parts of the music, the visuals could shift to softer tones and more intricate, flowing patterns.

This innovative fusion of technology, music, and visual art not only enhances the overall sensory experience for the audience but also provides a new dimension for artistic expression. It transforms the traditional concept of a music show into a dynamic and interactive platform where the collective emotions of the crowd become a living canvas, continuously shaped and reshaped by the music and the individuals expressing themselves through dance.

In essence, this concept blurs the boundaries between performer and spectator, creating a shared experience where the music not only resonates through sound but also comes to life visually, making each live performance a truly unique and unforgettable event.

The System

This cost-effective solution leverages Raspberry Pi computers to generate impressive visuals in real-time. Capable of producing visuals with any resolution, the system can seamlessly display them across multiple screens, all synchronized for a cohesive experience.

The affordability of this solution stems from its utilization of Raspberry Pi computers. Each display is linked to a Raspberry Pi, which is responsible for rendering either the entire or a portion of the generated image. The computer-generated image is crafted using a GLSL shader program, shared across all Raspberry Pi devices.

To maintain synchronization, all Raspberry Pi units are interconnected through a local network, ensuring that their clocks are precisely aligned. Notably, the system's efficiency is maintained by the fact that no image data is transmitted across the local network. This design choice allows the system to operate smoothly even with low-end computers, such as the Raspberry Pi, making it a cost-effective yet high-performing solution for dynamic visual displays.
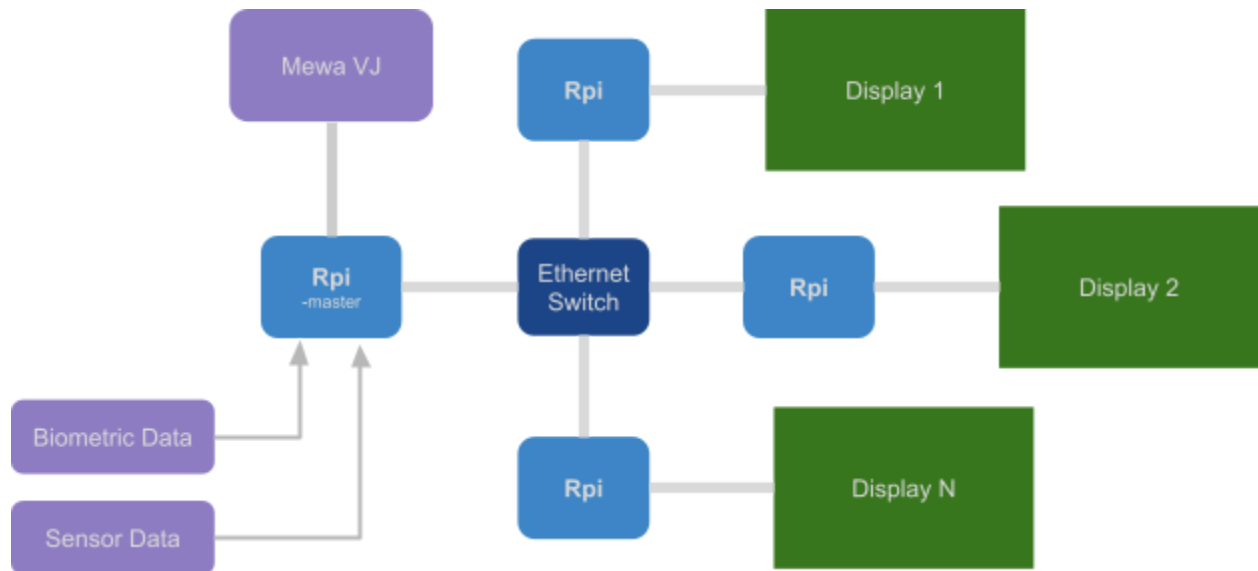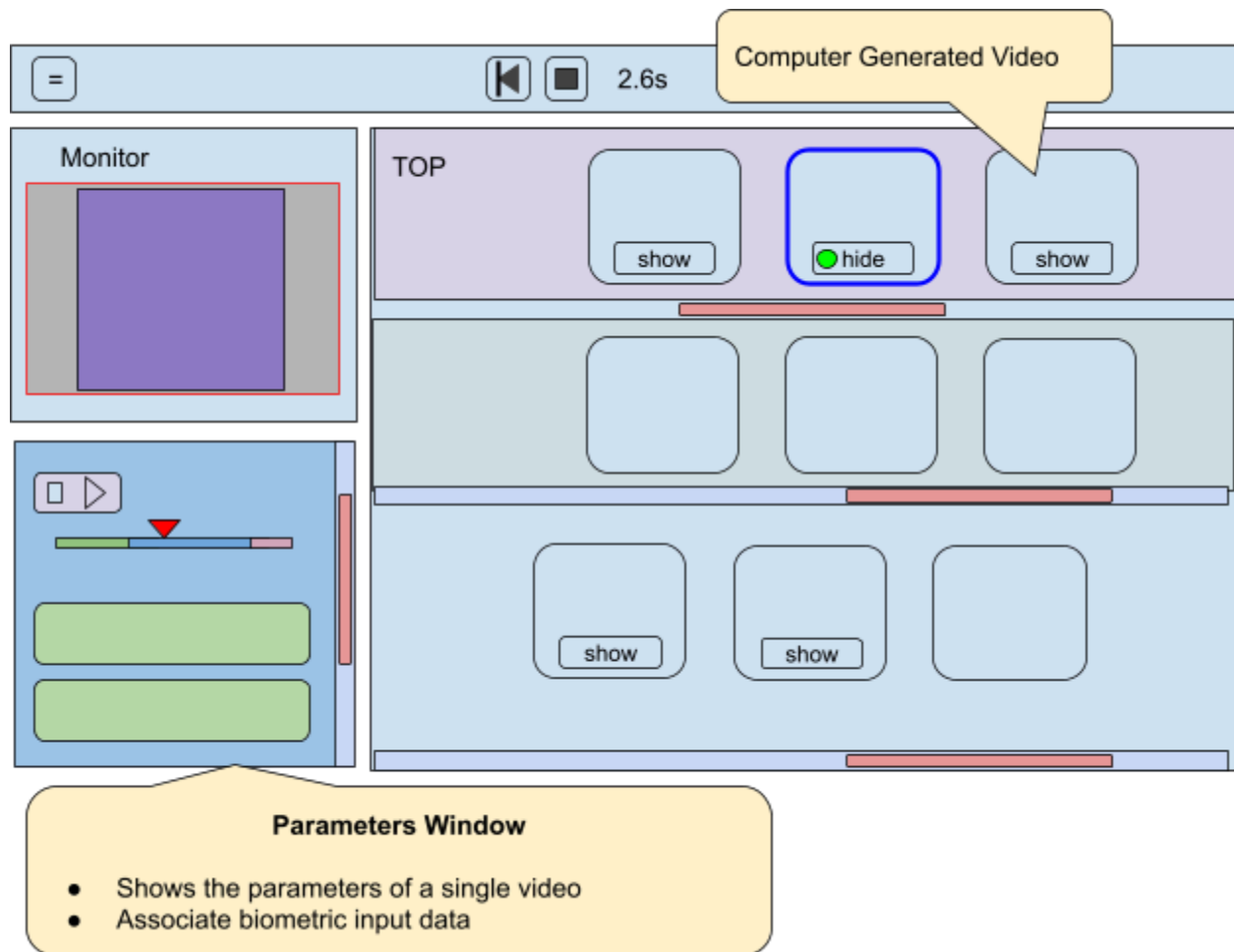
The VJ app

Mewa VJ is an app designed to control the dynamic visual system during a live show.

Mewa VJ provides a user-friendly interface for live mixing various computer-generated videos. This intuitive UI is designed to operate seamlessly on both mobile and desktop platforms, ensuring accessibility and ease of use across different devices.

Computer Generated Video

Monitor

TOP

show | ● hide | show

show | show

Parameters Window

- Shows the parameters of a single video
- Associate biometric input data

The VJ App features three tracks displayed as three rows. This represents the maximum number of videos the app can simultaneously render. The top track corresponds to the topmost layer in the visual hierarchy, while the second track is positioned below the top layer.

The VJ App operates within a web browser, eliminating the need for software installation or a dedicated machine. This browser-based functionality enables users to access the system from their individual machines, promoting flexibility and ease of use without the constraints of specific hardware requirements.

Biometric Data Input
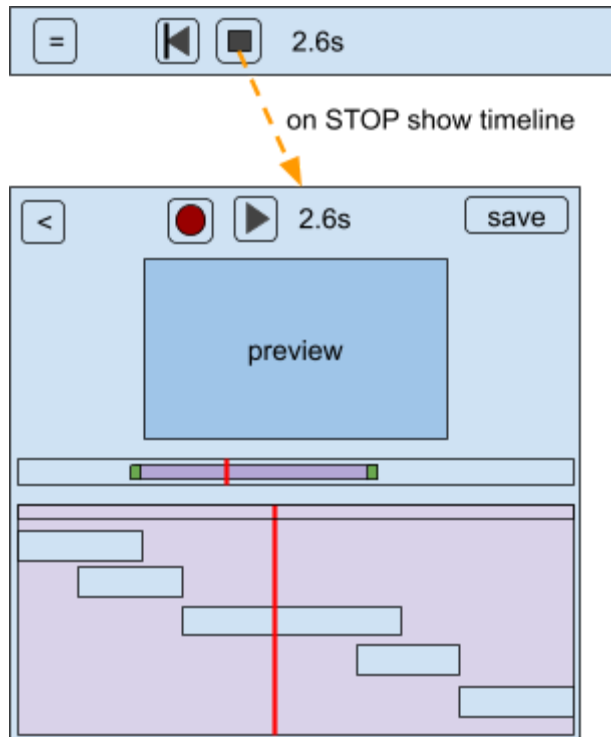
Parameters can be associated to
- **Curve**: The parameter value changes through time according to a curve
- **Emotibit**: receives values from an *emotibit* device
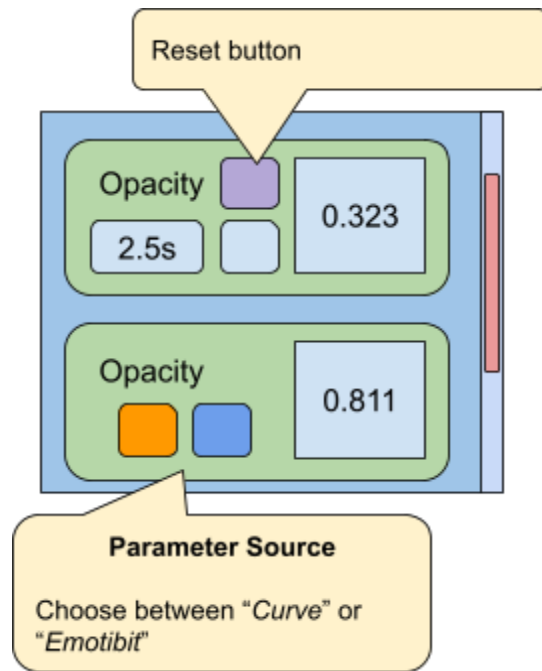
Recording

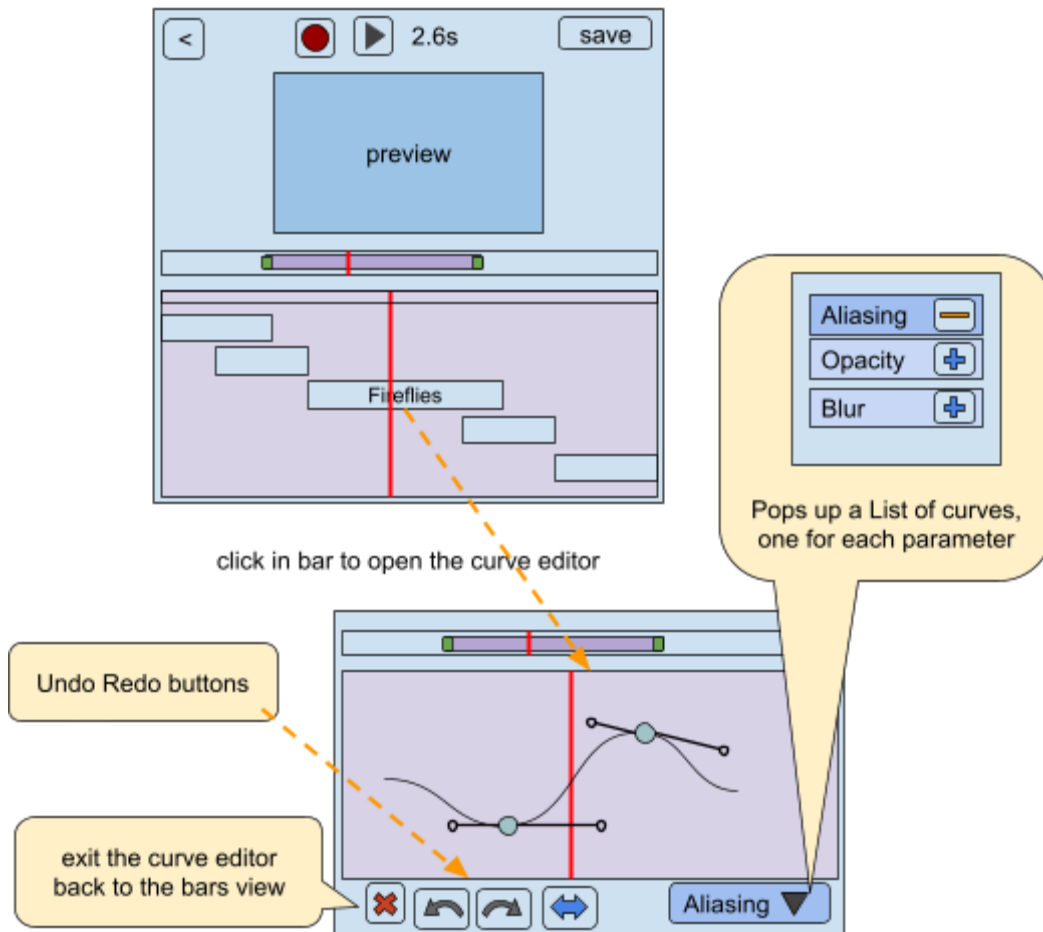*Shows* can be recorded and edited through a timeline based UI.

on STOP show timeline

Curve Editor

Parameters can have curves associated. And curves can be edited inside the VJ App through the curve editor.

click in bar to open the curve editor

Undo Redo buttons

exit the curve editor
back to the bars view

Pops up a List of curves,
one for each parameter

Demo

For development purposes VJ App is available at https://mewatools.com/vj

Technical considerations

Sound Image Latency

To account for latency between sound and image, the system will incorporate an adjustable delay feature. This functionality enables users to fine-tune and synchronize the timing of the sound by adding a customizable delay.

Clock synchronization

The synchronization of clocks across machines will be done using the Network Time Protocol (NTP). As per the NTP documentation, this protocol is capable of delivering an error rate below 1 millisecond. This precision is crucial to create the illusion of a unified and seamlessly coordinated display.

Feature Requests

Video Transitions

The user wants to import its own videos and apply transitions. Some transition examples at https://videohive.net/item/handy-seamless-transitions-pack-script/18967340