

Lotus Audio - Virtual 3D Music Driven Environments

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Premise



Lotus Audio is a web app for artists to create virtual environments that respond to music. Artists can create scripts written in JavaScript to create 3D environments and shapes which respond to music. The platform allows them to share their creations with users through the web app along with options for monetization of their creations if they choose to do so. Users can experience the artist's creation in the browser and can optionally have the experience in virtual reality (VR). They can invite others to join their virtual experience creating a social virtual space for shared audio-visual experience.

The app is designed for artists who enjoy making music visualizations as creative expressions. Possible audiences who may take interest are video artists, demo artists, musicians and anyone who enjoyed Winamp visualizations. It is research into platforms for digital artists which can extend utility for their creations. It allows multiple people to experience the visualization at the same

time which adds a social dimension by default. Artists can monetize their works of art attributing a sense of value for the works created.

It also opens up a new mode of media to be thought of as something worth paying for. While video consumption platforms have established centralized models of directing revenue towards creators, this platform tries to directly connect creators with consumers with only the technology underneath being the medium. A lot of ideas about its implementation have been inspired and built on principles of the decentralized web. The application has been previously used to create artworks for algorithms and a presentation for a conference about visualizing the physics of sound.

1. Concept

The application is inspired by the demoscene internet subculture which focuses on producing small computer programs that produce audio-visual presentations. The application is accessible via a URL on a browser and collaborators can easily create, view and share their creations within the app. The web app and some demonstrations are detailed below.

2 Web Application

App:
<https://lotusaudio.herokuapp.com>

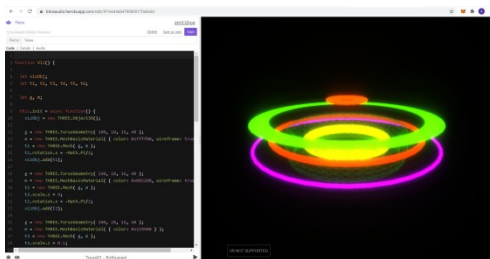
Git:

<https://github.com/amitzkpa/lotusaudio>

The app uses several core web technologies. Users can visit the URL of the website on an internet browser. They will be presented with the list of public creations present in the gallery from which they can select to view the experience. When viewing the creation users can load music choices from the list supplied by the artist or pick a track of their choice. On starting the song the 3D environment comes to life, processing the music and creating the 3D experience in the virtual environment.

2.1 Creation

Artists create the 3D environment using Javascript. The geometry in the environment is rendered using threejs – a popular browser based 3D rendering library. The processing engine parses the artist's creation and injects the logic into the scene. The scripts are designed to conform to a basic structure which enables it being processed this way. The processing engine parses the audio file and passes it to the script for rendering. The audio is processing is done vis WebAudio API which does an FFT analysis of the spectrum and processed information is passed in a series of arrays to the artists scripts. The scripts are created in the browser in the editing mode which is very similar to the viewing mode with extra tabs and settings for configuration.



Script creation and editing screen.

2.2 Processing

The web app is a client side application which reads the visualizer script and a given audio file to generate 3D geometry. The script and the audio files are independently loaded from a URL. The audio file is parsed using the WebAudio API and passed to the script. Threejs is used to create the geometry and render the virtual scene. WebXR technology allows users to experience the 3D scene in VR.

2.3 Experience

A virtual 3D environment is populated with geometry as defined in the artists' script. All designs start with a fixed environment output by the initialization method on the file. Users can enter this environment for trying out the experience. When they start playing the music the geometry in the environment responds to the music. Designers have the choice to lock the animated content to be accessible only to paying users. Users have the choice to enter the virtual environment as a VR experience if they have a connected headset.

2.4 Sharing

All experiences being served as a web application makes it really easily to share experiences. Creations are shared over a URL and it's easy to share them by passing the URL. The scripts driving the experience are also viewable for everyone. Planned future development will include a way for creators to fork and remix designs. Users can also invite others to participate in a particular experience by sending an invite link. Invited participants join the same experience with synchronised music and environment but viewing the experience from a different vantage point in the virtual environment.

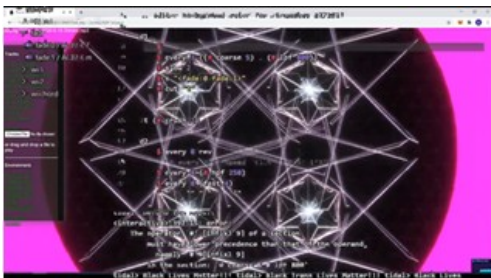
2.5 Monetization

The application currently also has experimental features to allow artists to monetize their creations using WebMonetization. WebMonetization is a new experimental way of monetizing content on the internet based on engagement. Creators can lock access to their content till the user starts depositing micropayments to an address specified by the creator. It is very simple for the artists to create a pointer where they can receive payments and just as simple for the users to start sending payments. It is based on a proposed W3C standard and the underlying infrastructure is directly supported by the browser.

3. Experiences

3.1 Wonderville Algorave, New York 2020

An experience was created for an online algorave hosted by Wonderville. Musicians and visualizers get together at algoraves to create digital music and accompanying visuals. Typically the visuals are rendered as videos made using music visualization software such as TidalCycles, Orca, Resolume etc. This visualization was created as a new technique to make such visuals where a 3D scene was generated procedurally which responded to music contributed by other artists.



3.2 Seeing Sound, CodeLand Conference 2020

The visualization attempts to visualize the physics of sound by simulating its effect on freely suspended particles. It was inspired by prior work done in the field of Cymatics where the wave nature of sound vibrations is exhibited by studying the actions of vibrating plates on sand particles. The visualization takes the same approach by suspending virtual sand particles in a 3D environment and simulating interference effects on these patterns emulated by processing the sound via the app engine.

