

Evoking the Mythic: Hearing the Sound of Sukhāvātī

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Abstract

Buddhism has a rich visual history of ancient paintings and sculpture used to evoke spiritual and archetypal concepts. One of the key figures in Mahayana Buddhism is the celestial Buddha Amitabha, also known as the Buddha of Infinite Light. Several Buddhist texts describe the “Sukhāvātī” the land that that Amitabha inhabits. The texts not only describe the physical characteristics of this environment but also the soundscape. This paper discusses the process of transcoding an image of Amitabha into sound to create an interactive sonic environment. This process explores how choosing sounds based upon the literary description, can be a way of creating a link between an image and the literary counterpart.

Keywords: Interactive audiovisual composition, image and sound interaction, transcoding.

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1. Introduction

The system presented in this article is a continuation of a system developed for the project, *Hearing and Feeling Memories: Connecting Image, Sound and Haptic Feedback to Create a Multisensory Experience of Photographs* [1]. After the loss of Matthew Evans’ father in April 2019, the project investigated how mapping image to sound could be a way of linking various artefacts left of his father. This included an image and audio of his father playing the guitar and the guitar itself. The project investigated how using the digital data stored in an image—in the form of pixel data—and recycling it into new forms, can be a way of reanimating what was locked in stasis. As Matthew is a practising Buddhist, it became of interest to explore how the previous system could be developed as a way of exploring Buddhist iconography.

One of the modes of interaction developed in the previous system was providing an ability to be able to click on areas of an image and trigger a sample. This enabled an exploratory and reflexive relationship with a chosen image, a concept that this article seeks to expand upon.

The previous system was focused on diversifying the sonic potential of a single audio sample. This project, however, is concerned with how multiple samples can be assigned to various regions of an image to create a more varied soundscape and how the pixel data of that image can be a way to manipulate audio processing of a sample. The samples have been selected based on the description of a soundscape that accompanies an image as found in a Buddhist text: Amitabha sitting in his Pure Land. In doing so, a static religious image can become a way of evoking an experience of a sonic environment that normally sits outside of one’s experience.

Buddhism, like many religions, has a rich symbolic tradition to represent various aspects of its doctrines and teachings. This project seeks to explore how a linked audio-visual approach can create a relationship between an image and a literary counterpart. This article, therefore, intends to document research into techniques and approaches that have been uncovered using a cyclical practice-based research methodology [2]. Due to the ongoing COVID-19 pandemic, it has not been possible to realise the work in a gallery space, however, a demonstration of the system¹ that will eventually be used to create the *The Sound of Sukhāvātī*² is presented.

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¹ <https://github.com/mdfevansbcu/evokingthemythic>

² <https://vimeo.com/515210270>

2. Amitabha and Sukhāvati

Buddhism has two main branches or vehicles; *Theravada* and *Mahayana*. Theravada Buddhism is focused on the original teachings of the historical *Buddha, Siddhārtha Gautama*. Mahayana Buddhism is formed of a collection of Buddhist traditions, a subset of which are the *Vajrayana* traditions. As part of Vajrayana Buddhism, there are several celestial Buddhas and *Bodhisattvas*—a being that is on the path towards enlightenment for the benefit of all beings [3]. One of the most well known of these figures is the celestial Buddha *Amitabha* [4].

These archetypal Buddhas each have specific qualities. Because of the complexity of the qualities of the enlightened mind, the various archetypal Buddhas represent the numerous aspects of the principle of enlightenment. These Buddhas make up the *Mandala of the Five Buddhas* each of which has its associate colour, ritual object, direction, particular wisdom and so on. As the Buddhist writer, Vessantara explains,

Over the centuries thousands of archetypal figures have appeared within the Buddhist tradition. Each has a sense of coming from a realm of heightened reality. Each feels rich in symbolic meaning. However, they do more than constellate feelings associated with fundamental aspects of human life. They express through colour and form, an experience which goes far beyond the range of normal human experience. [5]

Of all of the various archetypal Buddhas, Amitabha has the most devotees due to the belief that devotion to him can lead to a rebirth in *Sukhāvati*, the *Western Paradise*. Although sometimes depicted as golden, Amitabha is more often depicted as being a deep red. The time of the day associated with Amitabha is the sunset and he is the Buddha of the West.



Figure 1. A *thangka* painting of Amitabha in his Pure Land

Amitabha presides over a Pure Land which gave rise to the Mahayana tradition of Pure Land Buddhism, a kind of Buddhism most common to East Asia. Pure Land Buddhism has three principle sutras, or teachings, some of which form the canonical Buddhist scriptures. These texts describe *Sukhāvati*, as an archetypal 'Land of Bliss' that Amitabha inhabits. *Sukhāvati* can be translated as 'blissful', a kind of paradise where suffering does not exist [6].

Contained in these sutras are the descriptions of the various physical and sonic features of the environment such as, "The brilliant colors of these trees are so luxuriant that it is impossible to see them all. When a fresh breeze wafts through them, exquisite sounds of the pentatonic scales, such as *gong* and *shang*, spontaneously arise and make symphonic music." [7].

This land is the subject for numerous Himalayan and Tibetan *thangkas*—cotton or silk scrolls that are ordinarily painted by a Buddhist monk. These paintings held a sacred significance, being an incarnation of the aspiration towards enlightenment [8]. The figures in thangkas were and are used as a way of directing contemplative experience and to bolster meditation practice [9].

The Buddhist principle of impermanence is a concept that has inspired the development of this artistic work. Impermanence is one of the three marks of existence, part of the Buddhist description of reality [10]. This principle explains that all conditioned things are in a continuous state

of flux. The sutras describe the sonically changing landscape of Sukhāvati, something that the fixed visual depiction of Amitabha is unable to relay. Transcoding [11] image-to-sound, can be a way of generating a more unified experience of image and sound that can evolve and develop rather than being static.

3. Buddhism, Composition and Installation

Buddhism and Buddhist philosophy have been a source of inspiration for many years for various western composers and sound artists. During Wagner's later years, the composer showed a strong interest in both Hinduism and Buddhism as shown in *Parsifal* [12], *Tristan und Isolde* [13]—a myth that also inspired Messiaen's *Turangalila-Symphonie* [14]—and the unfinished Buddhist opera *Die Siegfried* drafted between 1856 and 1858 [15]. This unfinished opera became the inspiration for the much later *Wagner Dream* [16] an opera that intertwines the last day of Wagner's life with the sketches of the original opera. Harvey has also explored central Buddhist concepts in the orchestral pieces *Body Mandala*, *Timepieces*, *Tranquil Abiding*, *White As Jasmine ...Towards A Pure Land* [17]. Like this project, Harvey has used the description of the Pure Land to inspire the chosen sounds in *Towards a Pure Land*, such as woodwind evoking birdsong, and percussion that suggests the breeze as described in the sutra.

This relationship between eastern religion and western composition featured prominently in the work of American composer John Cage. This relationship is notably found in Cage's *4'33"* [18] a composition which can be commonly misinterpreted as four minutes and thirty-three seconds of complete silence. Zen Buddhism became a source of inspiration for Cage, as Gann explains,

The idea in Zen that related to *4'33"* was Zen's direct attention to perceptual reality and its refusal to make distinctions [...] To the Zen listener, there is no distinction between the sound of a note from a piano and the sound of rain falling on the Maverick Concert Hall roof. Zen attention suggested to Cage that the accidental sounds he didn't create were just as interesting as the ones caused by his composing ego. [19]

One of the central Buddhist doctrines is that of *anatta* or "non-self" which refers to the principle of there being no underlying fixed, unchanging self. Zen master Thich Nhat Hanh explains that nothing can exist in and of itself. Rather, the universe operates in a continual state of interdependence [20]. This doctrine became a great inspiration for Cage's work and his exploration of the role of the self within the compositional strategy. *4'33"*

showcases how by creating a space for no sound, Cage creates a space for all sound.

In the gallery setting, exploration of the cyclical Buddhist doctrine of death and rebirth and the relationship between Tibetan Buddhism and sound was featured in the exhibition *The World is Sound* [21]. The exhibition held in the Rubin Museum of Art (New York) focused on linking the museum's Tibetan Buddhist art collection with site-specific commissions by contemporary sound artists. These included the *Le Corps Sonore* [22] that used the museum's staircase to create an immersive drone soundscape that explores ephemerality and impermanence. The same exhibition featured *OM* [23] which comprised over ten thousand recordings of Rubin Museum visitors saying the sacred syllable "OM" to create a vast mantra played to at the entrance for museum visitors.

With the mindfulness meditation industry now becoming a 1.2-billion-dollar market [24], the topic of meditation is increasingly explored as an underlying theme for sound art installation works. Pieces such as *8x8* [25], a light and sound installation in collaboration with sound healing artist Tenille Bently uses slow animation sequences integrated with sound design to evoke calmness and healing.

The interactive installation *Gedankenpendel* [26] aims to draw the visitor's attention to the constant changing and flowing nature of one's thoughts. The installation draws from the artist's own experience of meditation. The installation consists of a sound sculpture made from twelve speakers that hangs like a pendulum from the ceiling and outputs speech. When the user interacts with the sculpture by moving it, the more disorderly the speech becomes, getting progressively more discursive the more motion that is detected.

Another interactive sound art installation *Path* [27] explores the meditative space of the Zen garden through the creation of interactive and tangible interfaces. A custom sensor-enabled wooden rake uses spatial and speed sensors to trigger the sound of an audio monk chanting. The faster one rakes the higher the frequency to create as, Jingying refers to it, an "auralized landscape".

4. Transcoding Image into Sound

For over one hundred years, composers, artists, inventors and programmers have investigated the various ways that visual data can be translated into sound and music. In the computer age, one of the most common methodologies for achieving this is a spectrographic approach—one of the earliest examples being Iannis Xenakis's *UPIC* (Unité Polyagogique Informatique CEMAMu).

This kind of image-to-sound spectrographic analysis has been used in contemporary digital systems such as *Pixelsynth* [28], an audio synthesis environment that allows the user to input images and drawings as a basis for generating audio synthesis. The browser-based application analyses grayscale information of an image which is then translated into sine waves. *Pixelsynth* scans through a

greyscale image and outputs notes of the lighter coloured pixels. The user can also modify the type of scale, starting note, starting octave and the number of notes it plays. This linear spectrographic approach features more comprehensively in software such as *Photosounder* [29], which scans across an image from left to right, mapping the brightness of the pixels to frequency and amplitude.

Other applications such as *Singing Fingers* [30] allow the user to paint by touching a screen. This painting simultaneously records the sound of the environment around you. By touching the graphic again, you can playback the sound. The application was created to provide greater levels of accessibility for the recording, playing back and the manipulating of sound, specifically aimed at allowing children to “finger-paint” with sound.

Alternatively, a probing approach can be used to limit a data set often resulting in less sonically dense results, an approach that this project also uses. Compared with the linear scanning process, the probing method can provide more opportunity to intricately explore and navigate a chosen image. [31]. Applications such as *VOSIS* [32] allows the user to “play an image” via this probing method.

There are a variety of applications that use a direct sonification mapping system of pixel data to sound such as *Pixel Player* [33], which was developed using the graphical programming environment *Pure Data*. *Pixel Player* sonifies the RGB data of each individual pixel data point with these values subsequently used to affect the pitch of sine waves. Thus, each image would be noticeably sonically different.

This project, however, is more concerned with how transcoding pixel data can be used in a more analogous capacity. As McDonald explains, “normally analogy is about establishing partial equivalence between two different entities. Transcoding is a sort of extreme analogy, where we establish complete correspondence based on transformations between entities” [34]. The pixel data therefore has been used as a way of organizing and schematizing rather than producing a new sonic product that should be separated in some way from the original image. Many of the image-to-sound systems described above, transcode pixel data to audio synthesis. However, this project explores how mapping pixel data to affect audio samples can create a relationship between image and sound. By connecting multiple mediums, this can become a way of using sound to link an image with a literary counterpart.

5. The System

The system for this project has been realised in the graphical programming environment *Max for Live* [35]. Interaction with the image is achieved through a combination of creating various interactive regions with the probing approach. The various sections of the image have been overlaid with transparent click-able areas. As the user clicks on a region of the image, that click simultaneously triggers a sample and probes pixel data of

the current cursor/trigger point to affect various aspects of the sample’s processing. The audio samples are based on a description of the sonic environment found in the literary counterpart; section 5.1 specifically discusses the chosen samples for each region of the image. Probing for pixel data values is achieved via the Max object *Suckha*—coincidentally, resembling a word in Sanskrit found in Buddhism meaning ease or happiness. *Suckha* creates a clickable area that returns the RGB data of the pixel data point of the image that the user is clicking [36]. By using the probing method, this allows the user to focus on areas of specific interest rather than translating an image into larger data sets by scanning the entirety of an image.

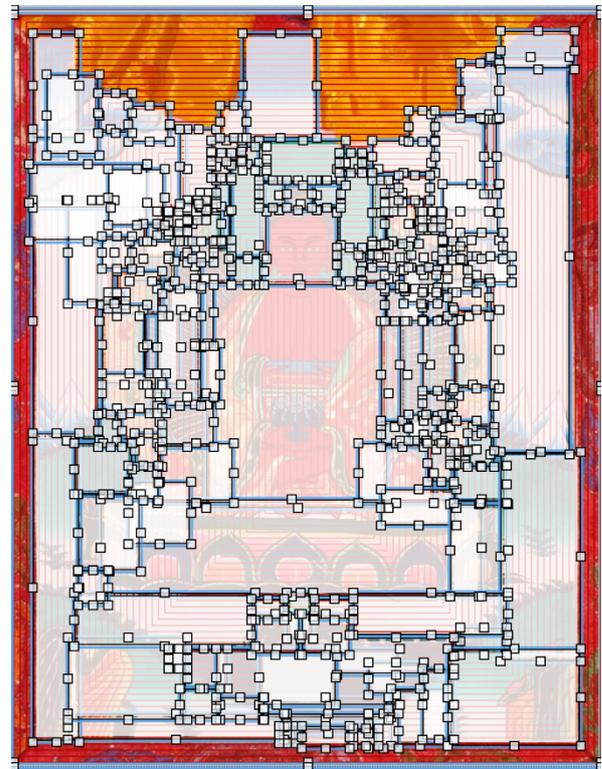


Figure 2. To create click-able regions that trigger the samples and returns RGB colour values, the image of Amitabha has been overlaid with transparent buttons and the Max object *Suckha*.

Each pixel has a red, green and blue value. These three values are gathered and averaged into a single value which determines the pixel data brightness. That value is then scaled relative to MIDI values. MIDI has a data range of 0-127, the RGB data has a range of 0-255, halving this RGB data output allows for the RGB data to be scaled relative to MIDI. This results in the resolution of the image matching the restrictions of the MIDI protocol, meaning no matter what the brightness of the pixel is, there is an equivalent

amount of processing that can be applied to the sample. This scaling also enables more seamless interaction between the graphical programming environment and the functionality of Live.

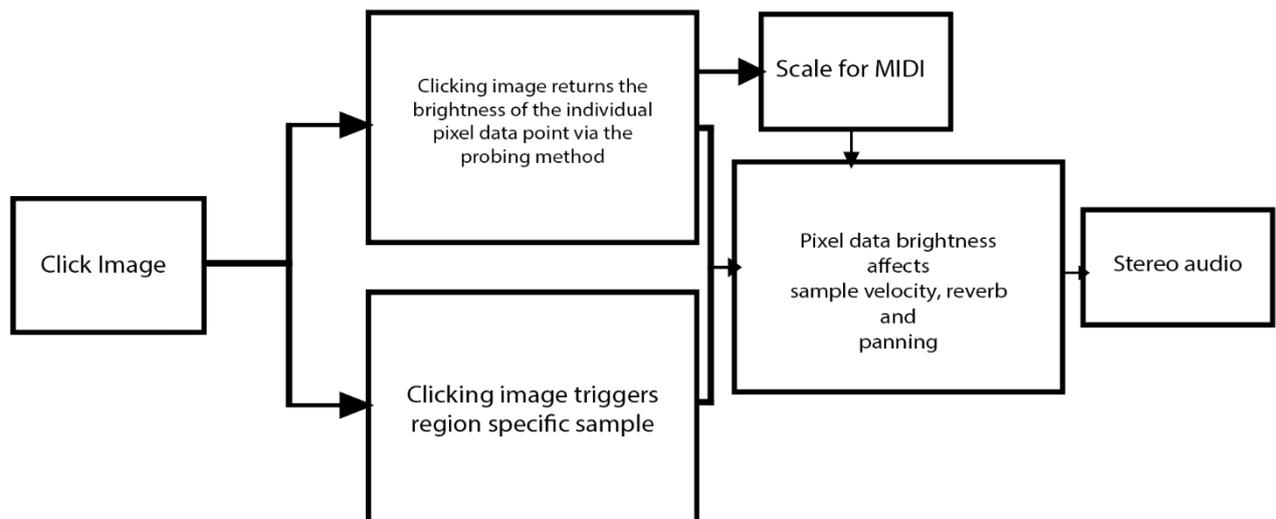


Figure 3. Image-to-sound process

The mapping of the pixel data is achieved via a one to many (divergent) mapping technique [37] that uses the brightness of the individual pixel data values to affect the velocity of each sample, the samples panning and the amount of reverb applied. A white pixel produces a maximum velocity and a black sample produces a minimum. After each sample is triggered by clicking on a region, the individual pixel data brightness value of where the user is clicking affects the next stage of the audio signal chain, the amount of signal sent to the reverb auxiliary track. The pixel data, in turn, affects the output of the send track—with a completely white pixel sending 100% to the return and a completely black pixel sending 0%.

Finally, the value of each pixel data point is mapped to a location in the stereo image. A black pixel would be panned hard left and a white pixel would be panned hard right, whereas the red of Amitabha is very central in the stereo image.

Although the samples are region specific, the aim of mapping the pixel data to affect the velocity of the sample, the amount of reverb and the location of the sample in the stereo image, are to provide a more dynamic soundscape that encourages exploration.

5.1. The Samples

There are several descriptions of the various sounds one hears in Sukhāvati found in the three Pure Land sutras. Therefore, the chosen samples have been selected based on these descriptions. These include: “The brilliant colors of these trees are so luxuriant that it is impossible to see them all. When a fresh breeze wafts through them, exquisite sounds of the pentatonic scales, such as *gong* and *shang*, spontaneously arise and make symphonic music.” There are the, “[R]ippling water forms meandering streams, which join and flow into each other. Their movement is peaceful and quiet, neither too fast nor too slow, and their ripples spontaneously produce innumerable wonderful sounds”. There are the also, “[M]any kinds of rare and beautiful birds of various colors, such as white geese, peacocks, parrots, śāris, kalavīnkas, and jīvaṃjīvakas” [38].

Concerning the image, iconographic representation of the various Buddhas and Bodhisattvas tend to include detailed visual symbolic conventions. For instance, in many of the thangka paintings of Amitabha, though he may

sometimes be depicted as golden, he is more frequently a deep ruby red, with black-blue hair. He is most commonly depicted sitting in the crossed-legged full-lotus meditation posture with his hands in the dhyana mudra—a symbolic hand gesture common to Hinduism, Jainism and Buddhism. In the case of Amitabha, the dhyana mudra is the gesture used to signify meditation. He is ordinarily depicted in embroidered robes with a glowing green aura behind his head and a red aura surrounding his body, which can often be edged by rainbows [39]. Other rich symbolic motifs are often the inclusion of Amitabha sitting on a lotus flower. The lotus is one of the best-known symbols in the Buddhist tradition, considered as a symbol of spiritual unfolding and purity as the lotus grows from muddy depths to flower above the water [40].

As Amitabha sits with his hands in the meditation mudra, the focal audio sample is a sample of a meditation bell. Bell sounds can be a way of directing contemplative awareness, as Thich Nhat Hanh explains from his experience,

I started inviting the bell when I was sixteen years old, the age when I became a novice monk. We say, “invite the bell” rather than “strike the bell” because we want to think of the bell as a friend. We want to invite its sound into our bodies. Inviting a bell to sound is one very simple way to relax. When we hear the bell, we breathe in and we breathe out, and we take in that beautiful sound. That’s it. If we don’t have a bell, we can use another sound—a phone ringing, an airplane [sic] passing overhead, a chime of a clock, a timer on the computer, or the natural sounds around us. We can even use the sound of a jackhammer or a leaf blower. [41]

Clicking on the figure of Amitabha triggers a meditation bell sound. The surrounding spherical regions surrounding Amitabha also trigger a meditation bell sound, the pitch of which gets higher following the C major pentatonic scale inspired by the description of pentatonic scales found in the sutra. The clouds and sky regions of the image trigger a sample of pentatonic wind chimes chosen to evoke the “fresh breeze”. Finally, the surrounding landscape triggers a soundscape composed of field recordings of bird sounds and rippling water.

6. Discussion

The mapping techniques described enable an integrated audio-visual system in which the repository of digital information stored in the form of pixel data can become a way of organizing the compositional output. By using a probing approach rather than the more traditional spectrographic approach, the resulting compositional output can be highly specific as the various pixel data points can produce a unique sonic response. By mapping the various zones of an image to a variety of related samples, the visual compositional form of an image can

dictate the sonic compositional output. This can further be encouraged by using the pixel data to affect various modes of processing.

Using a combination of a region-based approach with a probing approach enables a specific section of an image to trigger a sample inspired by the context of the image. Combining that with the pixel data probing approach—which in the case of this project has been pixel data brightness—to affect various modes of processing enables each region to become more sonically diverse, creating another link between the images composition and the sonic response.

At present this project has only explored mapping pixel data to affect stereo spatialization. It would be interesting to explore how more complex spatial mappings affecting the locality of binaural space could generate a greater sense of the location of the sonic environment for the user.

In future developments of the work, this technique could be used in an installation setting through the use of a touchscreen. In a traditional gallery and museum setting, there is often an obligatory look-don’t-touch rule. The modality of touch, however, could enable a more comprehensive and complete representation of the work [42]. Although a digital rendering of a painting or image is by no means a substitute, providing users with an ability to interact with an image could be a way of supplementing that experience through the creation of an interactive system. The current system is also limited to probing by individual clicks. Developing the capability of a multi-touch interface would enable the system to affect multiple regions simultaneously, functioning more like an instrument.

Using the probing approach to trigger samples rather than audio synthesis can be a way of artistically interpreting an image in a way that draws from its contextual background. The system presented in this project is specific to the subject matter, relying on the manual selection of sounds by the creators. It would be of interest to explore how developing an open system that could allow users to have free reign over the chosen image and sound. For instance, the techniques and approaches discussed in this article could be a novel way of connecting photography with field recording. They could be a way of connecting visual art with the sound or music that inspired it or even be used as a “remix” process of using album artwork to recontextualise the music of the record.

As with other artistic works by Matthew Evans, such as “ADSR” [43] which explored outputting the sonic output via a haptic vest to generate a multi-modal experience of the image-to-sound process, haptics could also be incorporated into this process to create a greater felt sense of the process. In the future development of this research, this could be used to create a meditation installation space that could allow the user to feel an image as well as hear it. In doing so the aim would be to further encourage a space that allowed users to become somatically mindful.

7. Conclusion

Transcoding sound from image can be a way of connecting multiple mediums. In connecting sound and image via the various region and pixel data mapping techniques described, an image can become a multi-modal stimulus. Using the literary description of the environment detailed in the Pure Land sutras to inspire the chosen samples, has enabled the creation of an interactive sonic environment in which an image can be explored, and the pixel data can become a way of organizing said sounds. By using the literary description of the soundscape of Sukhāvātī to inspire the sounds that are loaded into the system, multiple mediums can be assimilated into a more integrated and dynamic experience. In doing so, another mode of experience can be used to supplement the literary and the visual.

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Image and Sound Attributions

Image: "Buddha Amithaba" by Trisha Lamb is licensed under [ATTRIBUTION 3.0 UNPORTED \(CC BY 3.0\)](#) / Figure 1 is the original image. Figure 2 shows the image regions created in the graphical programming environment.

Sounds: "[tibetan ball.wav](#)" by Daphne in [Wonderland LICENSED UNDER CC0 1.0 UNIVERSAL \(CC0 1.0\) PUBLIC DOMAIN DEDICATION](#)

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