

The First Room: An artistic expression combining traditional Chinese I Ching culture and EEG technology

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Abstract

The rapid development and great influence of emerging technologies have changed the way of expression and creation of contemporary art, as well as the artistic expression of traditional Chinese culture. This is an art project named *The First Room*, an installation based on the I Ching, a traditional Chinese culture, with the purpose of exploring the possibility of combining the I Ching based on human electroencephalogram (EEG) data with artificial intelligence algorithms in future storytelling, and how it affects human emotions, and generating art visualisation images combined with the I Ching through computer algorithms. *The First Room* is a room composed of light, sound and image, which showcases a multi-sensory interactive space based on brainwave data. In this space, the audience is considered as one of the key components of the art installation and becomes the driving core of the project. By interacting within the space, it is hoped that participants will not only enjoy the programme, but also enhance the audience's understanding of the I Ching and future AI algorithms. This study discussed a method of creating future storytelling art based on objective EEG data signals in combination with traditional Chinese culture, providing a new path for the visual expression of traditional Chinese culture.

Keywords

EEG Art, I Ching Art, innovation, immersive media, artistic expression, installation.

Introduction

EEG technology reveals new dimensions of perception of traditional Chinese culture and art for audiences and creators, bringing new opportunities for artistic expression of Chinese culture. The interactive installation and the I Ching are presented in a completely unique way. The interactivity of art installations relies on deliberate and premeditated user actions and often requires some response in the form of physical movement [6].

The interaction of this project depends on the brain waves of the audience, and this behavior gives the audience a simple role as a participant in the relationship between the audience and the art installation. EEG technology interacts and generates data for the art installation through the reflections of the brain, establishing a new channel for the art installation of this project to integrate with the I Ching[14]. This paper attempts to create a new media form through the fusion

of EEG technology and the I Ching. This interactive installation reconfigures and integrates EEG data [1] with the 64 hexagrams of the I Ching, and describes the audience's data reflections and predictions in the art installation through light installations and sound installations in the space, which are different parts of the installation that combine EEG data with I Ching divination hangings. This project explores the operation mechanism of the art installation prototype predicted by EEG data and I Ching algorithms and investigates the entanglement between EEG computation and I Ching divination based on EEG data and I Ching as the cultural core. It not only embodies an art installation of new ways of making predictions, but also showcases a cultural space that enables participants to experience it in new media ways. Although both EEG technology and I Ching divination can take many forms, the study of brain physiological signals and I Ching divination from an artistic pathway promises to explore a new media form of new technology and traditional Chinese culture by way of an artistic installation experience.

Related work

I Ching in Art

The 64 hexagrams of the I Ching are a summary of the ancestors' understanding of the world, as well as an algorithm for future prediction, embodying the wider cosmic imagination of algorithmic prediction; observing the transformation of numbers to predict events on Earth[15]. Revered as a cornerstone of Chinese wisdom, the I Ching offers a rich system of dichotomies and metaphorical interpretations[17] that have been used in contemporary art installations to explore a variety of themes related to human existence and perception. The binary code structure of the I Ching consists of sixty-four hexagrams (lines) that provide a unique algorithm that transcends time and space[16]. Artists can utilize this matrix to construct random or interactive installations that reflect the connectivity between the I Ching as a divination tool and contemporary art. For example, John Cage's *Imaginary Landscape No. 4 (March No. 2)* [2] derives its structure from chance operations influenced by the ancient Chinese text, the I Ching, symbolizing the randomness and serendipity that was a prominent feature of his avant-garde compositional work. Cage's work was first performed in 1951, with 24 players scored for 12 radios. By applying the principles of the I Ching to site-specific

installations, the artist facilitates a dialogue between architecture, space, and spiritual philosophy.

Based on the basic principles of the I Ching, "The First Room" combines the arithmetic principles of the I Ching with EEG signals to design an art installation with a new way of user participation and an attempt to interpret the I Ching in a new way.

EEG in Art

Electroencephalography (EEG) is considered a reflection of a person's thoughts and can be used to control external objects without contact [9].

The raw brainwave data reflects the audience's mental state and translates into various forms of artistic expression driven by, for example, various transformations of light, sound, and image. This real-time biofeedback creates a strong connection between the artwork and the viewer, ensuring the uniqueness of each experience[5]. For example, *Eunoia*(2013)[7] and *Eunoia II* (2014)[8], this work is a sound performance controlled by EEG. A NeuroSky EEG headset was used in the project. With this EEG device, the artist was able to connect electrical impulses from the brain to the Max/MSP software and generate sound. By combining it with the Reaktor software, the device generates realistic sounds based on the wearer's level of concentration and meditation. These sounds also create specific ripples through changes in the water surface of the pool[4]; This device for visualizing EEG signals is based on the metaphor of the human body, using water as a medium to show the changes[4]. Alvin Lucier's *Music for Solo Performer*[3] (1965) is a groundbreaking musical work that explores the possibilities in the field of bio-electronic music by using the performer's brainwaves (EEG) as a power source for music. The work reveals the infinite possibilities between the human brain's two roles as an information processing system and a source of artistic creation. The project amplifies the performer's alpha waves and directs them to drive the percussion instruments, vibrating them for sound production. Effectively, this configuration allows the performer to "play" the physical device by controlling their neurophysiological state[11]. In both philosophical and musical contexts, this work challenges the traditional boundaries between human experience and musical composition.

Experiment: *The First Room*

Concept

The art installation *The First Room* in this paper adopts the above trends and characteristics. The concept of an art installation that combines the ancient wisdom of the Chinese I Ching culture with contemporary brainwave art is both forward-looking and exploratory, representing a fusion of the old and the new, the intertwining of tradition and technology, and containing great potential. In the age of digital art, the binary logic of the I Ching further becomes the structure of algorithm-based works. In these cases, the 64 sequences of the I Ching become the procedural composition that guides the installation and underpins it, where the process of data processing and calculation becomes integral to the aesthetic

experience. The incorporation of the I Ching into a contemporary art installation reflects the desire to build a bridge between the past and the future, between traditional wisdom and science. It affirms the fluidity of cultural memory and the indispensability of dialogical cross-referencing in the development of creative research. The exploration of this project has reinvigorated the artistic expression of the I Ching in a contemporary context, emphasising the potential of the I Ching to provoke subtle ideas about existence, the environment and their intricate interrelationships.

From a forward-looking perspective, *The First Room* was conceived as a forward-looking approach. coincides with the trajectory of art and science. As art and technology become increasingly integrated, the boundaries begin to blur, allowing for previously unimaginable crossovers. Coincide with the trajectory of art and science. As art and technology become increasingly integrated, the boundaries begin to blur, allowing for previously unimaginable crossovers[13]. It is this era of convergence that *The First Room* is aiming at, utilising technology, particularly neuroscience, as a medium to breathe fresh interactive life into the traditional meaning of the I Ching. Utilising brainwave art, the invisible thoughts, emotions and mental states are transformed into an immersive world of visual art. This incorporation of elements of real-time audience response into the installation makes the creation and expression of art a process of mutual influence and co-creation, rather than a one-way display. The emotional responses and perceptual changes catalysed by the viewer's interaction with the artwork become an important part of the art itself, bringing a dynamic and ever-changing layer of depth to the installation[13].

The exploratory aspect of this innovative concept is that it offers a novel, figurative way to delve into the I Ching. As an ancient divination text, the I Ching is philosophical and wise in its symbolic language, presenting a system of dichotomous and metaphorical interpretations[17].

Design

This interactive installation controls the response of devices in the immersive space through the audience's brainwaves, see figure 1 *project overview*. The images, lights, and sounds of the human world are driven by the thoughts of the viewer; the sheer act of focused viewing can make the lights flicker more frequently, make the audio fluctuate faster, create more variation in the images, and will have an effect on the generated I Ching text. Participants intentionally control their thinking while being surrounded by the transformations of the device brought about by the results produced by their thoughts. Taking the idea of the I Ching as an extension, the data of humans themselves has predictive power; human behavioral data affects the next transformation, which can be predicted by algorithms. Data as part of an algorithmic system is manipulated to operationalize the entanglement of data, people, and computation to produce predictions. These elements cannot be separated from each other[12] or from the culture itself[10]. The process of new algorithmic prediction based on I Ching and EEG signals moves data from collection/production, through mediation, to prediction, reshaping the world in powerful ways that bring new experiences to the



Figure 1: The content of this installation space under three perspectives. On the left is a light box, a stereo, and on the tabletop a brainwave instrument, a thermal printer; The middle image shows the moving image generated by artificial intelligence; The photo on the right shows the I Ching symbols and RUNwayML-generated interpretations obtained by the audience through a thermal printer.

viewer. This art installation wants to express this new technology fused with traditional Chinese culture through artistic creation. By combining this framework with cerebral art, the installation aims to translate this complex philosophical language into a form that viewers can intuitively 'feel' and 'experience'. This combination not only adapts the I Ching into a modern, accessible aesthetic, but also re-contextualises the I Ching in a way that centres on the senses as they interact with the world. Furthermore, through the integration of these elements, The First Room intends to reveal innovative perspectives on human cognition and interaction with symbolic systems such as the I Ching. By using EEG technology to visualise the brain's response to these systems, we can gain insight into how individuals process, interpret and emotionally react to the complex dichotomies and metaphors inherent in the I Ching.

In essence, this installation takes us into a realm where neuroscience becomes the central driver of a language of self-expression and philosophical enquiry. It represents a novel medium through which to contemplate, understand and appreciate the ancient wisdom of the I Ching. In this sense, it is both preservation and transformation, tradition and innovation - a fascinating aspect of the evolving nature of contemporary art. Both prescient and exploratory, the fusion of I Ching culture with brainwave art demonstrates the malleability of human creativity and inquisitiveness.

Conclusion

This investigation delves into the confluence of novel technologies and the rich tapestry of traditional Chinese culture, precipitating an innovative methodology that interweaves objective data-driven processes with Chinese aesthetics for artistic expression. Employing electroencephalography (EEG) monitoring apparatus, we captured the myriad nuances of brainwave dynamics in real-time as participants navigated the immersive art experience. Fueled by the tremendous wealth of EEG data and participant interactions, the project undertook a methodical analysis translating these data into the artistic medium, thereby generating personalized I Ching textual feedback. This singular blend of scientific data and traditional wisdom marked each participant's experience with a unique signature. For the development of this line of inquiry, we enacted a triangulated research modal-

ity that incorporated elements of design theory, comprehensive analysis of I Ching philosophy, and practical application of EEG technology in art creation. Culminating these diverse yet intersecting components, the project illuminates an innovative approach to I Ching representation, one that pivots around EEG data as its driving factor. This pioneering outcome showcases a probable trajectory for integrating traditional Chinese cultural symbols with the rapidly evolving field of neurotechnology. It presents not only a novel methodology shaking the foundations of conventional artistic engagement but also proposes a futuristic direction for the reincarnation of traditional Chinese culture in the digital age, suggesting a revolutionary blend of art, science, and culture.

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