

is a rose – A Performative Installation between the Tangible and the Digital

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ABSTRACT

The performative art installation *is a rose* uses plants as natural interfaces in order to establish a direct relation between natural and technological systems. The installation is used to visualize digital-physical interaction that is not necessarily explicit – triggered by touch or air movement, by direct and non-direct manipulation, depicting the sum of all interactions during the course of the day. The technical realization consists of detection of the movement of plants caused by the movements in their immediate vicinity and the subsequent deformation of a computer-generated sphere. The paper is explaining several different layers of meanings the artist was motivated by when developing the artwork.

CCS CONCEPTS

• **Applied computing** → Arts and humanities; Performing arts; Arts and humanities; Media arts.

KEYWORDS

Performative Installation, Tangible and Body-Centered Interaction, Agency, Plants

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1 INTRODUCTION

The notion of a fluid meaning construction that is taking place in the moment of interaction and is highly contextually bound,

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has been permeating the humanities and social sciences ever since 1970es and is known as *cultural turn* or *performative turn*, latter especially important for a paradigm shift towards the performative in contemporary art [1]. In HCI field, which is strongly positivistic but unavoidably anchored in human experience, an attention and understanding for different approaches to situated meaning and embodiment are came into focus in the third wave HCI [2]. The treatment of “interaction as a form of meaning making in which the artifact and its context are mutually defining and subject to multiple interpretations” is here united under the term *situated perspectives* [2].

Building upon these notions, we are presenting *is a rose* (2019¹), a performative art installation at intersection of contemporary dance and contemporary art, created by artist Charlotte Triebus and an interdisciplinary team. The artwork poses questions of who is an agent and who owns agency from an artistic point of view, focusing on the interaction of different types of agents and exploring the intersection of art and science. The work combines Tangible Interaction and Body-Centered Interaction without touch, referring to both moving bodies and nature’s strategies, where communication between species, in this case humans and plants, is driven by subtle expression abilities [3] that are hardly visible to the human perception apparatus.

2 INSTALLATION DESCRIPTION

The interactive performative installation is a rose consists of a circle of nine hanging plants, the roots of which grow in a ball of moss, a low-resolution LED screen and a tracking system utilizing an Azure Kinect and a small computer, which are placed outside of the visitor’s field of view. The computer runs the tracking software which detects movements and imprints of the visitors through their impact on the leaves of the hanging plants. *Asparagus plumosus* was chosen as the preferred plant due to its fine structure which enables the visual manifestation of tiniest movements. The plants hang from the ceiling on three thin nylon cords each, which quickly

¹The work *is a rose* was realized in 2019 and premiered at *Baumwollspinnerei* Leipzig from November 2019 till January 2020. It was also shown at *tanzhaus nrw* in Düsseldorf at the festival TEMPS D’IMAGES and at the gallery *Priska Pasquer* in Cologne from January till May 2020.

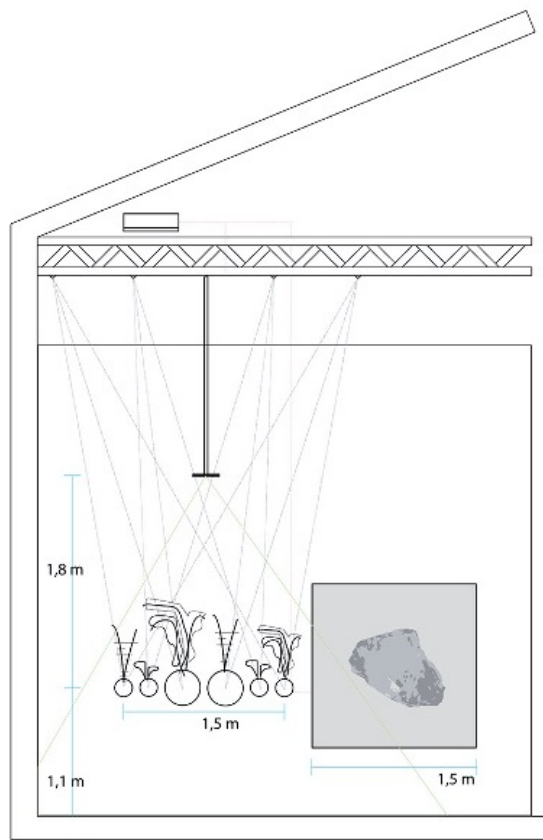


Figure 1: *is a rose* set-up at *Baumwollspinnerei* in Leipzig 2019/2020

bring the plant back to its initial position after its movement. The mounting consists of 27 transparent cords that are very light and are subtly reflecting when moving around the installation.

The interaction with the plants, caused either by direct touch or indirect breeze of air, is captured as a seismographic impression of the plants and is displayed on a 1.5 x 1.5 m² low resolution LED-screen with a resolution of 180 x 180 pixels. The screen shows an interactive, computer generated three-dimensional red sphere that rotates clockwise around the y-axis with a constant speed of 5 turns per minute. When a visitor interacts with a plant, directly or indirectly, the shape of the sphere is modulated in a subtle way. The animation shows each impact in real-time, using different means of deformation, such as growing, notching and tilting. The intensity of the impact corresponds to the interaction caused by breeze or touch; however, the exact location of the transformation is not selectable, and every subsequent interaction is affecting the previous ones. All impressions received by the plants add up over a day as a unified interaction and manifest themselves in the shape of a unique daily object shown on the screen. In this way, the resulting graphics show the interaction of both intended and unintended interactions of the visitors and thus represent a temporal-spatial, living representation of a non-repeatable constellation of movements in the exhibition space.

3 RELATED WORK

The incorporation of plants in mixed media artworks [4] is directly related and builds upon the general artistic interest in the concept of interactivity which has been explored through the artistic use of technology [5]. Latest experiments and findings in botany and interaction design have been further extending the notion of plants as alternative input and output devices or entities that can be engaged in the process of communication. As such, they are informing and inspiring the artistic research, but also often experimenting beyond the disciplinary borders. “Interactive Plant growing”, a multimedia installation by Christa Sommerer and Laurent Mignonneau (1994), is one of the earliest artworks based on the visitor’s interaction with the real plants by touching or moving their hands towards them and thus affecting the virtual growth of program-based plants on a screen [4, 5, 6]. “Cyborg Botany” is a design exploration that uses the plant’s own sensory and expressive mechanisms for creating augmented plants as interaction devices [7]. An additional example of combining biology, design and engineering through artistic representation is the project “Florence” that enables communication with a plant by converting text into a light frequency that the plant can react to and vice versa, translating plants electro-chemical signals back to text [8]. Unlike projects that use biological sensors [7,8], the movement of the plants in the project presented in this



Figure 2: A visitor in interaction with the installation

paper is tracked visually (passively). With an intention to imitate the biological processes which are crucial for the artistic message of the artwork, this sort of technological approach has been chosen as most appropriate.

4 ARTISTIC BACKGROUND

The artwork of *is a rose* alludes to several layers of philosophical and sociological discourse, among them the discourse of performativity in relation to agency as well as the related questioning of the traditional dichotomy of nature and culture. The human ability to perceive and express takes place in a human's distinct range of senses, however, it does not deny a different, unique way of perceiving to another species. Leaving anthropocentrism behind, we follow Karen Barad in assigning performativity to humans and non-humans and blurring the lines of the traditional nature/ culture divide [9].

Other than understanding a tangible interaction as a direct, physical manipulation of the plants, the artist states with the installation that successful tangible interaction can be taking place through other means than touch. Movement of multiple people in the space causing streams of air or even a direct blow towards the plant creates an equally valid impact in terms of interaction. This is finally reflected in the visual transformation of the sphere, which is equally affected by both, direct and indirect touch.

The categorization of the piece as a *performative installation*, implies its specific setting at the intersection between contemporary dance, as a *performative* form that was highly influential for the emergence of performance art [10], and contemporary art in form of *installation*. Furthermore, by referring to it as a dance piece, the artist draws attention to the fact that the piece looks for performing bodies as its formative part. Whoever is able to act and is enabled

to take part in the formation of the piece transforms into an active or passive agent [11] of the same. Since possible agents within the work are the visitors themselves or the plants presented, several transformations of the perception of performativity take place. According to the definition of agency as a potential to act [12], the plants are being transformed into legitimate agents, while the visitor is transformed into a dancer that becomes an active part of *is a rose*. This moment of transformation of the audience marks the performative shift in the piece [1].

Plants and humans are forming a network where each part is owning a sensory system. Using Barad's terminology, the possible engagements between the visitor and the plants are entering into "intra-action" and offering potential relations even without acting upon them [9]. Given that individuals of other forms, such as living plants, have their own agency, the artwork *is a rose* creates a link between the formally unequal interacting parties.

Plants growth, movement and interaction are normally not perceivable to the human eye and are therefore often considered passive. However, during the 20th century, a more abstract and more active definition of nature has emerged – scientists do not anymore observe nature as given but reflect on it as an active stakeholder of the ecosystem [13]. With *is a rose*, the artist is also insinuating the analogy between plants' natural capabilities and its artificial functions in the piece and intends to open a discussion that would break the dichotomy between the traditionally connoted term of nature and contemporary technology (that can be subsumed under the term *culture*).

Recent biological research has also shown that plants respond to their environment much more than commonly expected [3]. Apart from well-known functions of response to sunlight and humidity,

biological organisms are able to actuate or react to events or messages sent by other organisms close by. It is a communication [3] established due to sensing the environment around. There are two forms of equitability at work: the plant being equitable towards the visitor in terms of agency as well as the surveillant plant being equitable to a technological device. Augmenting physical, tangible bodies with digital means additionally opens questions of surveillance and also alludes to systems such as Foucault's panopticon [14].

Finally, the title *is a rose* relates to the quotation "Rose is a rose is a rose is a rose" by Gertrude Stein, that refers to different layers of possible interpretations and (visual or verbal) metaphors one expression may bear. It is a conceptual quotation taken from literature studies and philosophy, stating the possibility of various potential connotations of the same modes of presentation and representation. In general, the metaphor of a rose in reference to the described artwork (which is obviously no rose) convey the doubting of reality and its derived implied qualities. Comparing asparagus plants to roses underlines a discrepancy of expectation and reality such as the one appearing in the dichotomy of the "romantic, innocent" plant and its surveilling function towards the movement of the visitors.

5 TECHNICAL IMPLEMENTATION

The software implementation was carried out in an iterative and agile development process, focusing on the two main aspects: the detection of movement of plants and the deformation of the computer-generated sphere. An Azure Kinect IR depth sensor is used for detection of movement by applying basic image processing operations of the depth image such as thresholding and calculating difference between two images. After the initial setup, a supervising operator marks the position of each plant in the depth image and defines clipping planes. During startup, the system automatically gathers noise data for each plant to determine threshold values for each plant. If during the runtime the previously determined noise threshold for a specific plant is exceeded, that respective plant is detected as moving. The deformation of the computer-generated sphere is done in the 3D-realtime-engine Unity3D 2019. The three-dimensional sphere is procedurally generated by subdividing an icosahedron multiple times to create a three-dimensional sphere with 40962 vertices and a custom shader that creates the impression of red LEDs with 5 discrete levels of light emission. Multiple invisible deformer move on the surface of the sphere and deform the mesh of the sphere with a distance-dependent smoothstep modulated multi-octave Perlin noise with individual parameters for each deformer, which were designed to produce shapes of natural stones. The strength of deformation of each point is controlled by the strength of detected movement of a manually assigned plan.

As the installation is intended to be exhibited at different locations, remote monitoring and maintaining of the application was required. This is done using a remote desktop software and plain-text configuration files that allow to examine the system status at any time.

6 CONCLUSION

The performance installation *is a rose* offers a space open for interaction and interpretation. It intrigues and challenges the visitors by positioning them in a situation that questions the expected relations and reactions and brings to consciousness the effects that are not completely controllable and caused by mere co-presence of sentient life forms.

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