

Designing Poetic Interaction in Space

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Abstract. An amount of research has risen growing concern of designing aesthetics of interaction in addition to function, usability, and pleasure of it. Beyond aesthetic interaction, we propose poetic interaction as a promising design genre. Based on Bachelard's phenomenological approach, we suggest that poetic interaction design begin with imagination and expression-making of both material and computational things. The challenges include how to design successful reverberation and admiration of poetic images while one interacts and reflects. Examining spatial metaphors, we classify poetic interaction into poetic space and interactive artifacts. With gestalt psychology, we present practical guides for designing poetic interaction. Two examples illustrate the relationship between poetic images and expression-making. Finally, we implement a design work, *whisper*, to explore the framework, as well as validate our findings via a qualitative experiment. Participants were positively impressed that interaction could deliver experience of poetic images with artifacts and space of implicit expression.

Keywords: Interaction Design, Poetic Image, Poetic Interaction, Poetic Space, Expression-making, Gestalt, and Computational Artifacts.

1 Introduction

Over the past few decades, the domain of interaction design has shifted from function, usability, to emotional issues [1] [2]. It seems inevitable that people look for more than functional tools but "living objects." Moreover, some researchers reveal the importance of the aesthetics of interaction [3] [4], the intention of designing the pure beauty of interactions. When the main target is set to fulfill the aesthetics of interaction while designing, the essentials would not be how powerful the function is, or how easy it is to be used, but how the pure feelings or meanings are delivered during the interaction process. Recently, an amount of research reveals the intrinsic value of interaction, which focuses on how users perceive and comprehend the meaning from the interaction with interactive artifacts or within space. Moreover, some studies indicate the implicit qualities of interaction, such as gestalt [4], fluency [5], etc., which help clarify the essence of interaction. Therefore, we wonder what category of interaction design can be further explored beyond aesthetic issues, and what methodology can be applied as guides for such a category.

1.1 Poetic Interaction

In terms of Jordan's hierarchy of consumer needs (Fig. 1), an increasing amount of research is toward designing aesthetic interaction that is beyond the hierarchy. Referring to Heidegger's assertion that poetry is in some way the model of all other art forms [6], we propose poetic interaction as the origin and abstraction of aesthetic interaction, which are higher needs according to Jordan's hierarchy. One significant change is that aesthetic appealing is not necessarily valid for poetic interaction. Moreover, poetic interaction design focuses on conveying an image indirectly with an objective expression that contains some uncertain part of it, which causes flashbacks originated from personal experiences. Of notice is that the uncertain part of the expression is the key to convey poetic image in interaction. The delivery of poetic image depends on participants' inherent ability of gestalt. Inspired by aesthetics of interaction, we see a promising aspect of design, which is to create an implicit or transformed expression that invites users to interpret with common sense or their own experiences, and thus, makes users participate and reflect. Therefore, in this paper, we review theories of Bachelard's phenomenological approach, cognitive psychology and design cases, discuss potential ways of conveying poetic image, and establish principles of poetic interaction design. Finally, we implement a design work to validate our findings.



Fig. 1. A hierarchy of consumer needs

1.2 Reflection and Emotional Awareness

Hallnäs and Redström [7] propose Slow Technology, a design agenda for technology aiming at reflection and moments of mental rest rather than efficiency in performance, which leads a way of thinking that works could arouse the awareness and reflection after the interaction process. However, slow technology focuses on sense of time. This paper proposes a new design agenda that could evoke not only users' reflection of personal experience but also an emotional tendency. Aesthetic interaction design cares about the aesthetic experiences while interacting with an interactive system, including not only how it looks but also how it feels [3]. We argue that poetic interaction design inherits the attempt from aesthetic interaction design genre. Kolko [8] has given an initial definition of poetic interaction as "one that resonates immediately but yet continues to inform later, causing reflection and relying heavily on a state of emotional awareness." According to this, poetic interaction would emphasize the following reflection and the emotional awareness rather than the immediate feelings about aesthetics.

According to Bachelard [9], five senses and the existing experience are the bases of "material imagination", which help people to form the latent meaning behind the appearance. Moreover, the image that is formed by material imagination would make people more sensitive of what they feel for the current circumstance. To design for space that arouse reflection and emotional awareness, the importance of expression of

computational things needs to be promoted [10]. Therefore, poetic interaction design should begin with expression making and imagination of both matter and computational things.

1.3 Gestalt Psychology

Gestalt Psychologists indicate that human beings tend to see things as a whole rather than see them separately [11]. Moreover, if the parts that comprise the whole are independent, the whole is not simply the sum of the parts, but a synergistic “whole effect”, or gestalt [12]. For example, in Figure 2A, people would tend to recognize the image as a white triangle upon three complete black circles instead of three independent incomplete circles and a right triangle (Fig. 2B) or three independent incomplete circles (Fig. 2C). What needs to be noticed is that spatial relationship would be taken into consideration spontaneously through this plane graphic, which indicates that gestalt does not equal to the total of the parts.



Fig. 2. An example of Gestalt psychology

As Kenya Hara [13] has discussed the concept of “Emptiness”, he argues that communication happens when the recipient, offered not a message but an empty vessel, supplies the meaning himself. According to Kenya Hara, the perspective of emptiness is closely related to the poetic image of Bachelard, who points out that the way of conveying poetic image should orient oneirism (dream-like experiences) rather than accomplish it. As a result, under the frame of Gestalt psychology, the notion of the emptiness and unaccomplished part offered a sounder theoretical basis for poetic image. The experience of emptiness is common human experience. Its nature is perhaps best conveyed through poetic image, novels, or the visual arts [14]. With the inherent ability of gestalt and emptiness, poetic image in interaction can be designed by the expressions that are intentionally made incomplete.

1.4 Retentissement and Admiration

The nucleus of the delivery of poetic image mentioned above depends mainly on participants’ innate ability of gestalt. However, regarding the interaction design, we think that the perception of poetic image is highly pertinent to harmony in interaction that is inseparable from admiration. In the view of Bachelard [9], “the poetic image is an emergence from language, and it is always a little above the language of signification. By living the poems we read, we have then the salutary experience of emerging.” It is poetic image that puts language in a state of emergence. In other words, we have to experience its moment and feel admirable instead of any critical considerations. Hence, extended from the viewpoint of literature, the perception of poetic interaction can be established. There are two points worth noting. First, concerning poetic

interaction design, how could poetic image emerge while practicing interaction? On the other hand, how could we create and experience a moment of retentissement (reverberation) and admiration of poetic images after interaction?

2 Design Approach

Lakoff and Johnson differentiate three types of metaphors: structural, orientational, and ontological [15], where structural are metaphors of conceiving of one concept in terms of another and the other two are space related. Orientational metaphors convey one concept in terms of physical orientation based on the fact that we are embodied in physical environment. On the other hand, ontological metaphors give abstract things a sense of substance, allowing us to speak of them as objects. The reason why orientational and ontological metaphors form spatial metaphors of understanding abstract notion is because we have universal experience of being in physical environment and manipulating physical objects. To convey incorporeal and abstract things such as poetic images, interaction design shows promising potential by realizing these two spatial metaphors. Therefore, we classify poetic interaction into two categories: poetic space and poetic interactive objects. No matter which category, we think that expression-making for poetic interaction is the key step toward successful interaction design conveying poetic images. These two categories are illustrated in detail after examining expression of interaction design.

2.1 Expression-Making for Poetic Interaction

Extended from Norman’s Conceptual Models [16], the essentials of poetic interaction design can be deployed (Fig. 3). We argue that poetic image and reflection in a participant’s mind are the results of reciprocity between mental model of a participant and designers’ expression. The context where the interaction takes place provides the “interaction order” among the artifacts and a participant [17]. Of special notice is that the center of expression that evokes poetic meanings is the removed part as well as the visible context.

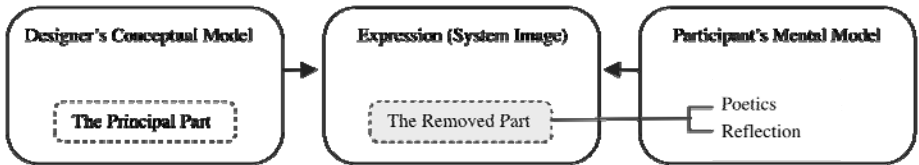


Fig. 3. Conceptual Models of Poetic Interaction Design

To accomplish the implicit part, two questions need to be answered: what should be removed, and how much proportion of the whole expression should be. The answers suggest the gestalt that participants would generate from the interaction. To create expressions for poetic interaction, the procedure is as follows (Fig. 4).

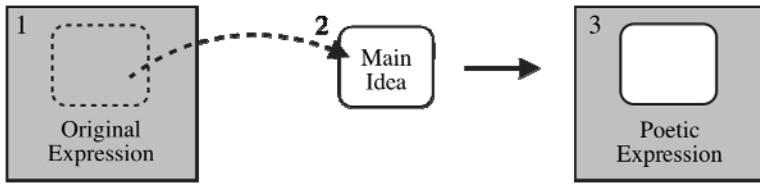


Fig. 4. The expression of a poetic interaction

Step 1. The main element of the designer's concept should be removed from the expression as blanks for participants to fill in. Designers' initial expression might be straightforward at the beginning. Yet to transform the original one to an expression for poetic interaction, the most compelling part needs to be recognized and removed.

Step 2. If some of the peripheral parts were deleted instead of the principal part, the expression would be regarded as an unfinished expression rather than a poetic expression. The proportion of the removed part of the expression would affect the level of implicitness. The expression represents the information that the design work provides, which means that lower proportion of the removed part of the expression would lead to a more explicit expression. Although participants can effortlessly interpret it, the interaction will not be poetic since no space is provided for reflection.

Step 3. If more than the bottom line of the expression is removed, the expression would be inadequate to be reassembled as a gestalt, where participants would not get enough the context and hardly retrieve the poetic image (Fig. 4). Therefore, designers should explore a preferable proportion between implicitness and explicitness.

From the above discussion, at the expression-making stage of poetic interaction design, three essentials are established. First, the context provides most of the background knowledge to the interaction. Second, the principal part of the expression needs to be recognized and removed as a blank for participants to fill in. Finally, the level of implicitness results in the level of poetic image. It is the responsibility of a poetic interaction designer to discover a preferable boundary of implicitness and explicitness. Throughout this, an expression of poetic interaction is considered accomplished.

3 Poetic Interactive Space and Artifact

Interactive space refers to space embedded with computing technologies where interaction is occurring. In such space, if the aim is to deliver poetic image rather than function, usability, pleasure, or aesthetics, we call it poetic interactive space. In addition, in order to design poetic interactive artifacts, it is necessary to find the concepts that belong to the same collocation can be regarded as making metaphors. As argued by Bachelard, "the poetic image is an emergence from language," we think that alternating collocation would be a good way to put language in a state of emergence. Not only changing ways of verbal description of movement, interaction design shows great potential to make users live the poems by acting with emerging collocations, which is carefully selected to form a poetic image.

3.1 Related Work: Office Live 4πversion

Office Live 4πversion [18] is an interactive artwork that attempts to describe a phenomenon about a group of colleagues working together in their own seats. However, this artwork only consists of a few chairs, a table, and some glasses on it. The only interaction that is happening is part of the screen of a colleague's computer would be projected to the glass that represents his attendance to the meeting as if he is making a speech to others. The spatial relationship has implied that groups of people are gathering. When a participant takes a seat and moves a glass, one is interacting within the space while becoming a part of expression. Although the expression is incomplete with the missing, audiences are able to recognize their interactions with their ability of gestalt. In this example, a poetic interactive space invites participants to interactively become a part of expression that is intentionally removed by designers. By acting as the missing part, the main idea, a participant would experience a moment of reverberation and a sincere impulse toward admiration of poetic images, as asserted by Bachelard as the key elements of poetic image.

3.2 Related Work: Tech Tap

Tech Tap [19] is a light. The form of the mainframe is a faucet, which also represents the switch of it. The form of the light is a bottle that can be loaded with light. If a user wants to bring the light with him to another room, he could turn on the light as tapping water, and load the bottle up with light. The light in the bottle would evaporate with time until it is drained. Some of the collocations of light and water are common, such as flow, and hence it is reasonable to apply the image of water to light. Therefore, the original expression is a simple and direct metaphor: light is water. However, as a poetic expression, the water is removed from the expression. Although no real water flows out, the light starts to shine, which correlates to the form of the artifacts smoothly. The ability of creating gestalt enables users to make the connection spontaneously. By literally describing the interaction, poetic expressions would emerge such as "pouring oneself another bottle of light," and "the bottle of light evaporating in the living room."

4 From Theory to Practice: Whisper

By reviewing several design cases, three general principles of poetic interaction design are preliminarily made: (1) the context provides major knowledge for poetic interaction; (2) the principal part of the expression should be removed; (3) to perform in a level of implicitness, intangible materials are preferably used to deliver poetic image, such as sounds and light. To exemplify the principles, a design work is done: whisper. From observation and interview, a drawer could be seen as a personal space to store and conceal precious things. Moreover, the behavior of finding things in a drawer is similar to that of digging things in the soft ground. Inspired by the well-known fairy tale "the King's Donkey Ears", expressions are made: everyone has a drawer that is connected to the Internet, like a square of shared ground; users could bury their secrets in their own drawers; secrets would be synchronized automatically; the finder is the secret keeper; buriers and finders are anonymous. The shape and

function of the drawer remain the same, keeping the artifact in daily use and preserve the original context of the interaction between drawers and users.

4.1 Concept

According to the above expressions, the digging and burying movements are of special interests (Fig.5). When one hides things in the drawer, it can be interpreted as burying treasures in the ground. With this metaphor, this work invites users to find an empty space in it, tell their secrets as if they are in a wilderness, and record it as a *whisper* (Fig.6). After finishing recording, the embedded LED light at the bottom of the drawer will be switched on to indicate its spot, and the objects need to be put back to the initial position to bury the secrets.

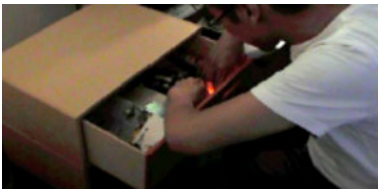


Fig. 5. Digging things in the ground

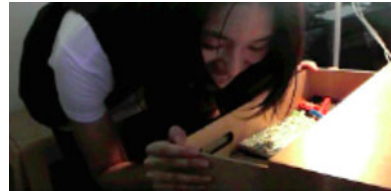


Fig. 6. Burying things as a whisper

When a whisper is buried, all drawers connecting to this system would be synchronized, implying that all drawers share the same mysterious land containing whispers. Therefore, when the drawer is opened, it will play the sound of nature to create calm and relax atmosphere. When another user finds a whisper, it will play the recorded voice only once, which means “takers are keepers”. Meanwhile, the LED will be off as if the whisper is taken away. All the communications proceed through Internet. While a whisper is buried or taken away, a tweet will be posted on twitter to make a history of this ongoing interaction for users to trace. This concept conducts an exploration of applying everyday objects to realize the vision of the Internet of things.

4.2 Poetic Interactive Spaces and Poetic Interactive Artifact

In this work, poetic interactive space and artifact are harmoniously integrated. A drawer, as a private and intimate space, contains personal tiny objects, which might be put casually or hidden carefully. The sound of nature played while opening a drawer refers to the space as a wilderness at night. With the context of fairy tales implied by the sound and the impression of its spatial meanings, the expression of the space is established. As we have mentioned about poetic expression, there are no trees or soil put in the drawer as the main part of the concept. On the other hand, the bottom of the drawer, the *whisper* recorder and player as well as personal items can be regarded as interactive artifacts. The metaphor is a land with holes that contain *whispers*. However, physical holes and substances are removed from the expression. Therefore, the expression of poetic interactive artifacts is accomplished. Moreover, literally describing the interactive experience with *whisper* yield poetic expression such as “burying one’s voice in a drawer,” or “digging one’s secret serendipitously.”

4.3 Experiment

A qualitative experiment is held to investigate the interactive experience of the participants. The main purpose of this experiment is to determine if there exist any subjective feelings evoked, by collecting adjectives that participants use to describe this work. The participants were 20 students from a wide range of academic areas, ranging in age from 20 to 35 years. For each user, the procedure includes 3 steps: interviewing for user experience, playing the scenario, and exchanging and sharing.

First, to understand the background of participants, they were interviewed about their life experiences and habits, etc. Furthermore, chatting in this space would elicit information concerning one's attitude and situation. The purpose of this step is to immerse in the context of experience rather than finish a task of experiment.

Second is playing the scenario. At the beginning, we inform each participant about the behaviors of digging and burying something briefly instead of offering too much detail information. Each can hear secrets of others anonymously via drawers. In addition, we invite participants to bury a secret as a sharing procedure. We video-recorded all the experiment processes as well as personal emotions and feedback.

The last step is exchanging and sharing. We gathered participants to discuss and share feeling, thinking, and suggestions. Overall, several situations are of interest. For example, we received an email from one of the participants at that night, saying that he really wanted a *whisper*, which implies that reverberation and reflection after experiment did happen. The poetic images experienced by this participant did emerge as a mental need to revisit the poetic space by designers. On the other hand, although the main element of the designer's concept is removed from the expression, it is surprising that one participant guessed the concept of *whisper* as the tale "the King's Donkey Ears" which was the intended expression we had removed.

4.4 Results

Without explanation in advance, most users felt surprised when opening the drawer that played the sound of nature to create calm and poetic atmosphere. Some of them felt curious and expected about where the voice messages came. Some of them intended to enjoy the variety of the ambient light, etc. By listening to these shared secrets, most participants recalled their personal memories, even including singing a love song. Each participant aroused a private space at a different moment. Moreover, based on the description and sharing of participants, we analyze the empirical data and illustrate our findings using quotes. Three research findings are summarized below, ambience, behavior, and communication.

Ambience. This finding suggests that dynamic interaction between elements in space be inextricably linked with the aesthetic experience. Participants who get involved in this space might feel the poetic imagery by immersing the ambience. This can be seen in the following quotes.

Subject #04: "There is an ambience of nature when I open the drawer. As far as this space is concerned, it can set my mind at ease. Moreover, I immerse myself in this space-time." Subject #09: "I am interested in the shimmer which is buried in the bottom. It is a good idea to make implication of secrets through the shimmer." Subject #11: "I feel imaginarily about the interaction. Especially, the sound of nature that plays

while opening the drawer, it is so poetic.” Subject #14: “I like the variety of the LED when the LED is switched off gradually as if the whisper is taken away.”

Behavior. This finding implies that the aesthetic experience of an object cannot be understood without its context and intrinsic values. By interacting with the drawer, participants can experience the poetic image with a reflection of the behavior.

Subject #01: “I like the behavior of finding something in the drawer. To me, it is an intuitive behavior.” Subject #06: “It is so interesting to select a shiny secret and makes me wonder what the secret is.” Subject #08: “I think it is great to open the drawer while finding a secret accidentally.” Subject #09: “The behavior is just like that secrets can be buried in the drawer.” Subject #19: “I may open the drawer at anytime because I want to know whether a new secret comes in.”

Communication. The essential of the *whisper* is an everyday object. To endow such an artifact with meanings, the purpose of our interaction design agenda emerges. Nowadays, a drawer plays a role that can communicate with each other through the technology, echoing the coming age of IOT (Internet of Things). The anonymous communication adds a poetic interactivity unexpectedly.

Subject #07: “I strongly prefer to communicate secrets with anonyms. I can create an illusion such as appearances or anything else.” Subject #13: “It is fascinating that we can guess the teller of the secret implicitly. In addition, we can develop friendship and discuss more topics from the secrets.” Subject #18: “I may expect who is listening to my secret, or whether my secret may convey to the people I expect.” Subject #20: “It is interesting to guess where the secrets come from. However, *whisper* maybe can create a chatting topic such as do you play the drawer?”

5 Conclusions and Future Work

The present study is initial research on an approach of interaction design delivering of poetic imagery. We believe that there exist various kinds of approaches to implement poetic interaction. Furthermore, it would be a promising direction to establish a framework of poetic interaction. In addition, according to the experiment responses and observation, we feel that the quality of the implicitness has a significant effect on the level of the poetic imaginary. However, the discussion of implicitness is beyond the scope of this paper. Nevertheless, it is worth of noting that how implicit the interaction gestalt is corresponds to the level of the poetic imaginary, creating a spectrum of interpretation. However, too implicit meaning of interaction gestalt makes it difficult for participants to perceive or understand. Moreover, this finding points to an aspect in the spectrum of implicitness and explicitness for future research.

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