

Learning from Traditional Dynamic Arts: Elements for Interaction Design

Yu Zhang¹, Jing Gu¹, Jun Hu¹, Joep Frens¹, Mathias Funk¹,

Kai Kang², Qi Dong², Yuanyuan Wang², Feng Wang^{1,2}, Matthias Rauterberg¹

¹Department of Industrial Design, Eindhoven University of Technology, The Netherlands

²School of Digital Media, Jiangnan University, China

Abstract— *Understanding traditional dynamic art forms can inspire interaction design for public spaces. This paper attempts to identify the elements in traditional dynamic art forms that could contribute to the design of interactive public art installations. We show an example how these elements can be utilized by designers in a projection-mapping installation to generate concepts for interactions and experiences in public spaces.*

Keywords— *dynamic art forms, public spaces, design research, interaction design, interactive installations*

I. INTRODUCTION

There are a few studies [1-3] introducing dramatic theories and techniques, offering new perspectives into the traditional methods, but in our knowledge offer no clear solution or input for contemporary design of interactive public arts. The attributes of new media are simply not taken into account. Laurel attempts to provide new possibilities of interaction based on theatrical theory [2]. She focuses on how to emphasize technological aspects over dramatic theater plays, like adding sound, color, motion and the role of spectators. With regard to the roles of participants or users of an interactive system, Dalsgaard and Hansen divide them into operators, performers and spectators based on the performance (theater) theory, phenomenology and sociology [1]. They address the existence of re-identified concepts of performative spectator and spectating performer and argue that the user is simultaneously a 3-in-1 role shaping her understanding and perception of her interaction. Rajmakers et al. choose documentary films to inspire design research in HCI [3], despite not identifying theories and techniques from traditional operas, movies and contemporary art as inspiration for interaction design for public spaces.

The traditional dynamic arts have much to offer and it is time to explore how the theories and techniques from drama, film and opera could contribute to interaction design. The main objective of this paper is to explore new opportunities in the context of interactive experience design in public spaces. We first look into the traditional dynamic arts and identify a series of interesting elements that could be inspiring for interaction design, followed by a case study that shows how these elements were applied in the practice of the ALONE ALONG project.

II. DYNAMIC ART ELEMENTS

A. Different roles in performance arts: operators, performers and spectators

Participation in an interactive experience, especially when it comes to happenings in public spaces, is about: *what one does is experienced by someone else, and that the others are seeing and experiencing that one is experiencing something* [1]. So, the participant of an interactive public art installation is more than a passive user. Participating in creating [4] and interacting [5] with a public art installation is about transferring roles among the roles of operator, performer, and spectator at any time. On many occasions, participants are both operating and performing, and one is also a spectator of actions of the others.

B. Different attention spaces: foreground, mid-ground and background from unfocused to focused

This technique in managing the attention of the audience can also be effective for interaction design for public spaces: getting the attention of the public is usually a challenging task especially when the installation is surrounded by crowded and busy elements in an open space, such as buildings, lights, plants and busy people. Dividing the space of the interactive public art installation into foreground, mid-ground and background could help get attention from people in noisy and distracting surroundings.

C. Front stage and backstage in time and in space

Every public space could be seen as a stage. When a participant faces an interactive art installation, she is already performing on the front stage. While she does not know what is happening on the backstage. Sometimes interactive designers deliberately blur the difference between these two stages. But if the backstage is open to the participants as well, interaction and experiences in public space could be much more interesting as the meta-level of the “making” also plays a role, and this might even deliver a completely new experience.

Talking about interaction design in public spaces, what is possible in a given environment? It can be an experience of two folds: the first is the stimulation to imagination and emotion that is created by carefully crafted uncertainty. The second is the satisfaction provided by closure when the play is completed, if the plot has been successfully constructed. The experience unfolds over time.

D. Use of dramatic language.

Dynamic art forms expand the understanding about language, which is beyond the natural languages. For the interactive public media arts, language is reflected by not only words, but also other nonverbal media such as sound, signs and symbols, all of which play the roles that can have similar expressive power.

E. Tension: Controlling the Rhythm of Interactive Public Design

In a theater performance, we expect to have an experience from the beginning, to the end, in which the tension is gradually built up, until the climax, and then is released. Dynamic interaction of all protagonists mixes peaks and valleys [2] in a rhythm that starts from an introduction, rises to a climax, then falls to a slight return, and finally gets a conclusion. However, in the actual interactive process there might not be any clear boundary. The conclusion could act as the introduction for the next round of the next climax building up process, forming a spiral of climaxes.

Next, the project ALONE ALONG is presented followed by a discussion about how these elements learned from traditional dynamic arts could shape the user's experience.

III. CONCEPT AND PROTOTYPE

ALONE ALONG is an interactive installation designed for the office environment. It is an interactive media art installation with front projection into a cardboard made "train window" (Fig.1(a)). The concept is to install this digital train window on the different floors in the office environment. If there are two people passing by the windows at the same time on different floors, they will be able to see each other and wave to each other. In the design of this installation, the elements learned from the traditional dynamic arts are applied. During the interactive process, the participant is moving from her office (back stage) to the corridor (front stage). This participant's experiences on two stages are expected to be different – from being stressful on the back stage to being surprised and hopefully delighted on the front stage.

When the participant is on the front stage (the corridor), she is at the beginning a spectator. She watches the video in the train window on the wall (Fig.1(b)). Then she becomes a performer when she starts interacting with the video by walking faster or slower and by stopping in front of the window. When she sees her colleague appearing in the scene, she waves to him and expects him to wave back – she becomes a protagonist to influence the behavior of the others. This role changing process shapes her interactive experience in a richer and a more subtle manner.

In this work, the corridor, where the participant "performs", is the foreground. The colleague appearing in the window is in the mid-ground. The landscape or platforms from the film would be in the background. When this performer sees the colleague appearing in the train window, waving at each other is the interaction between foreground and mid-ground. At the same time, the mid-ground becomes the foreground for the colleague and Yang's foreground becomes the mid-ground for him – the intertwined views gives opportunities and

perspectives for the designers to tweak and tinker their ideas and concepts.

Moreover, dramatic languages are used to make the interaction and experience richer and more interesting. For example, background music, fast moving scenery and the familiar landscape are used to attract the user's attention. The content of video changes from fast-moving landscapes to arrival platforms of a train station.



(a) "train window"

(b) Participant passing by the "train window"

Fig.1. ALONE ALONG

IV. CONCLUSION REMARKS

This paper identifies a few key elements in traditional dynamic art forms that could contribute to the design of interactive public media art installations. The design of the example project "ALONE ALONG" highlights how these elements could introduce new perspectives into contemporary interactive forms and expressions, by carefully staging the tensions between being a performer and being a spectator, among foreground, mid-ground and background, between the front stage and the back stage, and among different dramatic expressing languages.

More work needs to be done to identify more of these elements and organize them into a clearer structure, and to investigate not only how these elements could be applied in an interactive design, but also how the creation process of these elements in the traditional dynamic arts could be applied in the process of creating ideas and concepts for interaction design of public media arts.

REFERENCES

1. Dalsgaard, P. and L.K. Hansen, *Performing perception—staging aesthetics of interaction*. ACM Transactions on Computer-Human Interaction (TOCHI), 2008. **15**(3): p. 13.
2. Laurel, B., *Computer as Theatre: A dramatic theory of interactive experience*. 1991: Addison-Wesley.
3. Raijmakers, B., W.W. Gaver, and J. Bishay. *Design documentaries: inspiring design research through documentary film*. in *Proceedings of the 6th conference on Designing Interactive systems*. 2006. ACM.
4. Hu, J., et al., *Participatory Public Media Arts for Social Creativity*, in *Culture and Computing*. 2013: Kyoto.
5. Wang, F., J. Hu, and M. Rauterberg, *New Carriers, Media and Forms of Public Digital Arts*, in *Culture and Computing 2012*, Springer-Verlag Berlin Heidelberg: Hangzhou, China. p. 83-93.

Proceedings

**2013 International Conference
on Culture and Computing
Culture and Computing 2013**

**16-18 September 2013
Kyoto, Japan**



Message from the Chairs

Culture and Computing 2013

Welcome to 2013 International Conference on Culture and Computing (Culture and Computing 2013).

International communities are facing various problems in different topic areas such as: population demographic shifts, energy use and creation, the environment, and food supply. It is necessary to build a global consensus for resolving problems within these topic areas. Unfortunately, there are difficulties that hinder communication among cultures. It is imperative to develop information and communication technologies that encourage mutual understanding and bridge the difference in cultures.

Several research directions impinge on the relations between culture and computing: archiving cultural heritage via ICT (cf. digital archives), empowering humanities researches via ICT (cf. digital humanities), creating art and expressions via ICT (cf. media art), generating culturally-directed behavior (cf. cultural agent), supporting multi-language, multi-cultural societies via ICT (cf. intercultural collaboration), and understanding new cultures born in the Internet and the Web (cf. net culture).

This year, Culture and Computing is back to Kyoto, the cultural heart of Japan, to provide an opportunity to share research issues and discuss the future of culture and computing. The conference is organized so as to exhibit the integration of state-of-the-art cultural computing technologies and Japanese traditional culture, along with several co-located events.

We have a single session Main Track and two Special Track sessions. The Main Track will present a collection of scientific or engineering research results that include, archiving cultural heritages, information environments for humanity studies, art and design, intercultural communication and collaboration, culturally situated agents and simulations, and analysis of new cultures in the Internet and Web.

The Special Tracks are collections of short papers, and are organized for the purpose of encouraging discussions in hot areas. This year, we have Special Tracks for "Digital Humanities" and "Culture based Media Art & Music." The Digital Humanities captures the trend in research and education in the Humanities that has emerged over the last decade. While researchers have not reached consensus on its definition, digital data available online all over the world as well as the global collaboration through the web will usher in a paradigm shift in Humanities research. Culture based Media Art & Music is anticipated in the new century. It has been said that intelligence, sensitivity, and consciousness are the central and most important parts of humanity. The 21st century can be an era of sensitivity if it adopts the essential basis of Asian culture. The generality, value, and importance of culture should be emphasized to the world.

The conference proceedings include both full papers presented in the Main Track, together with short papers discussed in poster sessions and Special Tracks. We are sure you will find your participation in the conference fruitful and hope that it is enjoyable. We are grateful to the authors, presenters, and delegates for their contributions. We would also like to express our special thanks to our program committee members and all the external reviewers for reviewing all the papers. Finally, we wish to thank the IEEE Computer Society Conference Publishing Services for their support in compiling the proceedings.

Kozaburo Hachimura, Toru Ishida and Naoko Tosa
Culture and Computing 2013 General Co-Chairs

Donghui Lin and Akira Maeda
Culture and Computing 2013 Program Co-Chairs

IEEE Computer Society Technical & Conference Activities Board

T&C Board Vice President

Paul R. Croll

Computer Sciences Corporation

IEEE Computer Society Staff

Evan Butterfield, *Director of Products and Services*

Lynne Harris, *CMP, Senior Manager, Conference Support Services*

Alicia Stickley, *Senior Manager, Publishing Operations*

Silvia Ceballos, *Manager, Conference Publishing Services*

Patrick Kellenberger, *Supervisor, Conference Publishing Services*

IEEE Computer Society Publications

The world-renowned IEEE Computer Society publishes, promotes, and distributes a wide variety of authoritative computer science and engineering texts. These books are available from most retail outlets. Visit the CS Store at <http://www.computer.org/portal/site/store/index.jsp> for a list of products.

IEEE Computer Society *Conference Publishing Services* (CPS)

The IEEE Computer Society produces conference publications for more than 300 acclaimed international conferences each year in a variety of formats, including books, CD-ROMs, USB Drives, and on-line publications. For information about the IEEE Computer Society's *Conference Publishing Services* (CPS), please e-mail: cps@computer.org or telephone +1-714-821-8380. Fax +1-714-761-1784. Additional information about *Conference Publishing Services* (CPS) can be accessed from our web site at: <http://www.computer.org/cps>

Revised: 18 January 2012



CPS Online is our innovative online collaborative conference publishing system designed to speed the delivery of price quotations and provide conferences with real-time access to all of a project's publication materials during production, including the final papers. The **CPS Online** workspace gives a conference the opportunity to upload files through any Web browser, check status and scheduling on their project, make changes to the Table of Contents and Front Matter, approve editorial changes and proofs, and communicate with their CPS editor through discussion forums, chat tools, commenting tools and e-mail.

The following is the URL link to the **CPS Online** Publishing Inquiry Form:

<http://www.computer.org/portal/web/cscps/quote>