A study on an interactive construction tool for better interaction ability in an interactive installation

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Introduction

In this paper, a VisionArtTool (VAT) system that increases the ability of an interactive artwork is created in an interactive installation. The aim of the proposed VAT system is to widen the interactive range in order to provide a maximum freedom especially for young artists. In recent works, interactive installation relies on heavy participation from spectators. Due to this the quality of the artwork depends on the techniques the artwork deploys and represents instead of showing the intention from the artists.

There is a common problem among interactive artwork and artists. A lot of interactive artists are restricted in their creativity to express an artwork, with a challenging task of allowing their artwork to be fully interactive from the perspective of the spectators.

Moreover, in-line with the progress, with information communication technology, many artists are not majoring in art but in computer technology with experience in programming as well[1]. Taking the technological background of a prospective artist into consideration, technologically innovative artwork has an advantage for this group of techno-savvy artists. Also, there are different goals for engineers and for artists. A goal for an engineer is to create a developed technology for artists to use, but this goal is not achievable if the artist is not techno-savvy as this may restrict their creativity to express an artwork.

Interaction

The concept of interaction goes beyond the display button as the interface mode. Interaction, according to the environment and the object, has a different form. Interaction needs to exist easily and anywhere in daily contexts, such as the Internet, online presence and it's experience. However, there is a subtle difference in the interaction of art that consists of meaning within the context of it's content. An active participation from the audience depends on an acceptance, and for it to not bore the audience: a main aim is to create a sense of participation and fun in the interaction. This can also extend the work - when the participants become creators of the interactive artwork when participating within the environment.

There is a difference in terms of interaction between engineer and interactive artist: interactive artists' aim to benefit the user, who does not need a technical background but a work that operates comfortably. In the usual engineering of a user interface, for an interactive artwork the artist may find it difficult to express the intended purpose of the artwork. This may be due to the engineering being solely focused on the accuracy and speed of interaction and as measured by user's usability of the system. Due to this, the nature of the artwork in producing an immersive interactive experience is not achievable with the engineering work focusing on the user's convenience rather than the actual intention of an artwork. Table 1 provides a comparison of an engineering process on interaction with that of the interactive art perspective. Their goal, target and the ability are different. We propose a new technique to directly solve this problem for the interactive art environment.

Table 1: Differences in the interaction of engineering perspective and interactive art

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[1] Kirak Kim, et al. "Dynamic Display System for better Interaction Ability in Interactive Installation," *Leonardo*, Volume 42:3, June, 2009.

	Engineer	Interactive artist
Goal	The user's convenience	Concentrate on artwork
Ability	Accuracy, speed	Depending on the intention of the artwork
Target	Users	Audience, artworks, artist

Our work uses computer vision technique, which is one of the most popular tools for interactive artworks. Computer vision technique is known to be one of the most efficient ways to encourage spectators to participate in artworks and to experience a sense of reality. In fact, a lot of interaction using interactive artwork involves the camera. For these reasons, the advantage of the computer-vision for tracking objects in consecutive images is easy, and for video objects detection, partitioning, location, and recognition, makes it best suited for this installation. The camera can act as an eye to replace the artwork in this field of study because it enables a variety of ways for an interaction with the audience. The proposed VAT system supports artists' to create an artwork without being trained in technology. Due to the differences in engineers' and interactive artists' skills and minds, the VAT system enables the interactive artists' to engineer the interactive artwork according to their intention and fulfil the basic engineering of a digital artwork. In other words, the interactive artists' can benefit from a complex engineering process via the VAT system.

VisionArtTool

In this paper, we propose VAT, an interactive artworks construction tool with computer vision techniques that supports artwork creation by interactive artists. Our proposed VAT system will bridge the gap between the artists' and engineers' own disadvantages and ease the creation of interactive artworks[2.]

The unique features of VAT system include usage of computer vision based interaction constituents (hand, foot, head, body, colour etc.). Artists are easily able to select the intuitive visual programming based tools and create their artwork. Thus, this suits the perspective of a non-engineering based artists who use technology and techniques for creating artwork as a representation of real-time interaction - where selections can be made from the vision based interaction constituents as mentioned above.

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[2] Kirak Kim, et al. "Study on Interactive Art Construction Tool based on Computer Vision Techniques," IADIS CGV 2008: 82-88.
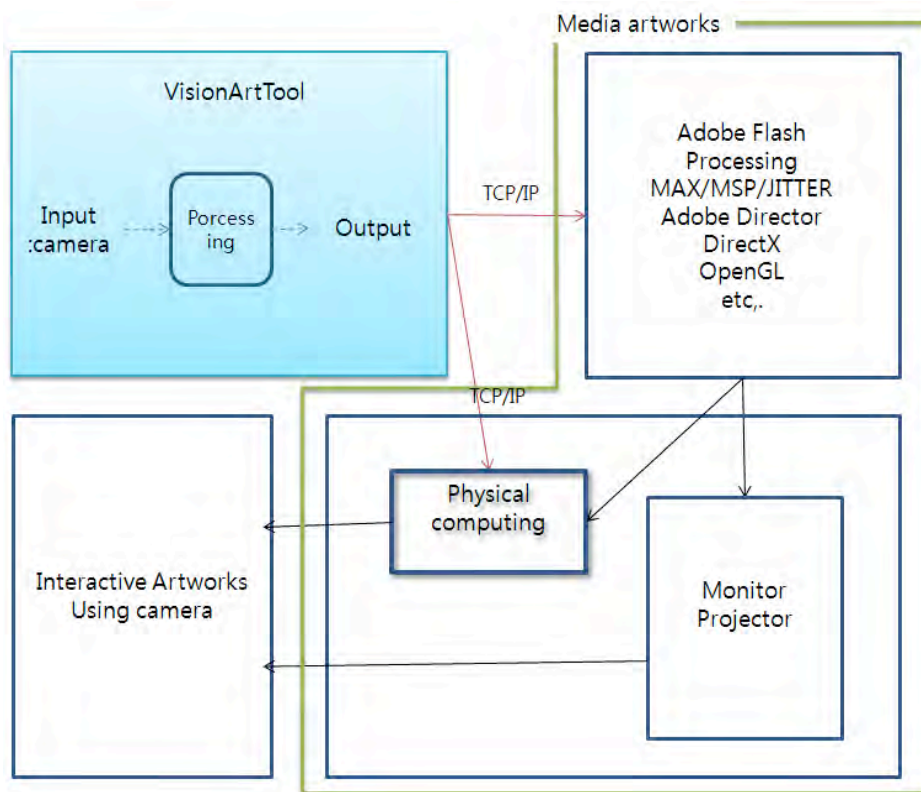
Figure 1. The position of VAT in Interactive Arts

In order for the artists to use this proposed tool, it is based on visual programming and consists of vision-based functions as a simple menu in the interface. This means artists' can apply the techniques to their interactive artwork easily as well as representing their intention. The VAT system is a generic vision-based toolkit that provides output for communicating with other art construction tools such as Processing and Flash in order to complete the interaction artwork content generation. Although, VisionArtTool is not a means to express a province of beauty, rather it extends the capability of enabling artists' express their work with technology. Figure 1 shows the position of VAT in interactive art. Figure 2 shows the proposed VAT main window that opens access to the VAT system.
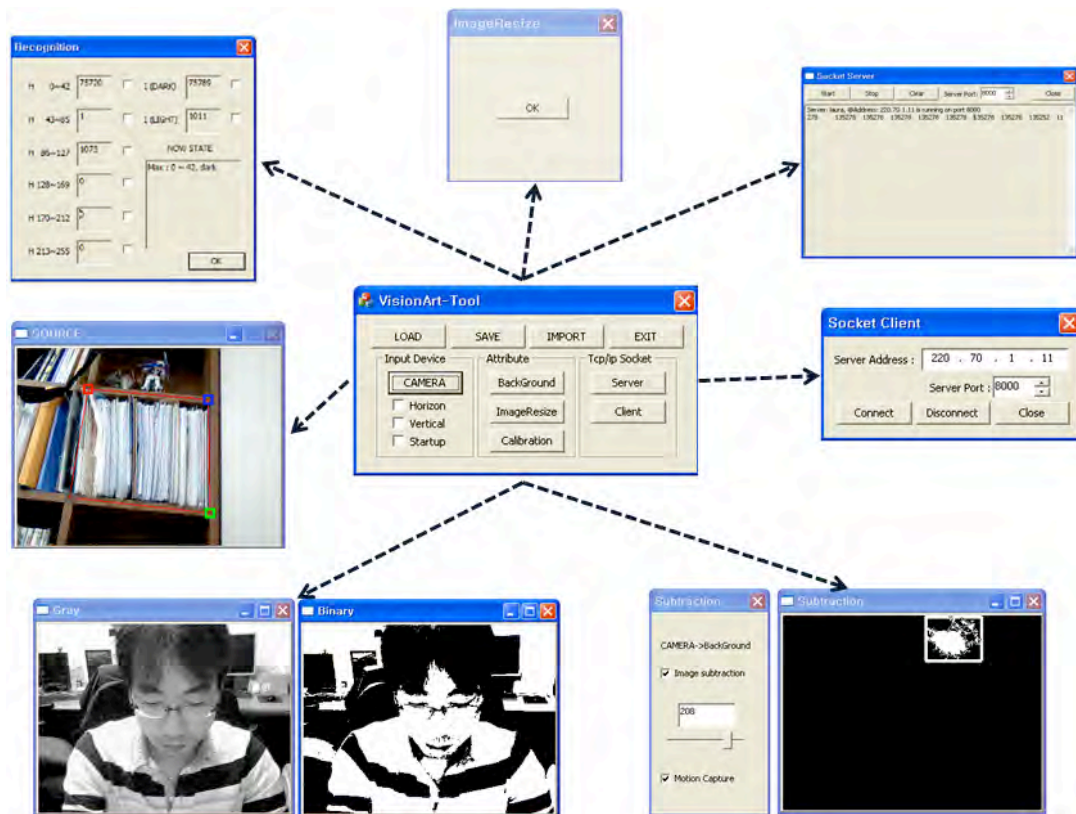
Figure 2. The VAT system and windows

The VAT is based on visual programming and is accessible via the click of a button. VAT connects to the camera with each of the buttons and selection of an interaction method is easy to use for the non-technologist artists. In our system, the VAT is composed of several dialogue windows. In order to briefly describe the abilities of the VAT system - consisting of a series of windows - it can be explained as follows:

First, the entire programs for the control, management, or Main-Window dialogue windows are present.

Second, the camera is connected with the click of a button, and the connection status of the camera is checked. A window to confirm the presence of the camera is recognized.

Third, a communication with other authoring tools or other programmes appears in the communication Windows.

Fourth, the calibration of the camera, video and images of artwork or images with the actual artwork for the screen calibration exists in the calibration-Window.

Fifth, to use the actual user interaction select Properties Window.

Sixth, background-subtraction is performed in the selective Window and can be saved.

Seventh, artwork installed by the gallery curator can be easily manipulated, even if it is before the PC is turned off. After starting, a new feature can automatically run as Startup. Buttons exist to facilitate this process. In addition, there are other selections of the user's interaction skills in terms of technology, and more interaction windows are produced as there is more interaction involved.
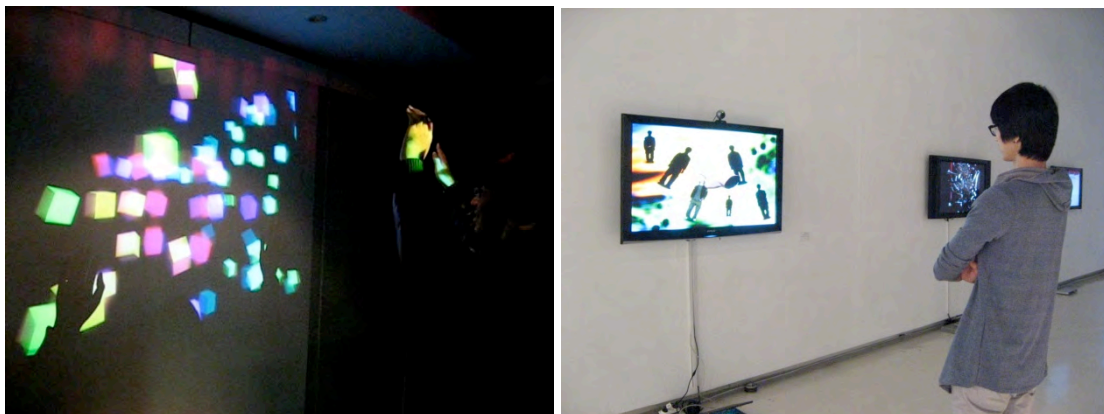
(a) Remaining Illusion Part 1   (b) Remaining Illusion Part 2

Figure 3. Interactive installation Artworks using VAT.

In order to visualize the results, Figure 3 shows samples of artwork in the installation of the VAT in an exhibition hall. The following pictures were taken during the VAT system in use. Figure 3 a) and b) are the artworks by PERFORMATIVE. In this exhibition, the activity is directly in relation to the working group of artists, theorists and technologists - PERFORMATIVE[3] - concerned with the practice of expressing the virtual into reality. The content of the artworks is built in the Adobe Flash[4] Direct

[3] PERFORMATIVE, http://performative.org
[4] Adobe Flash, http://www.adobe.com/products/flash/

3D[5], Max / Msp / Jitter[6] for the interaction of these cycles, and are used as the VAT system requires.

Conclusion

Recently some interactive artists creating media artwork have faced a lot of difficulties in creating their works. The factors which cause the most dissatisfaction include: the environment; an engineer with a communication problem; the programming code; lack of understanding of technology; cost and time issues; the artists' ideas. This yields many problems especially towards completion. In order to solve a variety of artists' problems, there is a need for a media art authoring tool (and other new authoring tools) to suit the less technically inclined artists' and yet provide a powerful means to express their work easily. The goal of this proposal is to create a a camera-based interactive artwork authoring tool for the creation of artworks; a tool that can be easily used but both the experienced artist and by others.

In this paper, the media art interactive installation with the VAT system which uses a camera and window based interaction - help the artists because has easy to use features. The engineering factors using plug-and-play directly into the coding structure, and the default libraries, make the running of the system transparent to the artists.

In the VAT system, artists can use the special interactive installation with authoring tool and be fully integrated with other programs with easy compatibility and where other authoring tools are available. It also provides general-purpose technologies in computer vision and this can be used in content creation with a wider scalability. Further research related to the VAT system and it's interaction library can be progressed into gesture recognition. Future oriented industry - related to media such as Winamp media player - or other kinds of commercial software, will be able to be integrated into the VAT system.

Reference

Pedram Azad, et al. "Computer Vision - Principles and Practice," Elektor International Media BV, 2008

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[5] DirectX, http://msdn.microsoft.com/en-us/directx/default.aspx
[6] Max/Msp/Jitter, http://www.cycling74.com/

Acknowledgements