

Interactive Digital Art using Sensor Technology

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Abstract. In this paper we search for Interactive Digital Art which is one of the art genre that take a digital technology with modern art and sensor technology helps audiences active participation on a art works. Various sensors are used for digital art works; however, Kinect from Microsoft Company is easy and useful for artist. The Kinect is a contactless controller to make an audience to be free from exist contact controller.[2] Sensor that on-board in Kinect recognizes the audience movement who is free from controller and offers visual or auditoria response to the audience in a real time. Therefore the audience becomes a user in an Interactive Digital Art.[1][2] The goal for this paper is to survey and analyze about the Interactive art works that includes based on cutting edge trend sensor technology and the production technology.

Keywords: Interactive Media Art, Sensor, New Media Art

1 Introduction

Modern art started from Fluxus in the mid-twentieth century and it developed to a free form deviate from tradition art expression. The appearance of portable video camera 'porta-pack' from SONY was the opportunity to uptake a video as an art. Video artist Nam June Paik who applies media actively into art made a sensation with experimental and avant-garde performance and exhibition that break the mould of the traditional art.[5] This artistic expression of art is according to the development of computer and internet in the late 20th century and the new media century has come. The types of new media such as television and video applies for experimental art brought the most visible result, and the present that the computer has developed digital video camera is the important media for art works. At that time artists, curators and critics named 'New Media Art' which use digital technology such as interactive multi-media installation, virtual reality and network in an art. Because of the character of New Media Art that continuously develop and factional, it is not easy to classify a super ordinate concept and a subordinate concept or unified the name.[1]

Even artist create an art, in modern art, incomplete art works can be completed with audiences participation place in a physical or in a virtual space. These arts using present digital technology make psychological and physical interaction with users or audiences. Therefore, the goal of this paper is to survey and analyze about interactive art works based on sensor technology. For this study, In Chapter 2 researched a

related works and In Chapter 3 survey and analyzed about sensor technology in interactive arts. The In Chapter 4, concludes the paper.

2 Related Works

In this chapter we survey for the concept of Interactive Digital Art and sensor technology that usually use or applied for Interactive Digital Art.

2.1 The Concept of Interactive Digital Art

Interactive Digital Art is a art performance in many art fields such as sculpture, painting and installation art through digital media. After development of technology, artists use various and easy program to create Digital Art. The biggest feature of Digital Art is to make audiences participate to the art works. Digital technology to be a direct medium for art works and through the participation of the audience the art works to be completed with their interaction. Interface in interactive Digital Art is the space to meet the art works and the audience, therefore, its importance is emphasized. Interface using in Interactive Digital Art, the Audience gives effects on the stream of the art work, change the structure, interresponse on environment or through network so make them to transform and production performance actively participated.[3] From the existed typical contact controller Wii from Nintendo to offer a contactless interface Kinect from Microsoft make the user to be free from controller. These game devices are also take a great role in Digital Art and it is a medium for interactive work.[4]

2.2 Interactive Digital Art Works applied Sensor Technology

Shadow Garden was displayed in Siggraph 2002 is developed by Mind Control company in San Francisco, USA. Shadow Garden shows communication between user and computer without keyboard or mouse. At the first project images create from computer on a wall or on a screen. When the user stand in front of the projector then shadows on covered the images. Digital camera placed on the wall to deliver the shadow signal to computer. The computer has a real time response algorithm for monitored images so images that are response from the shadow is generate. To project the generated images through projector as if it responds to the shadows. The users try to create great images so they can feel excitement to be a part of the art works.



Fig. 1. Shadow Garden, Siggraph 2002

The second Interactive Digital Art is from Mind Control in 2004. This is a virtual reality concept performance in virtual space. When the audience act like draw something with hand in front of the screen, a camera that include move sensor reads the action position and tree like image draws on the screen. If the user takes off the hands from it the tree branch falls off and disappeared.



Fig. 2. Mind Control, Calder 2004

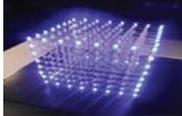
3 Sensor Technology

3.1 Interact Art Production Technology Analysis applied Sensor

There are many cases that artist apply open source or create art works algorithm individually using computer program language. However, the most artists use special develop program for media art production. These production technologies are kept on advancement. The Table 1 is compared and analyzed the production technology.

Table 1. Interactive Art Development Program based on Sensor

Title	Division	Feature	Example
processing	General program language	Media Lab members started the project in 2008 for unprofessional programmers. Simple language system is the feature of this program.	Wiring, Arduino, Fritzing etc.. Foundation for other multi program construction.

<p>Arduino</p>	<p>Single Board Micro Controller</p>	<p>Hardware platform to support develop environment For artists.</p>	<p>Arduino, using LED in art works.</p> 
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3.2 Sensor Technology

A sensor is a converter that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. A sensor is a device, which responds to an input quantity by generating a functionally related output usually in the form of an electrical or optical signal. A sensor's sensitivity indicates how much the sensor's output changes when the measured quantity changes. It widely use for daily lives like smart phones and game diveces. Contactless interface user mostly based on visual technology so use one or many number of camera track and recognise the movement of user. These contactless method based on visual technology like Figure 3. the flow is follow the steps; initialize, tracks, estimate the pose of user and recognise.



Fig. 3. Contactless Method Process based on Visual Technology

These sensor technologies are takes a great role not just in a game and an art field but also in medical, retail and commercial field.

4 Conclusion

In this paper, we analyzed about Interactive Digital Art works and art works production technology and its sensor induce to the audience's participation. Through the Interactive Digital Art analysis based on sensor technology is able to check the feature and the production technique. Digital Art is not a completed art; it is kept

changes and differentiated according to the media development. The development of technology cannot change the essence of art but the means and method will continuously change and develop for its expression. For the future study, based on contents and features of this paper, we will create our own Interactive Digital Art works and analyze how it affects users differently to Media art without sensor technology.

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