

## Research about Minecraft as Interactive Program for 3D Virtual Digital Art

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### Abstract

*In this paper, we researched about Minecraft as interactive program for digital art. This research will study the potential of Minecraft as realization. In digital art field, interaction is important. Many digital artists use the digital technology for their digital art works using various interaction program. Unique interactions, peculiar enjoyments or entertaining elements make digital art works look like a game. Games and Digital art are quite similar in terms of interaction between producer and audience. Naturally, game devices (Kinect, Wii Remote, Leap -motion) and programs are used in digital art field. They can realize interaction in digital art field in various ways. In particular, game engines are widely used to implement interaction with 3D virtual space in digital art. Normally, game engine has the disadvantage that artists feel difficulty to use it because of programming. They are different on a case by case, all game engines need programming. But Minecraft is easy to implement 3D virtual space and interaction without programming. Minecraft is a sandbox independent video game originally created by Swedish programmer Markus and later developed and published by the Swedish company Mojang. It's easy to deal than most game engine so, it is used in elementary schools for education in the United States. It seems to pixel art work in 3D virtual space. This research will prove the possibility of Minecarft in interactive digital art.*

**Keywords:** *Minecraft, digital art, 3D space, game*

### 1. Introduction

Continuous developments of computer interface and human interaction method gave innovative paradigm changes in various fields, and per applied areas, it developed by exchanging and applying technologies through combined researches. [1] In this paper, we researched about Minecraft (Figure 2) as interactive program for digital art. This research will study the potential of Minecraft as realization. In digital art field, interaction is important. Many digital artists use the digital technology for their digital art works using various interaction program. Unique interactions, peculiar enjoyments or entertaining elements make digital art works look like a game. Especially the field of games is a field where interface technology development, from joy stick game to movement based indirect interface technology, is commercially utilized well. Games and Digital art are quite similar in terms of interaction between producer and audience. Naturally, game devices (Figure 1(Kinect, Wii Remote, Leap -motion)) and programs are used in digital art field. Kinect is a motion sensing input device by Microsoft for the Xbox 360 video game console and Windows PCs and Wii Remote, also known colloquially as the Wii Remote, is the primary controller for Nintendo's Wii console.



**Figure 1. Kinect, Wii Remote, Leap -Motion**

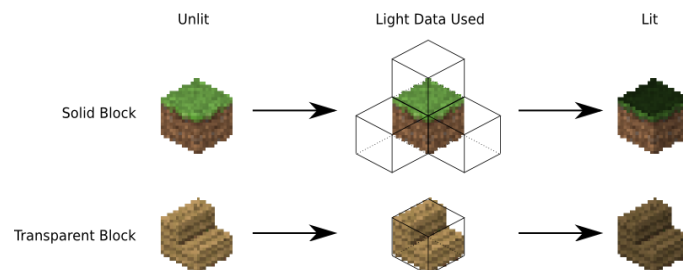
They can realize interaction in digital art field in various ways. In particular, game engines are widely used to implement interaction with 3D virtual space in digital art. Normally, game engine has the disadvantage that artists feel difficulty to use it because of programming. They are different on a case by case, all game engines need programming. But Minecraft is easy to implement 3D virtual space and interaction without programming. Minecraft is a sandbox independent video game originally created by Swedish programmer Markus and later developed and published by the Swedish company Mojang. It's easy to deal than most game engine so, it is used in elementary schools for education in the United States. It seems to pixel art work in 3D virtual space. This research will prove the possibility of Minecart in interactive digital art. Minecraft is a sandbox independent video game originally created by Swedish programmer Markus "Notch" Persson and later developed and published by the Swedish company Mojang. The creative and building aspects of Minecraft allow players to build constructions out of textured cubes in a 3D procedurally generated world. Other activities in the game include exploration, gathering resources, crafting, and combat. Multiple gameplay modes are available, including survival modes where the player must acquire resources to build the world and maintain health, a creative mode where players have unlimited resources to build with and the ability to fly, and an adventure mode where players play custom maps created by other players. [2] In digital art, development of technology is an important fact, because of technology is tool in development of digital art. Digital technology effects on game and also digital arts via development of interaction and immersion. Janet H. Murray explained the 'Immersion' is a pleasant experience that going into exquisitely processed illusion fantasy world. [3] Minecraft is a program like assembling a LEGO block in the virtual world.



**Figure 2. Minecraft**

## 2. Minecraft

Minecraft is a sandbox independent video game originally created by Swedish programmer Markus and later developed and published by the Swedish company Mojang. It's easy to deal than most game engine so, it is used in elementary schools for education in the United States. We propose to use and apply Minecraft in digital art in this paper. Figure 3 [4] is the image composition of Minecraft. [5] Each solid block doesn't receive lighting from the block it's in. From the three blocks it touches above, to the left, and to the right. For transparent blocks with potentially strange shapes, lighting is approximated by using the local block lighting on the entire image. Table 1 shows the history of Minecraft and Table 2 shows structure of Minecarft. Artists can development interaction in 3D virtual world using Minecraft in PC, console game machine and smart phone (iOS, Android). Figure 4 is the example of Minecraft terrain.



**Figure 3. Image Composition of Minecraft**



**Figure 4. Minecraft Terrain**

**Table 1. History of Minecraft**

May 2009	alpha version was publicly released for PC
Nov 2011	full version was released
Oct 2011	Android version was released
Nov 2011	iOS version was released
May 2012	The game was released on the Xbox 360/ Xbox Live Arcade
Dec 2013	The game was released on the Playstation 3
Sep 2014	The game was released on the Playstation 4 and Xbox One
Oct 2014	The game was released on the Playstation Vita
Dec 2014	Windows phone version was released

**Table 2. Structure of Minecrafft**

Factor	Contents
Terrain	Mountain, Floating island, Hollows, Hill, Beach
Surface	Surface layer, Basin
Water Bodies	Ocean, River
Large structures	Cavern, Ravine, Abandoned mine shaft, stronghold
Small structures	Lake, dungeon, Mineral vein, Tree, Huge mushroom, Spring, Desert well, Moss stone boulder, Ice spike
Buildings	Village, Desert temple, Jungle temple, Witch hut, Ocean monument

### 3. Process of Making 3D Object in Minecraft

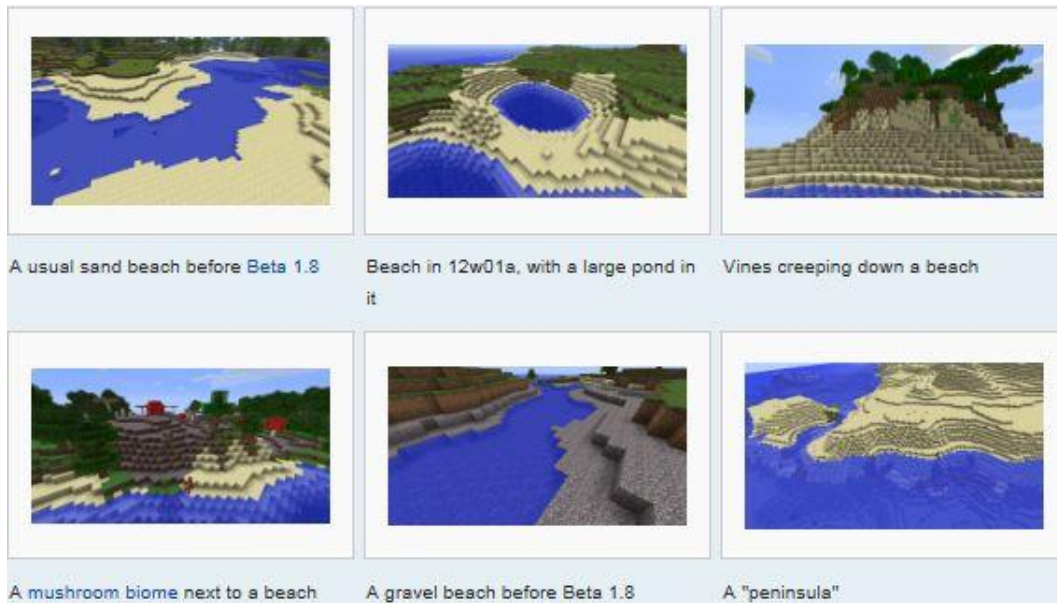
Process of making 3D object in Minecraft is as like LEGO block assembling in virtual world. Through each of the click, one block is assembled. A building or a different object is achieved by several clicks of user, as LEGO block. Figure 5 shows the Process example of making house in Minecraft. Minecraft has many kinds of block data as Figure 6. Figure 7 is the beach examples of Minecraft.



**Figure 5. Process Example of Making House in Minecraft**



**Figure 6. Block Data of Minecraft**

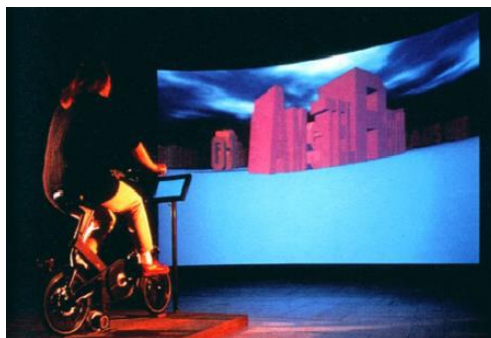


**Figure 7. Beaches of Minecraft**

#### **4. Application of Minecraft in Digital Art**

Through the medium's resistance to the unproductive dichotomy between what is "real" and "virtual," video games provide opportunities for a renewed understanding of how places function. The interactive nature of video games opens analytical possibilities that would not be available otherwise, such as examining the impact of rapid changes to the environment or characterizing conflicts more readily. Video games provide controlled, focused environments that may allow for a detailed demonstration of place in readily accessible ways. [6]

Figure 8 is 'The Legible City'. It is digital interactive art work. The artist of this art work developed art work using 3D virtual graphic. This art work provides the journey into 3D virtual world to spectators through interaction. In digital art work 'interaction' is important factor. Minecraft is easy to develop 3D virtual world than other 3D graphic program. Figure 9 is diverse example of Minecraft graphic art. Until now, most examples of Minecraft are looks like a pixel art, exactly 3D pixels. But, we can walk and play in complete 3D virtual world.



**Figure 8. Jaffrey Shaw, <The Legible City>, 1988**



**Figure 9. Example of Minecraft Graphic Art**

## 5. Conclusion

Audience's active intervention effects on the contents directly and changes the digital interactive art works. Interaction is important factor in digital art and game. So, game software is widely used in development of digital art. In this paper, we proposed application of Minecraft in development of interactive digital art. Games and Digital art are quite similar to each other. Most game engine has the disadvantage that artists have a difficulty to them because of programming. But Minecraft is easy to implement a 3D space and interaction without programming. Even we can experience 3D virtual world we made in Minecraft. Minecraft will be used a lot and it will be excellent program to implement 3D virtual environment in digital art. This will provide a more immersive experience to audience in digital art.

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