



New Trends and Issues Proceedings on Humanities and Social Sciences



Issue 5 (2017) 40-46

ISSN 2421-8030

www.prosoc.eu

Selected paper of 5th World Conference on Design and Arts (WCDA-2016), 26-28 May 2016, South East European University
Skopje-Macedonia

New generation console game technologies; Console game application supported with projection mapping

Seza Soyulucicek^{a*}, Hacettepe University Faculty of Fine Arts Department of Graphic Design, Ankara 06590,
Turkey.

Suggested Citation:

Soyulucicek, S. (2017). New generation console game technologies; Console game application supported with projection mapping. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 5, pp 40-46. Available from: www.prosoc.eu

Selection and peer review under responsibility of Prof. Dr. Ayse Cakir Ilhan Ankara University, Turkey

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Abstract

Up to now the relationship between console games and gamers has been restricted by limitations in screen size. The gradual enlargement of these sizes has accommodated for a technological boom in the development of game software programs, some of which have been hugely successful and had broad repercussions across both the gaming and technological landscape. In 2010, Microsoft and their Kinect team released an advertisement using projection mapping technique, which gave users an exciting preview of the future of game technology and provided inspiration for aspiring young game developers. With the help of new techniques, developers had the chance to produce artistically unique projects by creating a variety of different game experiences. Additionally, the enhancement of digital games, their interactive features, and the enlargement of the screens enabled users to experience a completely new level of immersion in their games.

Keywords: console game; game design; graphic design; game experience; game user interface design; projection mapping

* ADDRESS FOR CORRESPONDENCE: **Seza Soyulucicek**, Hacettepe University Faculty of Fine Arts Department of Graphic Design, Ankara 06590, Turkey

E-mail address: sezasoyulucicek@gmail.com / Tel.: +90-312-297-8825

1. Introduction

With the developing technology in the digital game industry, console games have attained a place in the lives of gamers, the number of which has increased gradually. The production of new gaming consoles has offered players new gaming experiences. Along with the known, gaming with a controller habit, gaming with the new, motion sensing input devices which enable gamers to play games without a controller has provided opportunity for the development of new and different games. And with the increasing competition in the gaming industry, the importance of original, creative and attractive games has increased. Therefore, responsibilities of a team in a game development process and the need for professional designers have increased as well.

2. Game Consoles

It's seen that, nowadays, the game consoles of Nintendo, Sony and Microsoft are the most popular ones.

2.1. Nintendo

Nintendo, Japan's game console producer, until the mid-1990s, was the leader in the game industry. However, as Sony stood out in the game industry in 1994, Nintendo's sales decreased and the firm ranked number two in the competition. Sony's consoles, compared to other consoles, in terms of technology, were more developed and Nintendo gradually lost the leadership. In 2001, Microsoft stood out in the industry and joined the competition as well. Nintendo couldn't cope with the new console technologies and fell further behind the competition. Consequently, Nintendo aimed to have different audience to develop different strategies and plunged into a quest (Ziesak, 2009).

Thereupon, with their new console Wii which was known by the code name 'revolution', Nintendo targeted not only to compete with Microsoft and Sony but also to reach broader demographic than that of the two others. As Nintendo aimed this console to be played by everyone, originating from the word 'we', they named the console as Wii. Nintendo Wii was introduced in North America and released in 2006 (Wolf, 2008).

The controller of this console named Wii remote, has only 2 buttons while other console controllers have approximately 7 buttons. Additionally, the Wii console connects to the internet through its built-in Wi-Fi with the help of which previous Nintendo games can be downloaded and played.

Wii is the first video game console with motion sensors. Its controller 'Wii remote' has since received much attention due to its unique features like motion sensing capability and differences between typical gaming controllers. Players, with this controller, physically get involved in and interact with the game.

According to Dahlen and the others (2010), Nintendo, setting the target audience as parents, families and especially women, developed a home video game console. Controlling Wii remote is very simple and it works with wireless internet connection. With the help of motion sensing capability, players control and manipulate items on screen by gestures. Additionally, pressing on the other buttons on Wii remote, players can change game settings.

2.2. Sony PlayStation Move

PlayStation Move launched in markets in 2010. The controller, which has motion-sensing ability like Nintendo, is designed only for PS3. The orb at the head, Move, allows players to interact with the console through motion in front of PlayStation webcam, PlayStation Eye. The color of the orb at the

head of the controller takes a different color for each player. Up to four controllers can be tracked at once on the PS3. The accelerometer and the rate sensor inside the controller are used to track player motions (Saunders & Novak, 2013).

While some of the motions sensing console games are developed specifically for a console, the others are developed compatible with all game consoles. The difference between them is that the way each console runs different. For instance, *Little Big Planet 2* was first released as a PC game. But with the advancing technology, it's been made compatible with many other platforms. *Little Big Planet 2* is a 3D platform game. To control the main character in the game, the player needs to use Move and the buttons on the controller to deal with the obstacles on the road. There are scenes that require the player to hold an object up, rotate 180 degrees and reposition it. Due to the sensitivity of Move's sensors, these moves are done easily. In this sense, compared with the sensors of Wii, Move's are more sensitive and successful.

In 2013, PlayStation released a motion sensing camera for PS4. PlayStation Camera has two ultra-sensitive cameras with lenses that distinguishes the player from the environment and transfers the image to the game. The player manipulates and controls the game with his/her gestures (<http://www.sie.com/en/corporate/release/2013/130221b.html>).

2.3. Microsoft Xbox

In recent years, PC games have become a growing and very competitive sector that takes a lot of money and effort. With the increasing competition in this sector, to increase the interest in games, game interface designs and used technologies are paid more attention. For example, the game console Microsoft released, Xbox 360 Kinect.

The game device Kinect which can be regarded as a technological revolution was first released in November 2010 in North America. The day Kinect was released; a big advertisement organization was held at New York Times Square. Hundreds of people attended this organization to see how Xbox 360 works.

Microsoft Kinect is a game device that has brought a new and different gaming style for digital games. The most appealing feature of this device is that it has no controller. Kinect enables players to play a game without having to use a controller, simply by gestures and motions. This way, the game is controlled by the player's body, not a controller (<http://www.xbox.com/en-GB/Kinect>).

Kinect is designed to sense the movements of specific parts of a human body. With the help of this specific body parts, the device understands what the player's body wanting to do and reflects it on the screen. Due to this advanced technology Microsoft developed, the audience of this console includes the ones who aren't familiar with games as well. The reason is that the system of this console doesn't require advanced console/control usage skills.

Kinect features an RGB camera, depth sensor and multi-array microphone that provide full body motion capture, facial recognition and voice recognition capabilities (<http://www.windows8hacks.com/tag/kinect>).

Motions of players are converted to commands by sensors called CMOS and transferred to the game. In other words, Kinect is responsible for transferring these commands to Xbox game console (Widenhofer, 2010).

Kinect starts to spread ambient lights once the game is started. In a short time, it senses the player's body parts and reflects them on the game. There are so many motions that a player can possibly do saved in the software of Kinect. Kinect's software matches the motions of players and transfers them into the system.

In May 2013, Xbox 360 was updated and released again as Xbox One. With its 1080p Camera Xbox One, compared to Xbox 360 Kinect, can be played in smaller places. Xbox one features are different than the others and more advanced. The most conspicuous one is personal voice control system. As the console is always on standby mode, it's possible to turn it on and off by voice control. The console is controlled by the sounds and images it can perceive (http://www.ign.com/wikis/xbox-one/Xbox_One_Kinect).

It can be said Microsoft Kinect/ Xbox that provides players with a new gaming experience is the first motion sensing game console. By introducing Kinect at an open public space, the message that applications in game design field can be improved and that there are alternative game designs was given. Each new technology developed in this field brings new design philosophies and different disciplines together. While designers perhaps so far laid emphasize on user- screen relationship during the game design- development process, they now lay emphasize on game-environment-user relationship.

3. New approaches to game design

Game consoles without a controller that provide players with a game experience that is unlike the known, are seen as innovations that competition in this field brought along. An example to these innovations can be given as the new game consoles developed by Microsoft, Sony and Nintendo. Especially Microsoft Kinect that's an additional device developed for Xbox has brought new approaches to this topic.

In the advertisement organization of Kinect, Microsoft and Seeper Arts and Technology Studio ran an installation project to introduce the device. On a building at the center of Munich, Stachus in Germany, abilities and features of Kinect was demonstrated using Projection Mapping technique (<http://seeper.com/work/xbox-kinect-launch>). Microsoft, in this event, introduced Kinect to public, showing that Projection mapping can be combined with digital games.

3.1. IllumiRoom

The presentation of the Kinect game using projection mapping technique in 2010 was reviewed in 2013 which lead to a new approach to game experience. Up to now, console game and user relationship has been restricted by certain screen sizes. The sizes and sound systems of these screens have been improved every passing year. According to Jones and others (2013), while screen and sound systems improve in time, what players see are restricted within a screen. For this reason, the developers of Kinect have come up with a new approach to change and improve watching experience. In their new approach, they aimed to reflect the game display on the whole surface of the wall behind the screen inspiring from projection mapping/video mapping technique. In this project, while what the player focuses on in the game is TV, low resolution images that 'radial transfer device' reflects on the wall are the game's complementary details. This project is Xbox 720 IllumiRoom prepared/developed by Microsoft's prototypes which is among the new game technologies they have been working on. IllumiRoom is defined as a proof of concept system that reflects the game display out of a TV frame via a radial transfer device to improve the game experience (Jones and others, 2013). The ever-developing IllumiRoom project that was introduced to public in January, 2013 is seen as an experimental study introduced to the game world.

IllumiRoom works like this: The wall surface behind the TV and objects around it (bookshelf, TV unit etc.) are scanned by Kinect and game display is reflected on them by radial transfer device. Objects already scanned by Kinect are modeled in the device's memory and game images are reflected on the objects according to their forms. This way, game space is enlarged. With the help of the radial transfer

device, various plays of lights, particles and environment objects are reflected on the wall surface around TV. Reflected visual elements complete the game scene. But the main focus is on the images on the screen. Working like this, IllumiRoom, is introduced as an application developed to improve the classic game experience (Jones et al., 2013).

3.2. RoomAlive

Microsoft, improving IllumiRoom project, developed a new application called RoomAlive. In this project, game experience is strengthened by reflecting the game screen wholly to the room the user is in. As the game screen that's entirely reflected to the room changes according to the players movements, the game is controlled only by the player's body movements. In this project, more than one projection device is placed in the room. The surface on which each device reflects the screen on is different. Additionally, Kinect watches user motions. Game screen is reflected entirely on the objects in the room and walls, using Projection Mapping technique. This way, the room becomes an interactive virtual game world. Players control the game touching, hitting, and crushing the virtual objects. Microsoft, aiming to provide players with an improved, different and captivating game experience without a TV, adapts the game screen to the room (Jones and the others, 2014).

Deriving from this study and advanced technology, it can be concluded that console game developers aim to create better game experiences on bigger screens and wider sights. The reason is that big screens have bigger effects on users' game performance. Users concentrate better on the game when the game is displayed on a big screen. Even though this project seems quite appealing, it is estimated that when it is released, compared to other game consoles, it will be much more costly. However, these experimental technologic approaches can be helpful for the coming applications.

4. Experimental Application Work

Inventions that are examples of arts and technology association not only lights the way for the game world but also helps designers reflect their artistic skills and reach players through different communication channels. Kinect for Windows, being put into independent developer's service, has started to be used in different fields as a new expression device that prevents Kinect from only being used in the game field. Designers, therefore, have had the chance to get used to similar camera systems and develop installations that provide different experiences. Developed applications are no longer only entertainment tools but also works that have high artistic values and gain new meanings.

By looking at these studies, a motion sensing game application has been developed. In accordance with the predetermined aims, a platform game that runs on Windows PCs and that can be controlled by Microsoft Kinect has been developed. During the whole development process, all interface designs and animations have been prepared and the help of software specialists have been taken. Originating from Turkish folk tales, to reflect Turkish culture, a game named 'Büke and Saklı Çalgı' has been developed.

While presenting the game, using the projection mapping technique, sprite graphics that supports the game play were set around the screen the game was displayed (Figure 1). In this trial, it's been observed that this way the user concentrates on the game better and that the additionally reflected screen completes the game experience. Around the screen, animated images that don't get ahead of the game and become integrated with the game concept were reflected. As the images were reflected in the dark, the usage of light colors was prevented. Low speed, small and semi translucent white particles/dots that go in different directions were used. These small particles were used to reflect the epic and magical side of the game.



Figure 1. Image of Game Display

5. Conclusion

It is seen that many technology firms have been cooperating with designers and artists more in recent years. Each new application and technique the digital world is provided are used by designers, forming new 'expression styles'. Developed projects that have high artistic values show that opportunities technology provide inspire designers to create artistically qualified projects. Additionally, technology firms that show their abilities via cooperating with designers and artists can foresee how technological developments should be in the future. In this sense, the importance of research, art-technology cooperation and inter-disciplinary will increase even more.

Deriving from the research and the applications in this study, it's believed that combining projection mapping and game experience and presenting it to players is a new promising, open to improvement and a new field in the console game industry. It's believed that, deriving from approaches like IllumiRoom or RoomAlive, there will be various new applications in the future and interdisciplinary studies will increase. In our times when prejudice and arguments about digital games still go on, the strength of the meaning a game conveys and combining it with good graphic designs successfully increases the artistic value of a game. When the artistic potentials of digital games, which are new expression and interaction styles, are considered, its seen that artistic and design values of this field is a force to reckon with.

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