Title:

How to improve the gameplay and user experience of FPS games in the field of scenery design

Abstract

This thesis contributes to the explanation of how to improve the gameplay and user experience of FPS games in the field of scenery design. Firstly, an analysis will be implemented to have a research on the current situation of different FPS games. Then, a model that simulates the players’ stage will be created to search for the exact elements that affect the gameplay and user experience. Furthermore, a detailed conclusion will be made. Finally, some future works and limitation will be discussed to get a better and more subjective result.

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# Introduction

The FPS (First-person shooters) game has become a type of extremely popular games in the current game market. From the first FPS game Doom, released in 1993, to the most recent FPS game named PUBG and Fortnite, the in-game design and game model have been added and improved a lot by the game developers. The first impression that an FPS game gives to the players is definitely the scenery design, which have a dominant factor for players judging whether to continue playing this game or not. In the last 30 years, there is a big progress in this aspect due to the development of computer technology and people’s thinking innovation.

There is an old saying, first impressions are strongest. The user experience will largely be affected by the scenery design compared with others such as game mode, cheating rate, money charging that might be experienced after the whole game routine. Apparently, many existing game developers are still making effort to improve their, for example, stage background and model details to provide the players with a more comfortable and understandable gaming condition. The producer’s investment on this part is absolutely critical and vital, or they may lose a large number of players at the beginning phase.

## Motivation

Since that the scenery design has played such a important role, it deserves to make a research on it to improve the gameplay and user experience. As a matter of fact, there are still many scenery design problems in the current games although these games might have been sold for millions of dollars. The elaborate and satisfied scenery design will attract a multitude of fresh players when the game published, so that the profit and fame will be guaranteed.

## Goal

The goal of this thesis is to, first, find the exact elements in scenery design that have impacts on the user experience and, second, improve the user experience according to the elements found above.

## Method

In this bachelor thesis, it will be examined how to improve the gameplay and user experience of FPS games in the field of scenery design.

Firstly, an analysis of already existing FPS games and their scenery design will be accomplished. Information about how users react to certain sceneries will be collected. Two specific FPS games as representative for this genre will be chosen and a deeper research on them will be taken. Corresponding feedback from the first examination will be taken into account. Abstracting the key points and a detailed explanation of them will be given.

Then, a specific prototype model will be created by Unity3D to simulate the stage that the players possibly meet. Many elements can be changed in this model and the feedback from testers will be recorded. The method "control variable" will be implemented.

Finally, the results will be analyzed comprehensively and a full conclusion will be made.

# 2 Related background

## 2.1 FPS game

FPS games, which has a full name of First Person Shooter, is a type of shooting game. The player has the view of the character’s eyes in the game, usually equipped with a gun or other weapons, and shoot the enemies or the opponent. It is a game with the 3D environment, so these games tend to be somewhat more realistic than 2D shooter games, and have more accurate representations of gravity, lightning, sound, and collisions.[1] The combination of a keyboard and mouse are always used to control the characters on a personal computer.

With the development of society, to meet the needs from a different type of players, game developers have broadened the traditional FPS games by adding new elements such as puzzle, role acting, Battle Royale. Therefore, the FPS game is currently a very extensive concept.

To speak generally, the FPS game can be categorized into two types. PvE and PvP. These two game types include almost all the FPS games in the current game market. It is a macro game classification suitable for all the video games at present. Next, we only discuss the FPS game within these two types.

### 2.1.1 PvE

PvE (Player VS Environment) is a term used in video games. A PvE game is a game type that players fight computer-controlled enemies. [2] Usually, this mode can be played alone or with other online players and AI companions. With a first-person view, players can shoot the monsters and collect specific materials to accomplish the missions. The scenery design and story line are usually paid close attention by players.



Figure: Screenshot of Borderlands 2( A classic PvE game published in September 2012)

### 2.1.2 PvP

PvP (Player VS Player) is a game type that players conflict with two or more live participants. [3] For an FPS game, it usually contains competitiveness and requires a intense reaction from the players. Many world famous gaming clubs cultivates the professional players for this type of game to win the tournament and prize. PvP games always lay emphasis on fairness and equity.



## 2.2 Color psychology

Color psychology is a study about human behavior in terms of different colors. Each color will provide the player with different feeling and then, player will have different reactions. It is a commonly used subject that implemented in marketing theory, pharmacy, brand design and so on.

People from different cultures will give the same color diverse meanings. For example, in China, people regard red as pleasure and ceremony, but in some western countries, they think the red represents financial deficit and risks. This is an example in common knowledge to demonstrate the importance of color in multiple areas.

To have a better understanding of color psychology, we should begin with the elements of color.

### 2.2.1 Elements of color

It can be described by the following three terms. Hue, Value, Chroma.[4]

Hue is one of the main properties of color. It is commonly acknowledged by people to describe a color. Under the light with different wave length, eyes can perceive different hues, which are very apparent characteristics of colors.

Value, also known as “lightness”, is a representation of variation in the perception of a color or color space's brightness. People can express them as brighter or darker.[4]

Chroma, which has a another name “saturation”, describes the color by its strength and brilliance. It refers to the intensity of color in an image. The chroma can be calculated by the amount of grey elements in a specific color. When the saturation is zero, you will see a totally grey picture.

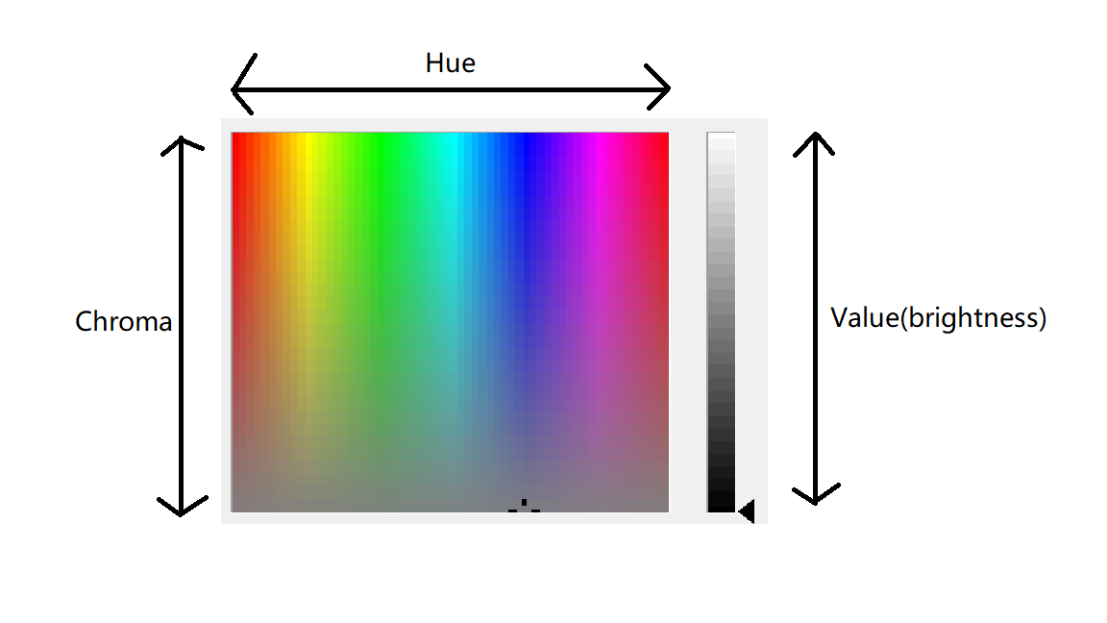


Figure: shows the relationship between these three elements in a single graph

### 2.2.2 RGB color model

RGB color model is a color model that red, green and blue lights are added together in various ratios to produce a broad array of colors. This model is broadly used in displaying images and videos in field of computers and mobile phones. However, different devices will analyze and show the RGB values in various results due to the difference in manufacturers and dye elements.

Although it is easy to use RGB color model to describe a color, two seemingly similar colors may varied largely. Using a color space to depict a color is a more usual practice.

### 2.2.3 Munsell color system

People always describe colors in a vague way such as grass green, light green. In fact, different people have slightly different definition in “grass green”. Therefore, a more accurate system is needed to describe the colors precisely.

Munsell color system was proposed in 20th by Albert H. Munsell in America. A.H. Munsell had combined the art and science of color into a single color theory. This achievement laid the foundation for the computerized color matching system and provided a more clear understanding of color principles.[5]

The graph below shows the exact relationship of Hue, Chroma and Value in Munsell color system.



Figure: Hue wheel of Munsell Color System

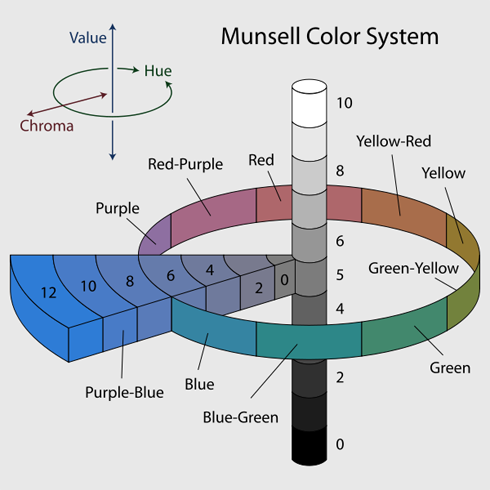


Figure: Full dimension of Munsell color system

### 2.2.4 HSV color space

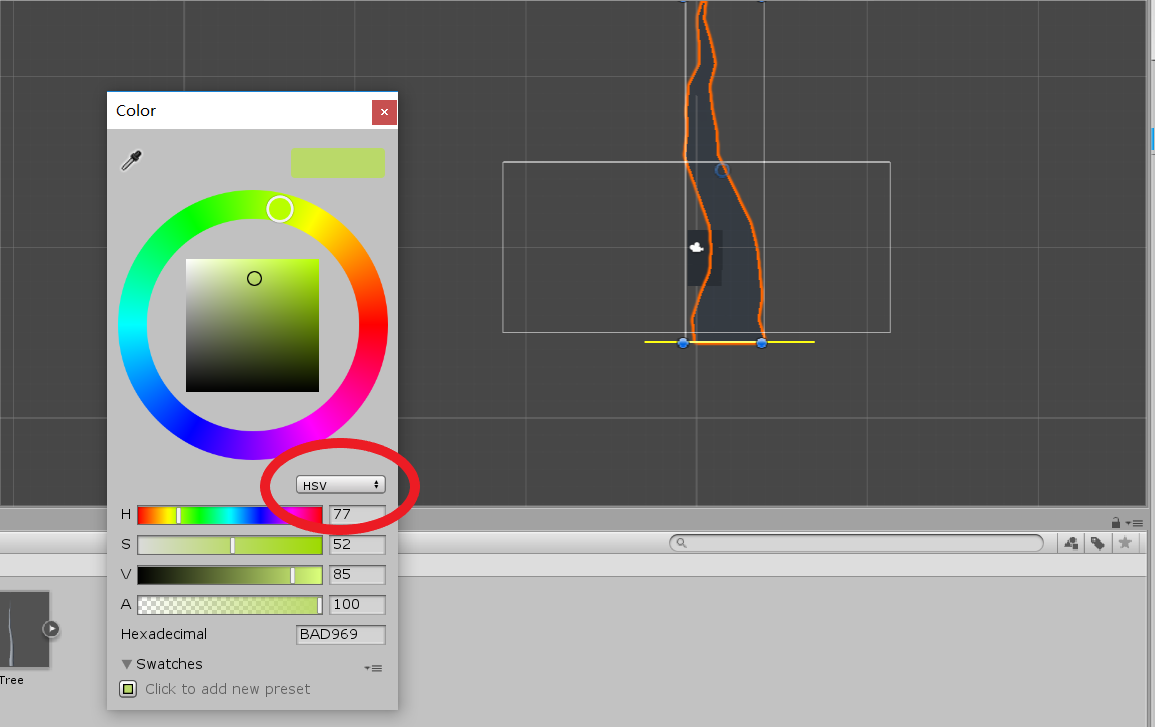
HSV(hue, saturation, value) is an alternative representation of the RGB color model. The HSV color space was invented in the mid-1970s, formally described by Alvy Ray Smith. This model is based more on how colors are organized and conceptualized in human vision.[6]

Hue is a degree on the color wheel from 0 to 360, 0 is red, 120 is green, 240 is blue.

Saturation is a percentage value, 0% means gray and 100% is full color.[7]

Value is the largest component of a color

HSV color space is a commonly used color space in web design, also in game design. In Unity3D, designers can choose the translucency color of a 3D object both in RGB model and HSV model, which largely increase the efficiency.



### 2.2.5 Human reaction to colors

Besides in marketing, advertisement design and other areas, colors also play an important role in game design. Game designers tend to make best user experience in the in-game playing. To meet the needs of most players, the scenery design should be accommodated to most of the peoples’ intuitive reactions. For example, the whole background should be in a comfortable color tone. An interactive object or a specific NPC(Non-Player Character) model in a game should be clearly identified and recognized. In this part, the importance of colors will arise.

There are so many factors contributing to the reaction of human eyes in terms of different colors. For example, the differentiation of screens, the people status, mood, clock time of a day, visual fatigue, age, gender. When people make experiments, these minor but apparent factors should be taken into consideration and avoided. Consequently, The results can be objective and fare.

## 2.3 Game engine

### 2.3.1 Introduction

A game engine lays the ready-made framework for game developers to create and build the video games. With game engines, people can create numerous gaming applications. Reusing the engines and codes is effective and money-saving for companies.[8] Most game engines comprise rendering engine, physics engine, sound, memory management and others. Each game engine has its own features and will finally produce games with their own characteristic.

### 2.3.2 Effect on scenery design

It is the rendering engine that decides the style of scenery and character model. Apparently, each game engine has its own design style in game screen. There are still many players that are attracted by one specific game screen and continue playing the game that only made by this game engine.

## 2.4 ISO9241

# 3 Approach

## 3.1 Game collection

In this phase, we will choose the exact two typical games that suits for testing and the whole research. One PvE and one PvP.

### 3.1.1 Market situation

There are currently thousands of FPS games in the market. Each of them has its own features and characteristics.

### 3.1.2 Game feature

### 3.1.3 Result

## 3.2 Game testing

## 3.3 Possible factors

## 3.4 Game Model Design

## 3.5 Testing and Analysis

# 4 Implementation details

# 5 Conclusion

# 6 Future works and limitation

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# 8 Appendix