

# Research on Game Character Modeling and User Experience Optimization Path Based on Emotional Design Theory

Xiaolei You

School of College of New Media, Jilin University of the Arts, Changchun, 130031, China

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**Abstract:** With the continuous development of the gaming industry, game characters are an important medium for users to interact with games, which to some extent determines the quality of the gaming user experience. This article refers to Donald Norman's three-level emotional design theory model and explores the relationship and optimization strategies between game character modeling and game user experience from three aspects: instinctive layer, behavioral layer, and reflective layer. This article explores the relationship between emotional design theory and game characters, and proposes a visual modeling method for characters from the instinctive level, a behavior model construction method for characters from the behavioral level, and a connotation construction method for characters from the reflective level. From this, it can be seen that a successful character design needs to take into account three aspects: perceived beauty, game enjoyment, and value belief, and use a three-level model to jointly create an immersive emotional experience for users.

**Keywords:** Emotional design, Game character modeling, user experience.

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## 1. Introduction

With the development of the digital entertainment industry, electronic games have become an important carrier for mass cultural production and emotional dissemination. In game products, game characters are an indispensable part. They are the proxy subjects for game players to enter the virtual space and the key to bringing players into the game narrative [1]. Excellent game character images not only attract players' attention through their exquisite appearance, but also move them through their own behavior and the stories behind them, and even become a cultural symbol.

At present, there have been significant improvements in game character modeling, from geometric accuracy to texture materials and bone binding. However, not all technological breakthroughs can bring good user experience, and the emotional feelings obtained by users in game character interaction are the key. So one of the core goals is how to consciously use role modeling to induce positive emotions in users. This is also a problem worth exploring in game design.

This article adopts the theory of emotional design as the research basis for analysis. Donald Norman's three-level division of human emotional design divides the process of emotional processing into three stages: instinctive, behavioral, and reflective [2]. These three stages correspond to people's impressions, experiences, and memories of role-playing games, respectively. Based on this theory, the author conducts a comprehensive analysis of game character modeling and finds design methods to enhance player experience.

## 2. The Correlation Between Emotional Design Theory and Game Character Models

This pathway suggests that the cognitive process of the human brain can be divided into three interactive processing levels, namely the instinctive layer, the behavioral layer, and the reflective layer. The instinctive layer is a direct sensation

that focuses on the representational features of the object, such as appearance, color, texture, etc. This was proposed by cognitive psychologist Donald Norman in his book "Emotional Design". The surface layer is the behavioral level, involving the pleasure and work efficiency during use, focusing on the functional implementation, operation, and interactive experience of the product; The deep level is the highest level of cognitive processing, including reflection on consciousness, cognition, experience, and cultural context, emphasizing the self image, self satisfaction, and memory value brought by the product.

If this concept is applied to game characters, game characters themselves are a natural carrier of emotional communication. Players understand this virtual world through the image of their characters, and have an impact on the world by manipulating them [3]. The stories that happen to the characters make players reflect on their own value and meaning of existence. And an excellent character image can help players better understand the character and resonate emotionally. If the character design is too rough, it may cause players to lack emotional investment in the character, affecting the overall gaming experience [4].

There is a one-to-one correspondence between the characteristics of game character models and the user emotions they trigger: at the instinctive level, visual characteristics such as facial proportions, body lines, clothing textures, color saturation, etc. mainly cause users' aesthetic pleasure, curiosity, or rejection; At the behavioral level, interactive characteristics such as the fluency of character actions, skill feedback effects, and the reasonableness of physical collisions directly stimulate users' sense of achievement, control, or frustration; On a reflective level, the connotation attributes such as character identity setting, personality growth, and cultural background symbols are more likely to stimulate users' empathy, admiration, self projection, or cultural identity. Mastering this mapping relationship is the foundation for systematic role design.

### **3. Visual Modeling and User Experience Optimization of Game Characters Based on Instinctual Layers**

The instinctive layer design pursues a first glance impact. In the case where users have not yet developed a deep understanding of the characters in the game, the first glance at the character image is one of the important factors in forming an emotional connection with the user. A good instinctive layer design will catch the user's attention from the beginning and arouse their curiosity.

The appearance and linear design of characters have rich metaphorical meanings. The overall size and basic posture of the character are the basic elements for expressing temperament attributes [5]. Characters with a lot of curves and rounded corners can convey a cute, friendly, and non aggressive temperament, which can easily arouse users' affection; The use of sharp lines and sharp edges in characters conveys a powerful, dangerous, and oppressive temperament, which can easily trigger users' admiration or reverence. Character silhouettes play an important role in the actual modeling process. In the process of making character models, the recognition of character silhouettes is a key factor. A good character silhouette can express the character's personality traits without any color or detail.

The color combination plays a good emotional guiding role in the design of the instinctive layer. Different colors can trigger different emotions in users. High saturation and high contrast color combinations can easily attract users' attention and convey a sense of vitality and confidence; Color combinations with low saturation and the same color scheme can convey a sense of oppression, vicissitudes, or introversion. The representation of materials during the modeling process also interacts with colors, sharing visual texture. The luster of metal materials, the transparency of skin materials, and the softness of fabric materials, the more these details are expressed, the better, in order to achieve realism and increase user trust [6].

Facial and facial expressions are the focus of attention in this layer, and the human brain naturally has a high sensitivity to facial expressions. The modeling of game characters' faces needs to consider a balance between realism and stylization. According to the uncanny valley theory, if a character is very human like but not very human like, people will feel uneasy. Therefore, facial modeling based on instinctual layers should seek a balance between appropriate artistic style and technical realism. Finally, the shape of the eyeball is particularly important because the eyes are the windows to the soul. A pair of large pupils with rich highlights looks very innocent and pure, while a squinted eye can appear very clever or contemplative.

The static character's mouth, nose, and facial muscles are composed of static models, and the dynamic expression changes need to be mixed with deformations. Simple actions such as smiling or frowning can quickly trigger resonance in the user's subconscious, making them feel the presence of the character [7].

### **4. Behavior Based Game Character Interaction Modeling and User Experience Optimization**

Behavioral layer design focuses on the user experience and

feelings during the interaction process with the character. If the instinctive layer determines whether users are willing to interact with characters, then the behavioral layer determines whether users are willing to continue interacting with characters.

#### **4.1. Smoothness of Character Actions and Pleasure of Operational Feedback**

The design of the behavioral layer is first and foremost a matter of operational usability, that is, how fast and matched the player's operational intentions are with the character's behavior presented. Careful design of animation state machines to ensure that there are no interruptions between the various actions of characters is also something that practitioners need to pay attention to. A stiff freeze frame or sudden action transition can affect the player's sense of immersion and trigger negative emotional reactions [8]. The authenticity of physical feedback also affects the behavioral experience. When a character collides with a wall, is attacked, or interacts with objects in the scene, authentic and trustworthy physical feedback can bring players a sense of immersion in the virtual world; The action of the character leaning back after being attacked, whether the character's running steps adapt to the terrain, and the position where the character's fingers touch objects when climbing up, all details are well done, which will give the player a stronger sense of physical presence, and this is a source of happiness on the behavioral level.

#### **4.2. Role Skills Performance and User Achievement Shaping**

Emotional experience not only comes from the manipulation of behavior, but also from the feedback obtained from this manipulation. For action games, the sense of impact and special effects feedback are important factors that form the closed loop of their behavioral outcomes [9]. After a player performs a heavy hit operation, a series of feedback on the screen, such as vibration, deformation of enemy strike actions, and explosion of strike effects, are clear indications of the behavior and results of this operation. The stronger this feedback loop, the greater the satisfaction that players receive. The visualization of character growth process is also one of the ways to create a sense of achievement. When a character upgrades or changes equipment, there should be a visual representation in the modeling. The armor of the characters is becoming more and more magnificent, and the weapon models have glowing effects, which are the most intuitive feedback for the players' efforts. Players perceive the character's growth from a visual perspective, thus forming a willingness to continuously engage in behavior. This process transforms internal growth into a visual representation, which can increase users' behavioral willingness.

#### **4.3. Role AI Behavior Patterns and User Interaction Trust**

In the design of non player characters, AI behavior patterns belong to the broad category of behavior layer modeling. Whether the teammate character can actively avoid danger and effectively assist in attacks will directly affect the player's trust in their teammates. An AI teammate who often blocks the player's line of sight or drops off terrain can easily trigger negative emotions in the player. A more detailed design is the nonverbal response of the character, such as whether the NPC will have a following gaze when approaching the character in

the game, whether they will make a slight move away or approach when the distance changes, etc. Such AI behavior can greatly increase the character's sense of being alive. When players feel that their character responds to their existence, it brings a sense of respect or attention, thus establishing emotional trust. The behavior level AI design does not directly affect the role model, but can influence users' perception of the intelligence level of the role by controlling the behavior of the model [10].

## **5. Reflection Based Game Character Connotation Shaping and User Experience Optimization**

Reflective design belongs to the highest level of emotional design, which goes beyond current sensory stimulation and operational processes, involving users' values of self-identity. At this level, the character models in games become emotional carriers of cultural symbols.

### **5.1. Character Background Story and User Emotional Projection**

The design of character images and the presentation of actions ultimately need to return to the shaping of the character's personality. Modeling work should be able to work with narrative design to carve information from the story into the model. If it is a veteran who has experienced the baptism of war, there should be corresponding scar marks, worn armor edges, and outdated cloaks in the model. These details exist not simply for realism, but only as carriers of narrative information, allowing players to associate the character's past from seeing these details. Players can understand the story behind this detail and develop feelings of admiration or pity. Clothing and accessory design also have a narrative function. The character's clothing is not only a visual element for decoration, but also a way to reflect the character's social status, racial identity, and cultural background. When players control a character wearing a certain ethnic costume to complete the entire game journey, there is a sense of cultural immersion. This sense of immersion is not simply appreciating visual beauty, but a recognition that enters the stage of thinking.

### **5.2. Self Actualization Brought by The Character Growth System**

Reflective experience - the manifestation of self-worth. If the development process of a character is closely linked to their level of involvement, in this situation, players will place their expectations on the character. Allowing players to freely change their character appearance is a great way to satisfy the reflective experience. Players can shape their ideal "me" by pinching their faces, changing clothes, and other methods. This is the effect that the avatar I have constructed can bring - strengthening the relationship between the player and the game character. Modeling the internal growth changes of a character is also very important, for example, if a character starts out timid and timid, it is manifested in a hunched body posture on the model; In the later story, this character grows into a strong and brave personality trait, which is portrayed in the model with a posture of standing tall and looking up. This series of changes reflects the companion's experience of character growth, and the companion will achieve great self realization by looking back at the state before and after the character. These character arcs visualize emotional growth,

turning abstraction into concrete, tangible, and memorable.

### **5.3. Deep Emotional Connections Triggered by Resonance Between Cultural Symbols and Values**

The design goal of the reflective layer is to make the characters in the game bear certain cultural values and spread them, reflecting certain cultural symbols in their character images, thereby triggering players' associations and emotional resonance with these cultures. This is no longer a simple aesthetic need, but a spiritual and cultural need. Applying traditional ethnic cultural elements to game characters, such as texture rendering with ink wash effects, game suits decorated with traditional patterns, accessory designs with cultural connotations, etc., can create a strong sense of national pride among game players with the same ethnic cultural background. After controlling a character wearing traditional clothing and exhibiting a strong ethnic cultural atmosphere through their actions, players will experience a sense of cultural belonging that is higher than the game itself after completing an adventure. This not only enhances the emotional connection between players and game characters, but also gives game products a certain cultural heritage significance. For players from different cultural backgrounds, these unique cultural symbols also have aesthetic appeal and can stimulate their cross-cultural curiosity and respect. In addition, how to choose roles and attitudes towards moral choices is also one of the key factors in achieving value recognition. During the modeling process, the portrayal of characters' facial micro expressions, body movements, and eye contact is used to demonstrate their inner attitudes towards moral choices; After making behavioral decisions with clear value orientation, the inclination of this attitude can be expressed through subtle expressions and behaviors in the role model. When the values chosen by the character align perfectly with the values held by the player, they will experience a feeling of finding a kindred spirit. This type of emotional bond in games is based on the recognition of values, and is therefore the most stable and reliable type, making the characters in the game no longer just code characters played by players on the computer, but become synonymous with spiritual orientation. Many excellent game characters are remembered by players because they represent a set of values or life beliefs that are recognized by them. Becoming one of the spiritual worlds for gamers.

## **6. Conclusion**

This article explores the relationship between game character modeling and user experience from the perspective of emotional design, and proposes some methods and strategies. Based on the above content, we have the following understanding. Game character modeling should be an emotional engineering, not a simple graphic design task. Norman's instinctive, behavioral, and reflective models provide us with a clear and specific compass for conducting such an emotional engineering practice. The three-layer design has its own weight, but it also supports each other. By accurately shaping and matching characters, as well as designing facial models, first impression attraction can be achieved, laying a solid foundation for subsequent emotional development; The design of the behavioral layer is to retain the user's soul, ensuring the controllability and satisfaction of the operation process through reasonable and smooth

behavioral actions, precise skill feedback effects, and intelligent artificial intelligence behaviors. This is the biggest difference between games and other art forms. Reflective layer design is the sublimation of user experience. The character images constructed using background stories, cultural symbols, and values attract the audience's self projection and spiritual resonance, and transform game characters from virtual data into memory symbols in the audience's mind. The method of character design to enhance the audience's gaming experience is to coordinate and unify three levels. A good game character should have stunning visual effects at first glance, functional features that will not get tired of long-term use, and connotation that will be unforgettable for a long time. In summary, with the continuous development of artificial intelligence generated content and real-time rendering, character modeling in future games will become increasingly efficient and refined. However, the understanding of human beings and the capture of emotions are the sources of vitality that determine the character. Game designers should take the emotional experience of users as the ultimate goal, constantly exploring the boundaries between technology and art, and bringing players a richer virtual life experience.

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