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Emotionally Driven Virtual Pet Games: User Needs and Future Trends

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Abstract:

With the rapid advancement of technologies such as virtual reality (VR), artificial intelligence (AI), and affective computing, coupled with evolving player demands, emotionally oriented virtual pet games have garnered significant attention in the gaming industry. Although virtual pet games have seen notable progress in realism and interactivity, there remains a research gap in how to effectively integrate technology, users, and the market. This paper primarily explores the future development of emotionally oriented virtual pet games from three perspectives: user psychology, user needs, and technological analysis. Through a literature review and case studies, the paper examines the emotional design orientation, the evolution of user needs, and the current state of technological implementation in virtual pet games. It concludes that emotionally oriented designs help establish emotional connections between users and virtual pets, meet user needs, enhance happiness, and alleviate stress. Looking ahead, technological innovations will bring new gameplay experiences, and emotional education and mental health may become focal points of research. Additionally, the perfection of legal frameworks and ethical systems is essential for safeguarding user rights. Finally, the paper summarizes and looks forward to the future prospects of the discussed topics.

Keywords: Virtual reality game, emotion, virtual pets.

1. Introduction

Since the 1990s when Tamagotchi was introduced, virtual pet games have gone through many technological iterations, developing from a simple 2D pixelated presentation to today's complex 3D interactive experience. With the advancement of technology, the rise of Internet socialisation, and the accelerated pace of people's lives, players are beginning to be dissatisfied with the simple interactions brought about by virtual pets, and the importance of the emotional factor in virtual pet games is becoming increasingly prominent. Emotion increases the immersion of players and strengthens the durability and user stickiness of the game. Players not only need virtual pets to have practical functions, but also need it to carry emotional value. Virtual pets have transitioned from

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simple electronic pets to highly immersive, intelligent and social interactive experiences. Therefore, emotion-oriented design has gradually become the core design principle of virtual pet games.How to interconnect technology, users, and markets is a research direction that needs to be studied in depth. By exploring the future development of emotionally oriented virtual pet games from three aspects: user psychology, user needs and technology analysis, we can help to provide psychological support for human beings, promote technological innovation, and provide a new direction for the development of the game industry.

The aim of this study is to explore the application of emotionally orientated design in virtual pet games and its use of AIand natural language processing techniques to enhance emotional expression. By analysing the changes in market trends and user needs, we will propose targeted strategies to meet future challenges. A combination of literature analysis and case studies is used to provide guidance and support for the development of virtual pet games.

2. Design Concept for Emotionally Oriented Virtual Pet Games

The design of emotionally oriented virtual pet games has a certain theoretical basis, which triggers positive emotional feedback from users through emotional design, to enhance the attractiveness of the product and enhance user stickiness. Under the influence of this theory, the image and interaction mode of animals with emotional expression will be better expressed, so that users can establish a deep emotional connection with their virtual pets. From a psychological point of view, people often have a love for pets with cute, lively, loyal and other characteristics, and such traits can be fully reflected in virtual pet games. At the same time, psychology also reveals people's emotional needs for companionship and a sense of accomplishment in daily life, people often get positive emotional feedback in such a cycle of love [1]. And the personalized customization of virtual pets can well meet the emotional needs of users in this regard. Based on the above theoretical basis, we make the following specific elaboration on the emotional orientation of virtual pets.

2.1 Emotion-Oriented Design in The User Experience

The emotion-oriented design of virtual pets is a design that mobilizes players' positive emotions through the design of game mechanics, pet images, and interaction elements, to achieve the sense of achievement and immersion that the game can bring. Most users want their pets to be unique, whether it's the species, the pattern, or even the voice and character. Therefore, virtual pet games will provide a wealth of personalized customization options, so as to strengthen players' sense of identity with pets and establish a good emotional connection. Pets will also interact with players through actions, expressions, sounds, etc., so as to show different emotional responses, and then stimulate the player's emotional output. This method can also greatly restore the authenticity of real pets.

2.2 Emotional Design in The Game

Using emotion as the main design element will give the game a distinct style. What kind of emotion the player needs will produce the corresponding game style. For example, the emotional needs of companionship will most likely correspond to the warm scene environment and cute pet style, while the emotional needs of the sense of adventure will make players more need for pet partners who are lively and obedient to command. Players can customize and adapt pets with their own emotional needs through the game, design common tasks, activities and even challenges, improve pet skills, and unlock more interactive elements, thereby improving the fun and playability of the game, and allowing players to feel the fun of cultivation in the virtual pet game. From the perspective of user satisfaction, the emotional design of virtual pets is undoubtedly indispensable, and the application of emotional design in virtual pet games can significantly improve user satisfaction and loyalty. While establishing a deep emotional connection with their pets, players also gradually develop a sense of dependence and belonging to the game, which makes the game have considerable user stickiness and improves the user retention rate and overall activity of the game. In addition, with the continuous upgrading of the quality of the basic resources within the game, users also pay more attention to the connotation of the game, and emotional design can bring a broader development space and richer game connotation to the virtual pet game and achieve a more comprehensive game design.

2.3 The Mechanism and Method of Emotional Communication in Virtual Pet Games

In addition to the basic emotional responses such as happiness, sadness, anger, etc., some complex emotions such as embarrassment and shyness can also be simulated by algorithms. Daily interaction is also an important way to communicate emotionally, just like taking care of real pets, virtual pets also need to be fed, cleaned, trained, played, and the interaction between these players and pets is also an important step to dilute the sense of virtuality. In addition, game developers can feel the emotional changes

of players in real time through the relevant technology of sentiment analysis and combine the personality of the pet to let the pet make corresponding feedback and adjust the corresponding behavior, so as to realize the emotional communication between the player and the pet.

3. Impact of Technological Advances on Emotionally Orientated Virtual Pet Games

In the past, due to the lack of computer technology, algorithms and computing power, there were some limitations and difficulties in analysing the user's emotions at the user terminal (mobile phone, PC, VR, etc.), which made the user's sense of immersion and emotional linking more lacking. With the development of technology, the use of Artificial Intelligence (AI) in real products has been developed significantly, especially with facial recognition and machine learning (ML) as a representative of the technology that can be used for emotion analysis, there has been a significant improvement. The application of Natural Language Processing (NLP) and voice interaction technologies has also effectively enhanced the immersion of virtual pet games. The following section describes their specific application scenarios.

3.1 Emotion Recognition and Feedback Using AI

The virtual pet game can detect the player's emotions and give correct feedback through AI technologies such as facial recognition and emotion analysis, giving the player the illusion that the virtual pet can sense emotions. When the AI facial recognition of the player's frown, smile and other expressions, the AI can analyse the player's mood through the algorithm is angry or happy, which determines what kind of action the virtual pet responds with. When the player is happy and laughing, the pet will show happy and excited emotions, while if the player is angry, they may look depressed or scared. This dynamic interaction is a major leap forward from earlier static responses, making the emotional experience more realistic and impactful, providing players with a sense of interacting with their virtual pets and enhancing the emotional connection.

Machine learning further refines this process by continually adapting to the behaviour and preferences of individual players to create a more personalised and emotionally coherent experience.Kalyani et al. [2] proposed a multi-modal emotion recognition system that combines the analysis of speech, text and facial expressions, effectively improving the accuracy of emotion detection and the breadth of applications. In addition, deep learning-based sentiment analysis techniques, especially Convolutional Neural Networks (CNNs), have been widely used in emotion recognition to provide more accurate feedback by analysing the audience's expressions and gestures [3] .

3.2 Natural Language Processing and Voice Interaction: Deepening Game Immersion

As NLP algorithms become more sophisticated, virtual pets can understand and respond to complex verbal commands, engage in deeper and more personalised interactions, and even recognise speech nuances such as tone and intent. Not only is such an interactive experience more natural and less scripted, it also enhances the player's immersion and makes them more emotionally connected to their pet. Players input voice commands through the microphone to communicate with their virtual pets in a more realistic way. In Hey You, Pikachu!, another virtual pet game released by Nintendo on the Nintendo 64 platform, players use a special microphone peripheral to issue commands as well as voice dialogue to their virtual pet, Pikachu, which is then fed back to them by the NPL algorithm. This allows for a more natural interaction between the player and the virtual character.

In addition, through high-quality graphic rendering and detailed animation effects, the virtual pet is made to be closer to a real pet in terms of emotional expression. This not only enhances the emotional connection between users and virtual pets, but also makes virtual pets more widely used in games and social platforms. For example, Umamageswari et al. [4] developed a facial emotion analysis method based on fast regional convolutional neural networks (R-CNN), which significantly improved the accuracy of virtual pets in expressing emotions.

3.3 Virtual Reality and Augmented Reality: Expanding the Boundaries of Immersion

In the field of virtual pets, both virtual reality and augmented reality technologies have their particular strengths; they have different characteristics and create immersion in different ways. VR devices render different images to the player's two eyes, constructing a three-dimensional image with spatial depth in the player's vision, giving the player a greater sense of presence and enabling more intuitive interaction. Augmented reality (AR) does not completely cover the user's field of vision, but by superimposing the display content on reality, allowing players to feel the experience of 'breaking through the dimensional wall', easier to produce emotional links and feel safe, less prone to dizziness. Players can play in familiar environments, such as seeing and interacting with their virtual pets on the living room floor. By being superimposed on a fa-

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miliar real-world environment, its blurs the line between gameplay and reality. Pokémon Go is an AR mobile game released by Niantic in 2016 that successfully combines virtual creatures with the real world, allowing players to see and catch virtual Pokémon in the real world through their smartphone's camera.The use of AR technology in Pokémon Go not only engages a large number of players but also encourages them to explore the real world and increase the frequency of outdoor activities [5].

3.4 Multi-platform Interoperability: Ensuring a Seamless and Consistent Experience

As technology advances and player needs diversify, it becomes critical to ensure that games deliver a seamless and consistent experience across multiple platforms. Multi-platform interoperability not only means that games can run on different devices, but also that the gaming experience remains consistent across platforms. Multi-platform interoperability ensures that players can access their virtual pets on a variety of devices, such as smartphones, tablets and VR headsets, without sacrificing the quality of the experience. This feature is critical to broadening the appeal of virtual pet games, allowing players to interact with their virtual pets in different contexts and environments.

Additionally, maintaining a consistent emotional experience across platforms helps strengthen the connection between players and their virtual pets, as the emotional narrative is not interrupted by switching devices. Achieving seamless multi-platform interoperability not only enhances accessibility, but also ensures that the emotional depth and immersion of the game is retained. Cross-platform data synchronisation is an important linking step regardless of the platform being used, and for simulation-based parenting games like Nintendogs, multi-platform interoperability can be achieved through cloud-based storage and data synchronisation. Players' progress on one device can be synchronised in real time to other devices, allowing them to continue the game from the point of interruption, whether they're continuing on a smartphone, tablet or other game console. This seamless gaming experience can greatly increase player satisfaction and game stickiness. Additionally, ensuring a consistent user interface (UI) and user experience (UX) across platforms is at the heart of multiplatform interoperability. While different devices may have different input methods (e.g., touchscreen, joystick, keyboard, etc.), game designers need to ensure that these differences do not affect the core game experience. By optimising UI design and interactions, players can get a similar feeling of operation on different platforms.

4. Market Demand and User Psychology Analysis

4.1 Changing User Demand for Emotionally Oriented Virtual Pet Games

The change in user demand for emotionally oriented virtual pet games has a certain social background. First of all, the social competition in modern society is very fierce, people's life pressure increases, and the demand for emotional catharsis and sustenance increases, so that the application of virtual pets has a wider audience. In this fast pace of life, people often take care of themselves, and there is no extra time to take care of real pets, and virtual pet games take data as the main carrier, personalization as the selling point, with a strong demand fit, users can abandon most of the shortcomings of real pets when using, and only enjoy the value that their pets can bring, which is also a great advantage of the personalized customization function of virtual pet games. At the same time, with the continuous maturity of AIand virtual reality technology, the interactivity and authenticity of virtual pets are also continuously improved to further meet the needs of users.

In addition, with the advancement of time, people are gradually inclined to establish emotional connection with virtual pets, rather than just treating them as cold data, and virtual pets have gradually become the new favorite on social media, becoming a new medium for people to communicate and interact with each other.

4.2 Differentiated Needs of Users Of Different Ages

The demand for virtual pets by users of different ages shows an obvious trend of differentiation. For children, because children's curiosity is generally strong, the desire to explore is strong, and their demand for virtual pets focuses on entertainment and fun, and pursues colorful and cute virtual pets, so the gameplay that is simple to understand, interactive, and positive feedback is more suitable for them. Virtual pets can provide children with a novel and interesting game experience, which can further stimulate their desire to explore while satisfying their psychological needs and achieve a virtuous circle between virtual pets and child users. Teenagers' demand for virtual pets is more personalized and socialized, and teenagers are in an important stage of personality formation and development and enhancement of social needs, so they hope that virtual pets can show their unique personality and style. For teenagers, virtual pets are a medium to express themselves and establish socialization, and it is a way to show themselves through the image and character of virtual pets. As

we grow older, work and life will bring a lot of pressure and challenges to adults, which makes the needs of adults focus on emotional sustenance and relaxation, and virtual pets can provide them with emotional support and companionship, so as to alleviate the anxiety and relaxation of adults under pressure. Based on the above-mentioned differences in demand caused by age, it is necessary to fully consider the different situations of different audiences when designing emotionally oriented virtual pet games to better meet the personalized needs of users.

4.3 Social Features in The Virtual Pet Game

Social features are widely used in virtual pet games. In addition to the interaction between players and pets, virtual pet games can also realize the interaction mechanism between players, such as visiting each other, exchanging gifts, and completing tasks together, to enhance the connection between players. At the same time, there will be relevant communities and forums in the game, where players can express their pet raising experiences, show the personality of their pets, and even launch folk competitions to form a compact social circle. Developers can also introduce elements of social challenges, multiplayer co-op missions, and pet battles to promote player cooperation and competition. At the same time, in addition to virtual reality, you can also open the play channel of other platforms, log in to the game on different devices, and expand the social range. The game also allows players to display their pets on their personal homepage, share the daily life of their pets, and form a “pet circle”, thereby promoting social communication.

5. Conclusion

This thesis primarily addresses the future development of emotionally oriented virtual pet games by examining user psychology, user needs, and technological advancements. Emotionally oriented design plays a crucial role in establishing a companionship relationship between users and virtual pets. The game stimulates a positive emotional response from the user by enhancing the user’s affection for and dependence on the virtual pet. Users don’t just want a companion, they want a relationship that satisfies emotional needs and brings pleasure to the experience. At the same time, such positive emotional feedback can improve the user’s sense of happiness and gain, stabilize mental health, relieve the pressure and loneliness brought by life, and finally enable the user to establish a deep connection with the virtual pet, giving the player a sense of belonging and security. In the future, technological innovation will bring new ways to play virtual pet games, and players will also get new experiences in them. The combination of emotional education and mental health may also become one of the research hotspots in the field of emotion-oriented virtual pets. At the same time, it is indispensable to formulate laws and regulations to form a certain ethical and moral system to restrain the behavior of citizens and ensure the legitimate rights and interests of users and virtual pets.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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