
Narrative Generation and Personalized Interaction Design of Non-player Character Driven by AIGC

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Abstract: Non-player character (NPC) narratives can significantly enhance user experience through effective interaction with players. Powered by AIGC, the generation of NPC narratives has become more efficient and intelligent, enabling players to immerse themselves in the game more effectively and ensuring steady progress. This article first outlines the core requirements for NPC narrative generation, then explores the technical pathways of AIGC-driven NPC narrative creation through three stages: preparatory work, mid-process generation, and post-optimization. It further analyzes personalized interaction design for NPCs empowered by AIGC, focusing on linguistic, behavioral, and emotional interactions. Finally, the study concludes by summarizing the synergistic optimization of AIGC-driven NPC narratives and personalized interactions, aiming to provide valuable insights for related research.

Keywords: AIGC-driven; non-player characters; narrative generation; personalization; interaction design

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1. Introduction

AIGC technology, an emerging innovation, has experienced rapid development in the new era^[1]. AIGC-driven narrative and interactive design has become a key focus in game design. The core logic of AIGC-powered NPC narrative generation lies in leveraging AI technology to overcome the limitations of traditional fixed scripts, enabling controllable character design, interactive responses, and dynamic iteration in narrative creation. This ensures that narrative content aligns with the setting while maintaining strong adaptability^[2]. This study primarily explores how to achieve narrative generation and personalized interactive design for non-player characters (NPCs) under AIGC technology.

2. Core Requirements for Npc Narrative Generation

NPC narrative generation focuses on enabling non-player characters (NPCs) to express stories that align with the virtual world's setting, while facilitating interactive feedback and narrative progression through user engagement. Effective NPC narrative generation can transform NPCs from mere tools into dynamic connectors between users and the virtual environment.

In NPC narrative generation, character ontology consistency and uniqueness serve as fundamental prerequisites. The generated narrative content must strictly adhere to the character's core attributes and detailed characteristics, ensuring unified persona design without logical fragmentation. NPC dialogue should maintain seamless integration with behavioral actions to reinforce character development. When depicting plot progression or attitude shifts, the narrative must preserve logical coherence with effective transitions. Additionally, NPC narratives require responsive two-way interaction, capable of generating personalized feedback based on user engagement patterns and interaction history. They should dynamically adjust narrative content according to real-time scenario demands, catering to both casual players and core storylines. Furthermore, narrative generation must align with the world's span and setting, conforming to virtual world rules, era-specific features, and story contexts while matching the physical environment and scene conditions of the NPC, thereby establishing narrative-scene synergy. Different regional and group-specific NPC narratives should demonstrate distinct characteristics, creating layered depth. Moreover, NPC narrative generation must prioritize immersion and empathy-building, which constitute key objectives^[3]. By incorporating personalized narrative details that align with character personas and worldviews, NPCs can achieve enhanced vividness. The narratives should also enable multidimensional emotional expression that resonates with character traits and contextual needs, effectively conveying emotions to evoke user empathy and elevate gaming experiences. Ultimately, NPC narrative generation should integrate diverse character types to fulfill distinct narrative roles. Core plot NPCs drive story progression and deliver critical information, while casual NPCs provide fragmented details to establish the world's context. Guidance NPCs offer clear prompts to enhance understanding, and companion NPCs fulfill emotional support functions.

3. The Technical Path of AIGC-driven NPC Narrative Generation

3.1. Preliminary Preparation

In AIGC-driven NPC narrative generation, preparatory work forms the foundational stage that directly impacts subsequent generation outcomes^[4]. This preparatory phase primarily involves establishing clear constraints and high-quality data support based on AIGC models, ensuring generated content aligns with character profiles and worldviews while reducing redundancy and error rates during mid-phase generation. Key tasks at this stage include three main components: data collection and preprocessing, model selection and optimization, and rule system construction. During data collection and preprocessing, researchers gather virtual world settings, core NPC character profiles, scene rules, and high-quality narrative samples. These are then cleaned, deduplicated, and labeled to build datasets, with tags like character profiles, scene settings, and interaction scenarios embedded for model precision. In model selection and optimization, appropriate AIGC base models are chosen according to application scenarios, with fine-tuning implemented to incorporate constraint rules tailored to NPC narrative characteristics. This enhances the model's ability to recognize character consistency and worldview alignment. The rule system construction phase defines core constraints, priority levels, and interaction triggers for narrative generation, laying the groundwork for mid-phase production.

3.2. Mid-term Generation

The mid-phase generation constitutes a pivotal stage in NPC narrative creation, primarily employing techniques like Prompt engineering and dynamic interaction perception to deliver targeted narrative outputs^[5]. During this phase, the model first captures real-time user interactions and historical engagement patterns. By analyzing contextual factors such as time of day, weather conditions, and plot developments, it interprets user intent across information acquisition, narrative progression, daily communication, and task triggers. Subsequently, the model generates precise prompts by integrating predefined character rules and worldviews, while specifying narrative tone, sentence structures, detail levels, and core content. Personalized elements like verbal cues and subtle gestures are incorporated to ensure prompts align with the interaction context. Finally, leveraging these prompts and proprietary datasets, the model produces narrative content including dialogues, inner monologues, and behavioral descriptions. This process enables multiple narrative branches

corresponding to different interaction intentions and choices, ensuring narrative uniqueness and effective user engagement.

3.3. Post-optimization

Through iterative optimization using manual verification and data feedback, we continuously adjust and correct model biases to ensure NPC narratives better align with user needs and predefined settings, effectively enhancing narrative quality. During the optimization process, we first conduct manual quality checks on generated narratives, focusing on character consistency, world-building coherence, interaction compatibility, and linguistic standardization. Any non-compliant content is promptly corrected, while erroneous cases are recorded in the model's optimization dataset for fine-tuning. Simultaneously, we analyze user behavior data to assess narrative satisfaction, identify preferred narrative styles and detail types, and collect user feedback on issues like character inconsistencies, narrative redundancy, and logical inconsistencies. These insights are then transformed into optimization requirements, enabling adjustments to constraint rules, improvements in Prompt engineering, and dataset supplementation. Additionally, we regularly fine-tune and upgrade AIGC models based on validation data and user feedback, enhancing their ability to recognize character profiles, scenarios, and interaction intentions. This improves narrative generation quality and efficiency while adapting to dynamic changes in virtual worlds, ensuring narratives consistently meet overall predefined specifications.

4. NPC Personalized Interaction Design with AIGC

4.1. Personalized Language Interaction

In the design of personalized NPC interactions, various forms of communication are involved, with verbal interaction being the most fundamental. It requires language to align with character profiles, user preferences, and contextual scenarios, avoiding stiffness and repetition^[6]. Powered by AIGC technology, personalized verbal interaction design primarily focuses on three aspects: character-oriented language style, user-adapted language adjustments, and scenario-specific language variations. In character-oriented language style design, differentiation principles should be implemented. The model combines key character tags of NPCs to automatically generate tailored language styles—for example, a grumpy blacksmith's speech features blunt, confrontational tones with catchphrases like “Hmph” and “Stop whining”; a gentle healer's language adopts soothing tones with phrases like “Don't worry” and “Take your time.” For user-adapted language adjustments, the model tailors expressions based on interaction history, character traits, and preferences. For example, repeated interactions create familiarity; friendly tones with helpful intentions cater to righteous faction users; while wary and hostile tones target evil faction users. In scenario-specific language adaptation, the model adjusts content and tone according to current contexts. During battles, the language evolves with combat dynamics and allies, adopting tense, urgent tones. Rainy scenes incorporate descriptive phrases like “It's pouring rain!” to enhance immersive interaction experiences.

4.2. Personalized Behavioral Interaction

Behavioral interaction stands as a cornerstone of personalized NPC interaction design, serving as a powerful complement to verbal communication. To achieve this, designers must create seamless integration between NPCs' actions, character traits, dialogue, and interaction scenarios, enhancing visual realism and immersion^[7]. The AIGC system first analyzes character rules, interaction intent, and contextual states to generate personalized behaviors. Leveraging AIGC, designers can create customized actions based on character profiles. For example, a lazy noble NPC might stand with hands on hips, pacing slowly while adjusting collars, while a diligent farmer NPC would polish tools, bend over to massage his back, and dab at his sleeves. AIGC also adapts to user interactions, generating context-aware responses that align with narrative flow. When a user seeks help from an irritable blacksmith, the character might frown, wave impatiently, and say, “Boring? Let me see!” Meanwhile, a gentle healer would smile, nod gently, and respond, “Don't worry, I'll handle it.” These actions not only fit the scenario but also reinforce the character's personality. Furthermore, AIGC enables dynamic behavior

evolution—basic actions and interactions adjust as the story progresses and NPCs mature, ensuring consistency between behavioral responses and narrative development.

4.3. Personalized Emotional Interaction

Through personalized design of emotional interaction, NPCs can express genuine emotions and provide feedback, enhancing user immersion and fostering emotional connections. Powered by AIGC, technologies like emotion recognition and modeling support the personalized design of NPC emotional interactions.

In personalized emotional design, the model integrates NPC character traits to generate tailored emotional expressions. Introverted NPCs avoid direct emotional outbursts, instead conveying feelings through tone modulation and subtle gestures. Extroverted NPCs express emotions directly with dramatic vocalizations and exaggerated movements, ensuring emotional expressions align with their character profiles while avoiding homogenization. The system also implements differentiated emotional feedback mechanisms. Through AIGC technology, it continuously monitors user interactions and emotional tendencies, generating customized responses based on historical data. For example, repeated assistance from an indifferent NPC may gradually shift emotions from “indifference” to “trust” and “gratitude,” with interactions evolving from “non-response” to “proactive care.” Conversely, harming an NPC could transform emotions from “friendliness” to “disgust” or “hostility,” shifting interactions from “welcoming” to “rejection.” These evolving emotional responses demonstrate logical progression through contextual triggers. Moreover, NPC emotions are not static—they dynamically adapt to plot developments and user interactions. This requires creating customized emotional trajectories. For instance, a NPC grieving the loss of a loved one might initially display sadness and indifference, but through user companionship and comfort, their emotions gradually shift to calmness and warmth, with corresponding changes in speech and behavior, establishing a cohesive interactive dynamic.

5. AIGC-driven Synergistic Optimization of NPC Narration and Personalized Interaction

NPC narrative generation and personalized interaction design are not separate entities but are closely interconnected. Through effective synergy and mutual reinforcement, they can deliver a natural and immersive NPC experience to users. To achieve optimal synergy between NPC storytelling and personalized interactions driven by AIGC, the following aspects need attention.

First, establish a unified NPC persona constraint system that integrates persona rules throughout narrative generation and interaction design processes, ensuring narrative content, language interactions, behavioral interactions, and emotional interactions align with the same persona. Utilize AIGC models to achieve consistency between narrative language and interactive behaviors through shared persona tags, detailed characteristics, and capability boundaries, while ensuring emotional expressions resonate with narrative content. Second, leverage AIGC’s dynamic perception capabilities to enable effective synergy between interaction and narrative. User interactions serve as the core trigger for narrative generation. The model should dynamically adjust narrative branches, details, and tone based on interaction intent, ensuring precise responses to user interactions and preventing narrative-disconnection. Narrative content should guide users through subsequent interactions via language, actions, and emotions, creating seamless transitions between narrative and interaction to enhance fluency and effectiveness. Third, strengthen data integration and sharing by establishing shared datasets for narrative generation and interaction design. Effectively integrate user interaction data, narrative feedback, emotional change data, and quality verification data to ensure bidirectional data utilization. For instance, AIGC models can optimize narrative generation using user preferences, interaction frequency, and branch selection data to better meet user needs. Narrative data such as persona consistency and scene relevance can also refine interaction design, ensuring alignment between interactive behaviors, emotional feedback, and narrative progression.

6. Conclusion

In conclusion, NPC narrative generation and personalized interaction are pivotal to enhancing user experience in gaming. AIGC technology, with its distinct advantages, provides robust technical support for these design aspects. To ensure NPC narrative generation and personalized interaction meet expectations and user needs, AIGC-driven development must focus on three critical phases: pre-production preparation, mid-process generation, and post-production refinement. By implementing personalized interaction design through linguistic, behavioral, and emotional engagement, NPCs can truly serve as a bridge connecting users with the virtual world, ultimately elevating both game quality and user experience.

Disclosure statement

The author declares no conflict of interest.

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