AIGC-Empowered UI Design of the “Piggy” APP: Innovative Practice in Intelligent Pig Farming Scenarios

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Abstract. This paper takes the UI design of the "Piggy" APP as the starting point to explore the application of AIGC (AI Generated Content) in mobile interface design for vertical domains. Aiming at the shortcomings of existing pig farming APPs, such as single function, homogeneous interface, and the disconnection between entertainment and professionalism, this paper proposes an intelligent UI design scheme based on the "Farming + Entertainment" concept. Through in-depth research on target users, we build a four-module UI structure including farming management, entertainment, social sharing and auxiliary functions, identify core user pain points via experience surveys, and define design goals covering data visualization, interactive engagement and social sharing.

Technically, we construct a multimodal intelligent UI system with Blender, liblibAI image generation model V2 and Kling 3.0 AI video platform, completing the design of core UI components such as digital characters, scene images and interactive functions. Prompt optimization and parameter adjustment are adopted to ensure the consistency of generated content and improve the UI's aesthetics and professionalism. Iterative testing and user feedback optimization are incorporated in the design process, with quantitative and qualitative methods used to evaluate the interface's visual appeal, usability and functionality. This work effectively solves the user experience pain points of existing pig farming APPs, balances professional farming management and entertaining interaction, and provides a new path for digital applications in intelligent pig farming, as well as a reference for AIGC-enabled design in similar vertical domain APPs.

Keywords: AIGC; UI design; intelligent pig farming; multimodal generation; user experience

1 Introduction

1.1 Research Background

With the development of artificial intelligence technology, AIGC (AI Generated Content) has become a major force in digital content creation, bringing tremendous changes to traditional UI design. According to the White Paper on AIGC Industry Development 2026, China's AIGC market reached 89.7 billion yuan in 2025 and is expected to exceed

R. Zur et al. (eds.), *Proceedings of the 2026 5th International Conference on Art Design and Digital Technology (ADDT 2026)*, Advances in Computer Science Research 131,
https://doi.org/10.2991/978-94-6239-737-8_30

160 billion yuan in 2026, with AI applications growing most rapidly in the area of design and creativity. Meanwhile, China's pig farming industry—a key component of agriculture—is at a critical stage of digital transformation. In 2025, the national pig inventory reached 430 million heads with a scale-up rate exceeding 73%, and demand for intelligent farming continues to rise. However, existing pig farming APPs generally suffer from single functionality, homogeneous interfaces, and a lack of professionalism and entertainment, failing to adequately meet the needs of large-scale farmers and pet pig enthusiasts. AIGC-based UI design can effectively address these problems by leveraging multimodal content generation to advance scenario production and improve efficiency, thereby promoting digital application development in the pig farming industry.

1.2 Research Significance

This research focuses on both theoretical and practical significance. From a theoretical perspective, this paper highlights the research gap regarding AIGC technology in vertical domain UI design, proposing a complete framework from requirements analysis to technical implementation, which provides guidance for the application of generative AI in mobile application interface design. From a practical perspective, this paper aligns with the development trend of smart agriculture, aligning with the recent study by Maric et al [1]. on the integration and application of digital technologies in pig production addresses the problems of single functionality and poor user experience in traditional pig farming APPs, and explores the “Farming + Entertainment” design concept to provide a viable technical pathway for the digital transformation of the pig farming industry. It promotes the integration of agricultural technology with user experience design and demonstrates strong socio-economic benefits and development prospects.

1.3 Research Content and Technical Approach

This paper focuses on the UI design of the “Piggy” APP, conducting research on the basis of need-driven and technology-enabled approaches [2]. The research content covers three aspects: user needs survey and analysis, UI framework construction, and multimodal element generation. The technical approach begins with questionnaire surveys and in-depth interviews to understand the needs and pain points of target user groups, then employs Blender modeling software, the liblibAI image generation model, and the Kling 3.0 AI video generation platform to create an intelligent generation system for major UI elements including digital characters, scene images, and video-based interactive guidance. Finally, improvements and refinements are made based on user testing results to integrate professional farming management with entertaining interactive experience.

2 Related Technical Background

2.1 Overview of Core AIGC Technologies

AIGC (AI Generated Content) is a key direction in the development of artificial intelligence technology, transforming the digital creative industry with its powerful content generation capabilities. AIGC technology is based on deep learning algorithms; it uses large-scale data for training to obtain an intelligent content generation model capable of generating text, images, audio, and video. Furthermore, the development of large language models such as the GPT series has brought strong semantic understanding capabilities to AIGC, making generated content better aligned with user needs. In recent years, advances in multimodal fusion technology have greatly enriched AIGC application scenarios, enabling joint generation and refinement across different modalities.

From a UI design perspective, AIGC technology has brought disruptive change, playing a very positive role in improving design efficiency, enhancing visual expressiveness, and improving user experience [3]. Traditional UI design primarily relies on designers' personal experience and manual labor, which is time-consuming, costly, and difficult to ensure style consistency. AIGC technology can generate large quantities of visual elements—such as icons, illustrations, and background images—in a short time through intelligent, prompt-guided generation, greatly improving design freedom and creative expression. For industry-specific applications such as intelligent pig farming, AIGC technology can also generate professional and targeted visual content tailored to specific industry conditions, effectively compensating for deficiencies in traditional design resources and professionalism.

2.2 Tool Selection and Application Rationale

Performing the complex creative feat of the parallel creation of a thing (ob-ject, service, system) and its way of working is the core challenge of design reasoning [4]. Based on the "Piggy" APP UI design requirements and considering the diversity of intelligent pig farming scenarios, this paper selects three main AIGC tools to build a multimodal content generation system. For digital character design, Blender modeling software is chosen as the foundation for character creation due to its strong 3D modeling capabilities and open-source nature. This software supports refined geometric modeling, material rendering, and animation production, well meeting the need for diverse display of the Piggy character. Using Blender's node editor and sculpting tools, various poses and styles of Piggy digital characters can be rapidly created to enrich the APP's character asset library. Moreover, combining Blender with AI generation technology allows procedural modeling to improve work efficiency, making character generation more efficient and consistent.

For scene image generation, the liblibAI image generation model V2 demonstrates excellent adaptability and generation quality. It can generate high-quality background images and diverse scene graphics suitable for pig farming scenarios based on keyword descriptions. Through appropriate prompt engineering and parameter adjustment,

liblibAI can generate creative scenes such as modern farms, smart devices, and intelligent monitoring systems, providing visual support for APP interface backgrounds and functional modules. For video-based tutorial generation, the Kling 3.0 AI platform features powerful character rendering and lip-sync capabilities. It supports natural language prompt input and can generate short animated clips with consistent character appearances and expressive gestures, making it highly suitable for creating engaging guide characters for in-app walkthroughs. The selection of these three tools is based on considerations of technical maturity and functional compatibility. Blender's open-source nature greatly reduces development costs; liblibAI's commercial service ensures consistency of generation quality; and Kling 3.0's multimodal capabilities enhance user experience. Their combination lays a solid foundation for subsequent UI design improvements and feature additions.

2.3 Core Principles of APP UI Design

In mobile application interface design, adhering to the principles of consistency and simplicity is a prerequisite for ensuring good user experience. The principle of consistency means that various elements in the interface maintain unity in visual appearance, interaction patterns, and functionality, giving users a consistent operational experience across different pages [5]. The principle of simplicity means eliminating unnecessary content, highlighting key functional points, and using appropriate information hierarchy to guide users' attention, preventing interface overcrowding that reduces usage efficiency. For vertical domain APP design, it is also necessary to formulate design standards based on industry characteristics, maintain application accessibility, and balance functional complexity with operational simplicity.

3 User Needs Analysis for "Piggy" APP UI Design

3.1 User Needs Survey and Analysis

This paper employs a combination of questionnaire surveys and in-depth interviews to conduct needs research on target users of intelligent pig farming applications. The research subjects include three major user types: large-scale farmers, pet pig enthusiasts, and general users. A total of 120 questionnaires were distributed, with 119 valid responses collected (As shown in Table 1), and 3 in-depth interview was conducted. The survey results reveal systematic gaps in the current intelligent pig farming APP market; users' demand for professional farming management and entertaining interactive experiences is growing increasingly strong, yet market-available UI applications remain completely blank in this regard. Large-scale farmers place greater emphasis on data visualization monitoring, intelligent early warning reminders, and farming efficiency analysis, hoping for a simple and clear operating interface. Pet pig enthusiasts prefer entertainment features such as games or decorative elements, and have high requirements for UI aesthetics, fun, and personalized customization. General users hope that the "Piggy" APP can present itself as a creative form of "entertainment plus science popularization."

1) Drawing on the approach to AI user experience research by Salgado-Reyes N [6], this paper summarizes the main needs and feature priority levels for "Piggy" APP UI design. Among surveyed users, 87.5% felt that existing pig farming APP interfaces are not attractive enough, 73.2% desired more intelligent data presentation methods, and 68.9% wanted additional interactive and entertaining content. As shown in Table 2.

Table 1. Survey Results of Target User Needs for "Piggy" APP.

User Type	Sample Size	Core Needs	UI Focus	Feature Priority
Large-scale Farmers	17	Health monitoring, yield analysis	Clear info, integrated services	Professional > Usability > Aesthetics
Pet Pig Enthusiasts	37	Social sharing, fun interaction	Attractive, personalized elements	Entertainment > Design > Professional
General Users	65	Light entertainment, knowledge popularization	Friendly guidance, easy to understand	Usability > Fun > Feature richness

Table 2. Users' perceptions of the main needs and functional priority of existing pig breeding mobile applications

Major needs and functional priority ranking	sufficiency	deficiency
Interface attractiveness	12.5%	87.5%
Intelligent data presentation	26.8%	73.2%
Interaction and entertainment	31.1%	68.9%

Through comparative analysis of need importance and functional satisfaction, the primary UI design focuses were identified as: information architecture improvement, digital character design, social sharing functionality, and intelligent health monitoring. Users also have certain demands regarding visual aspects such as color schemes and icon styles, in line with the current trend toward younger market demographics, laying a solid foundation for subsequent use of AIGC technology to generate UI elements.

There are certain limitations in this study with respect to the sample. Although the survey endeavored to cover three core user groups—professional pig farmers, pet pig enthusiasts, and general users—the overall sample size remains relatively small, which may compromise statistical representativeness and, in particular, limit comparative analyses among subgroups. The limited number and dispersed geographic distribution of professional pig farmers make it particularly challenging to obtain reliable feedback on the professional-oriented features of the app. Moreover, the survey was conducted within a relatively narrow scope, resulting in insufficient diversity in terms of occupational backgrounds, usage scenarios, and behavioral patterns. These factors collectively restrict the external validity of the research findings for broader user populations. In future research, we will focus on expanding the sample size, especially by increasing

the participation proportion of professional pig farmers through multi-region collaborative surveys and targeted online recruitment. At the same time, more diversified user types (e.g., small-scale family farm owners, swine veterinarians, and science enthusiasts) will be introduced, and mixed research methods (e.g., in-depth interviews combined with large-scale questionnaires) will be adopted to more systematically validate and refine the current findings, thereby enhancing the robustness and generalizability of the research conclusions.

3.2 Translating Functional Requirements into UI Design Requirements

In response to the different needs of the three main user types, a multi-functional optimized UI design scheme covering farming, entertainment, social, and other functions is developed.

In the translation of farming management functions into UI design requirements, hierarchical visualization of monitoring data is the primary design focus. Large-scale farmers need timely access to professional data such as feed consumption, growth curves, and health monitoring, requiring clear and intuitive chart interfaces. UI design must use color hierarchy, icons, and layouts to present complex farming data in simple and comprehensible ways. Given the limited size of mobile screens, the design also prioritizes layered information display and quick search functionality.

The UI design translation of entertainment module functions centers on visual expression of fun and interactivity [7]. Pet pig enthusiasts' demand for virtual rearing, growth records, and outfit customization translates into vivid and lively stylized Piggy visual design. UI design must utilize color coordination, animation effects, and interactive feedback to create a relaxed and enjoyable user experience. In particular, the digital character design requires the UI interface to display personalized Piggy characters, allowing users to freely customize outfits and change scenes, thereby increasing user emotional investment and usage frequency.

The requirements of social sharing functionality reflect the importance of community-oriented interactive interfaces. Users' needs for experience sharing, achievement display, and interactive communication translate into design requirements for information feed interfaces, comment interaction areas, and personal profile pages. UI design requirements for auxiliary function modules primarily consider user operational convenience and system accessibility, reducing users' cognitive load through icon recognizability, menu hierarchy, and streamlined operation processes [8].

In the specific visual design requirements translation process, color system design is a critical component. Based on the pig farming industry's own characteristics and target audience preferences, the UI design employs a creative combination of pink and green tones—highlighting the adorable aspect of the Piggy character while expressing the concept of healthy farming. Icon system design requirements translate into dual needs of functional recognition and visual unity: each functional module must have its own distinctive and easily recognizable icon while maintaining overall coherence across the entire icon system.

3.3 Design Constraints and Optimization Directions

During the "Piggy" APP UI design process, numerous design constraints must be balanced. Technical constraints primarily arise from issues of generation accuracy and consistency in AIGC tools; when batch generating UI elements, style consistency problems may be encountered in balancing modeling-based and AI-based creation. User diversity is also a significant constraint: farmers care about data accuracy and convenient operation, and the UI should simplify professional data and highlight anomaly warnings. Korhonen et al. proposed that future home health monitoring should integrate wearable and ambient sensors to continuously collect data in daily life, enabling unobtrusive health management. Beyond UI design, this multi-device monitoring approach—although developed for humans—can be extended to intelligent swine health systems. In pig farming, wearable devices such as smart ear tags can be fused with environmental sensors to continuously track multiple physiological parameters while animals remain in their natural state, improving monitoring accuracy and early warning. As demonstrated by the ubiquitous heart rate monitoring case in their work, the multi-sensor collaboration and data fusion framework can be transferred to pig health management, allowing the monitoring system to blend into the production environment across the full life cycle and support precision livestock farming [9]. Pet pig enthusiasts prefer fun and social features, but the design cannot depart entirely from the normal use of smart pig farming—requiring the UI design to balance professionalism and entertainment.

Based on the above analysis, "Piggy" APP UI design improvements focus on three aspects. First, improving the degree of intelligence by optimizing AIGC tool prompt strategies and parameters. Second, making the interaction experience smoother through tightly logical menu icons and clear main operation processes. Third, enriching the content ecosystem through fun scenarios and personalized Piggy characters, forming a continuously updatable content pool to increase user stickiness and application value.

4 Methodological Framework: AIGC-Empowered UI Design for Vertical Domains

Beyond presenting the final "Piggy" APP design, this paper contributes a generalizable three-stage methodology for applying AIGC to UI design in vertical domains (e.g., agriculture, healthcare, education). The framework comprises: Stage I – Domain-Specific Requirement Elicitation (combining questionnaires and interviews to identify user types and pain points); Stage II – Multimodal AIGC Tool Orchestration (selecting and integrating complementary generative tools — Blender for 3D modeling fundamentals, liblibAI for image generation, Kling 3.0 for video/voice — to cover diverse UI element production); Stage III – Iterative Consistency Optimization (leveraging prompt engineering, parametric variations, and human-AI collaborative fine-tuning to ensure stylistic and functional consistency of generated assets). This methodology shifts the focus from a single product to a replicable process. It demonstrates how AIGC can bridge the

gap between specialized functionality and user engagement in niche markets, addressing common issues in existing vertical apps such as “monotonous functionality and homogeneous interface design.” The subsequent chapters instantiate this framework through the “Piggy” APP case study.

5 Case Study: Applying the AIGC Methodology to the 'Piggy' APP

Following the three-phase methodology above, this section details its instantiation in the pig-farming domain.

5.1 Overall UI Design Framework Construction

Based on preliminary user needs research and AIGC technology selection, this paper conceives a four-part UI design scheme for the “Piggy” APP. The overall concept is “Farming + Entertainment,” dividing the entire APP into four parts: management, communication, digital piglets, and others. The farming section primarily centers on data visualizations and health monitoring. The entertainment section mainly features a digital Piggy series where users can create their own unique digital Piggy characters. The social sharing section emphasizes information flow and user communication. The auxiliary functions section includes settings and help to ensure convenience throughout the entire usage process. The main core sections are shown in the Figure 1.

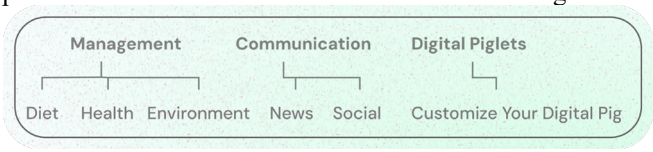

Fig. 1. Overall UI framework of the “Piggy” APP (the main three-part structure of "Farming + Entertainment").

In actual development, the framework design fully integrates AIGC technology characteristics, utilizing intelligently generated content to achieve real-time updating and personalization of interface elements [10]. Interface design is concise and clear with well-defined information hierarchy and clear operation processes. The framework also has good scalability, allowing for functional improvements and interface enhancements based on user suggestions.

5.2 Core UI Element Generation and Implementation Driven by AIGC

Core Digital Character Design.

In the “Piggy” APP UI design, the main digital character serves as both brand identity and emotional bond. In this paper, Blender is used for modeling combined with generative AI for design, producing a series of digital characters at different levels. The protagonist “Piggy” (As shown in Figure 2) is the core character; building upon the

basic “Piggy” form, Blender geometry nodes are used to create stylized characters. AI is then used for parametric adjustment to rapidly build stylized characters and generate style backgrounds integrating the digital Piggy (As shown in Figure 3). The overall creative approach responds to the “Piggy” APP’s intelligent and sustainable development direction, promoting the integration of production and entertainment [11].

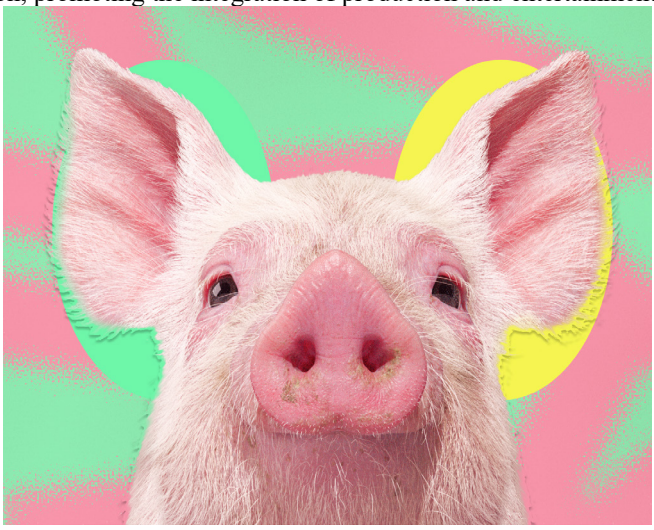

Fig. 2. Core “Piggy” digital character design created with Blender geometry nodes.

To facilitate reproducibility, we briefly describe the configuration of the Blender geometry nodes used for the digital creative extension of the “Piggy” character. The node tree comprises three main groups:

First, based on the morphological foundation of the piggy body, a geometric form approximating the piggy’s physique is created to serve as the carrier. Using the “Distribute Points on Faces” node, a stochastic point cloud of specified count and density is generated. Subsequently, the “Instance on Points” node is employed to distribute spherical instances in batches over the point cloud, thereby completing the arrangement of basic decorative elements.

Second, noise and random-value nodes are introduced to generate independent stochastic data. After being controlled via “Map Range” and “Color Ramp” nodes to define numerical intervals, these data drive the scaling and rotation parameters of each spherical instance, imparting individual variations and avoiding repetitiveness.

Finally, global displacement or field-control nodes are used to fine-tune the overall distribution. The instanced geometry is then realized, and custom attribute data are output for material rendering purposes, thus completing a digital decoration generation process that balances randomness with controllability. (Note: The geometry node parameters are tunable; different parameter values yield distinct stylistic variations, which can be selected based on design requirements. The configuration described here serves as a reference baseline.)

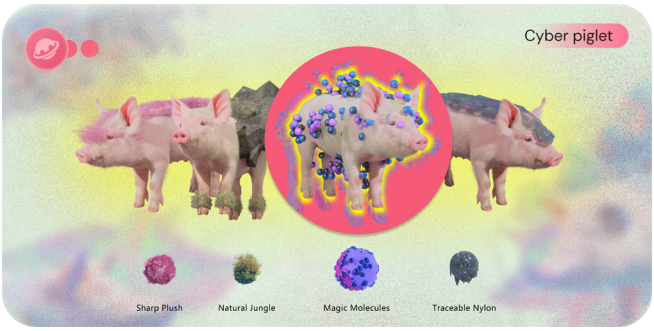

Fig. 3. Digital Piggy character series showing stylized variations generated via AI parametric adjustment.

UI Scene Image Generation.

Scene images serve as the visual background and functional guide for APP interfaces, playing a crucial role in creating user immersion. For the creative process, the liblibAI General Image Model V2 is employed. To ensure reproducibility, we provide a detailed description of the prompt engineering and parameter settings. For the farming environment scene, the base prompt is: "Interior of a modern intelligent pig house, clean white walls with transparent windows, temperature (22°C) and humidity (65%) controlled as constants, overall warm ambiance, soft blue-gray lighting, orderly and well-arranged architecture, neat and unified." For interactive scenes featuring the Piggy character, based on the given base mesh of a cute pig character in a 3D rendering, personalized character expressions are incorporated, such as: "tsundere expression, clean, soft shadows, cute piggy," etc. Apart from keyword guidance, the overall parameter settings remain at their default values, following the general model's creative mode. Negative prompts focus primarily on error correction, such as: "remove redundant mouths, ensure fur is not too long," etc. In the farming section, scene images primarily emphasize the professionalism of modern pig farms, such as intelligent pig houses, monitoring equipment, and data display screens. To ensure that scene images conform to the overall UI design style, unified standards are established for lighting and color atmosphere. Leveraging the large-scale production advantages of AI generation technology, the time and cost required for scene image production in traditional design can be greatly reduced while ensuring diversity and consistency of visual content. As shown in Figure 4 and Figure 5.

Fig. 4. Example of AI-generated scene image (farming environment): intelligent pig house with monitoring equipment.

Fig. 5. Example of AI-generated scene image (interactive context): smart management scenario.

Interactive Element Design.

Interactive elements are the important link connecting user behavior and system feedback; their quality directly affects the smoothness of user experience and ease of use. Drawing on the design concepts of the interactive modules—such as real-time data visualization, remote device control, and anomaly alerts—in the IIP4MPF platform proposed by Gu et al. [12] for massive pig farming, this paper employs the Kling 3.0 AI video generation platform to build a comprehensive interactive feedback mechanism for the "Piggy" APP. Operational controls such as sliders and switches are embellished with Piggy elements (As shown in Figure 6), ensuring normal functionality while maintaining overall interface style consistency. The navigation bar adopts a bottom tab format; icon design incorporates imagery related to farming tools and pet supplies. AI-

assisted interaction prototype testing is used to adjust touch hotspot sizes and response speeds, making real-world use more convenient and efficient. For video generation via Kling 3.0, the piggy image serves as the foundational basis. Multiple piggy characters (e.g., the Elder Piggy) play important guiding and indicating roles in the UI interaction. An example generation prompt is as follows: "An elderly piggy elder, with a righteous and positive tone, announcing, 'Hey, hello! I am the Elder Piggy. If you encounter any problems, you can ask the Smart Piggy,' speaking in a gentle tone, with a smiling and energetic expression, and soft lighting." For each clip, the same type of base prompt is used to ensure character consistency across different scenes.

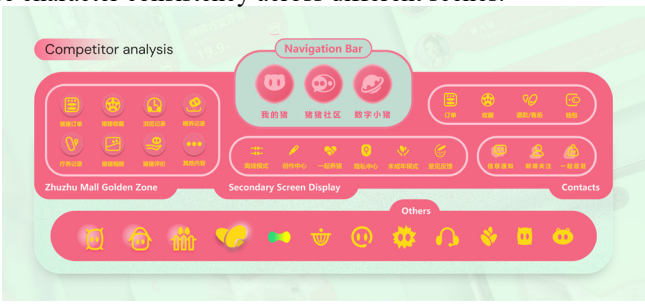

Fig. 6. Icon creative design for the "Piggy" APP navigation and functional modules.

Color and Typography Design.

Color and typography are the basic visual elements of UI design and play an important role in user perception and information acquisition. This paper establishes a three-level color structure: the primary color is natural cyan-green (#4ED3A3), representing harmony and vitality; secondary colors are soft pink (#F46783) and bright yellow (#FED917), evoking a warm feeling. For typography, a dual-font scheme is adopted: the rounded sans-serif font "Alegreya" is used for titles and important information to ensure readability on screens. System default fonts are used for body text, considering compatibility across different platforms. Font sizes are divided into six levels from 16px to 32px, with adjusted line spacing and letter spacing to provide a good reading experience across different screen resolutions.

5.3 Detailed UI Design of Each Module

Farming Module UI.

The farming module is one of the main functions of the "Piggy" APP (As shown in Figure 7); the UI primarily emphasizes data presentation and operational convenience. Important information such as pig house environmental monitoring, feed management, and health status is clearly displayed. Main features include real-time data monitoring panels, historical trend charts, and intelligent warning reminders, all maintaining a consistent style. Interaction design focuses on convenient touch operations; users can swipe to switch between different time periods to view data, and tapping on charts reveals detailed data explanations. Data presentation uses a card-based design, while AI-

generated Piggy cartoon characters are incorporated as elements guiding user operations, making professional tools more approachable and user-friendly.

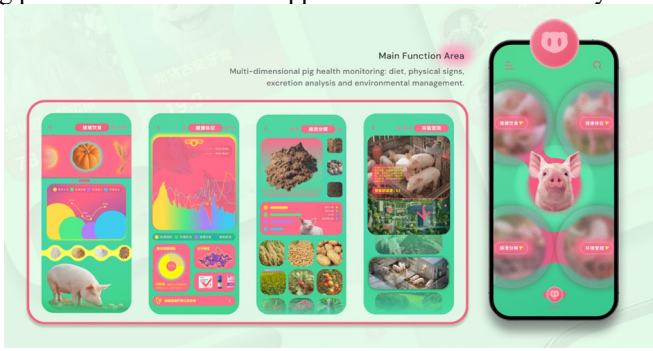

Fig. 7. Farming module UI: core functional area display showing data visualization panels and health monitoring.

Entertainment Module UI.

The entertainment module UI design emphasizes fun and interactivity. Interface colors are lively and bright, creating a relaxed and enjoyable feel (As shown in Figure 8). The gamified nurturing interface adopts a unique personalized style to achieve high user stickiness; interactive functions such as feeding and outfit customization each have AI-generated animation feedback. The interface layout has a clear sense of hierarchy. Meanwhile, personalized outfits created by users can be shared through social functions, and users can share their achievements to the public social area with one click, strengthening the dissemination power of entertainment.

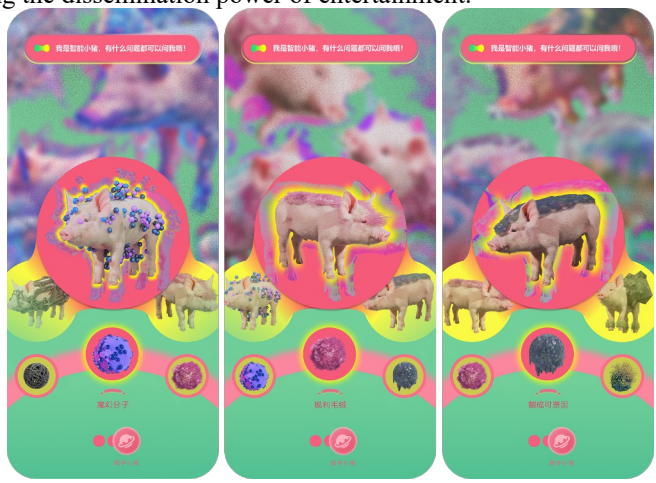

Fig. 8. Entertainment module UI: stylized digital Piggy customization and display showcase.

Social and Information Module UI.

The social and information module UI design emphasizes information acquisition efficiency and social interaction convenience (As shown in Figure 9). The interface uses a clean card-feed layout combined with AI-optimized information structure to make content hierarchy clear. Information is presented in a combination of graphics and text, with AI-generated related illustrations enhancing the reading experience. In the social function area, users can connect with interesting "pig farming friends" and learn from pig farming experts; content is pushed by intelligent recommendation algorithms. Comment and like operations have smooth animations to increase user stickiness [13].

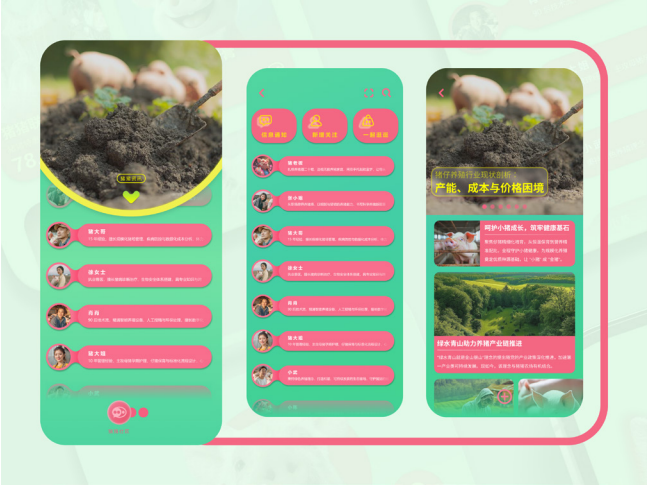

Fig. 9. Social and information module UI: card-feed layout with community interaction features.

5.4 AIGC Optimization Strategies in UI Design

In the "Piggy" APP UI design process, the application of AIGC technology is primarily reflected in three aspects: improving the accuracy of content generation, ensuring consistency across multiple types of content, and continuously iterating user-centered improvements. To prevent content errors and style inconsistencies, this paper proposes a prompt engineering-based approach to improve generation quality. By fine-tuning keyword inputs to the liblibAI image generation model—combining keywords such as "intelligent pig farming scenario," "cute Piggy character," and "data visualization interface" with specific colors and composition requirements—generated scene images and digital characters achieve visually consistent effects. Additionally, an AI-assisted optimization method is incorporated into Blender modeling, using parametric approaches to allow Piggy characters to vary across different functional modules while maintaining recognizability. The overall effect is shown in Figure 10.

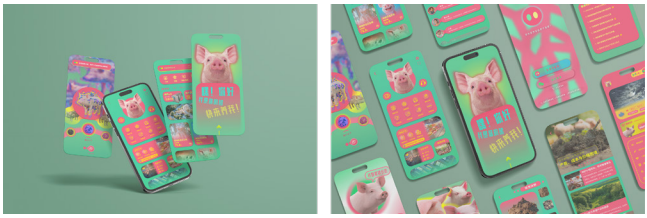

Fig. 10. Overall creative display: integrated presentation of the “Piggy” APP UI system.

6 Design Effect Verification and Analysis

6.1 Verification Scheme Design

In order to better understand the results achieved by the “Piggy” APP UI design under AIGC technology, this paper proposes a comprehensive, multi-angle verification scheme. The scheme is based on user experience evaluation, considers the characteristics of the intelligent pig farming industry, and adopts a combined quantitative and qualitative research approach. Combining the ideas of artificial intelligence with the emotional expression of design thinking [14]. The specific validation protocol encompasses multiple aspects, including user interface usability testing, functional experience satisfaction surveys, quality assessment of AIGC-generated content, and evaluation of specialized usage experience. For the quality assessment of AIGC-generated content, we establish clear and objective evaluation criteria, adopting a combination of designer scoring and user feedback. The details are as follows: (A five-point Likert scale is uniformly adopted for all ratings; the evaluation participants include 21 UI designers, 81 general users, and 17 professional pig farmers; the final score for each indicator is the average of at least three independent ratings, thereby making the quality control process more transparent and replicable.)

1) Digital Character Acceptance and Perceptiveness: Analysis of the appeal of AI-generated character features (e.g., users’ preference for digital personality embellishments such as spherical decorations, slime decorations), color scheme consistency (acceptable range of RGB value deviation), and cross-module transition (acceptance of creative applications across different modules). As shown in Table 3.

Table 3. Definition of Scoring Criteria for Digital Character Acceptance and Perceptiveness

Stability of AI Character Features	Color Scheme Consistency	Cross-Module Transition
4	3	4

2) AI-Generated Scene Image Relevance: Relevance scores are assigned based on the degree of matching with prompt keywords and functional scenarios. As shown in Table 4.

Table 4. Definition of Scoring Criteria for AI-Generated Scene Image Relevance

Piggy Series Characters (e.g., Elder Piggy, Sister Piggy, and other built-in character images within the application)	Specialized Illustrations for Swine Breeding, Manure Analysis, Dietary Health, and Other Professional Domains	Digital Entertainment Section, Creative Decoration Section	Others (e.g., icons for the mall, Piggy Weather, membership, settings, etc.)
4	5	3	4

3) Interaction Naturalness: Scored from two dimensions: usage comfort and attractiveness. As shown in Table 5.

Table 5. Definition of Scoring Criteria for Interaction Naturalness

Overall Comfort	Overall Attractiveness
3	4

4) Professional Feasibility (Evaluation Participants Limited to Professional Pig Farmers) : Multidimensional indicator evaluation of the APP's professional functions conducted by pig farming users. Analysis of professional advantages and application deficiencies. As shown in Table 6.

Table 6. Definition of Scoring Criteria for Professional Feasibility

Piggy Diet	Health Monitoring	AI Suggestions	News	Farming Environment Management
4	4	4	5	4

6.2 Design Optimization Approach

Based on user testing feedback, we optimized the user interface of the "Piggy" APP in terms of layout, color scheme, interaction design, and other aspects [15]. In terms of interface layout, we expanded the original functional module areas to improve screen space utilization and user efficiency. In response to user feedback regarding issues such as "overly stylized colors" and "too much data," we reorganized the farming data page using a card-based layout. Through AIGC technology, key information—including temperature, humidity, feed consumption, and health status—is presented in a layered manner, generating more intuitive chart-based interfaces. In color design, we adjusted the original pink color scheme based on color psychology principles: the strong contrast among green, yellow, and pink in the initial version was reduced, making the overall palette more transparent and adaptable. This not only creates a natural farming atmosphere but also ensures good visibility under different lighting conditions. The entertainment module interface was also optimized by incorporating more dynamic animation effects and sound effects, and by using AIGC technology to make Piggy's facial expressions richer and movements smoother.

The optimized interface design, while retaining the original "Farming + Entertainment" dual-core concept, places greater emphasis on the combination of professionalism and fun. For large-scale farmers, professional data visualization displays are enhanced and batch operation workflows are simplified. For pet pig enthusiasts, social sharing convenience is increased and AIGC technology is used to add more personalized decorative items. In terms of system performance, application runtime efficiency is greatly improved through reducing the size of AIGC-generated content and optimizing loading methods. Interface adaptability is also improved for different screen sizes and operating system versions. Improvements to user guidance mechanisms include newly added interactive tutorials, optimized visibility of help documents, and enhanced smart prompts [16]. These improvements not only address user experience issues in the initial design but also demonstrate the role that AIGC technology plays in the iterative optimization process.

7 Conclusion and Future Work

7.1 Research Conclusions

This paper takes the application of AIGC technology in the "Piggy" APP UI design as its entry point, proposing an intelligent UI design scheme driven by a "Farming + Entertainment" dual-core approach to address the current problems of single functionality and homogeneous interfaces in pig farming applications. This paper innovatively combines multiple multimodal technical approaches—including Blender modeling, liblibAI image generation, and Kling 3.0 video generation—to accomplish intelligent generation and optimization of major UI elements including digital characters, scene images, and voice content. User testing demonstrates that the scheme achieves expected results in visual appeal, usability, and functionality, providing a replicable methodology and practical case for AIGC-empowered design of vertical industry mobile applications.

7.2 Research Limitations

This research also encounters some challenges in utilizing AIGC technology to assist "Piggy" APP UI design. For technical reasons, some AIGC-generated content in terms of details and style still requires manual post-processing. The user testing subjects are also relatively homogeneous, limited to a specific region and lacking broader cross-regional testing. Moreover, this paper primarily discusses the application of AIGC technology from a UI visual perspective, with limited research on the integration of AIGC technology with back-end data processing and algorithm optimization, not fully leveraging the role of artificial intelligence in the overall application system.

7.3 Future Prospects

As AIGC technology continues to advance and the digital transformation of the pig farming industry deepens, there remains considerable room for development in the "Piggy" APP UI design. In the future, more advanced multimodal generation technologies could be employed for interface design, VR/AR technologies could be used to create immersive farming environments, and these results could be extended to more agriculture-related industries, providing better design approaches and technical support for digital applications in smart agriculture.

Acknowledgment

The authors would like to thank all participants in the user research and testing phases for their valuable feedback and contributions to this work.

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