Development Strategies for Augmented Reality-Empowered Journal Apps: A Case Study of TIME Magazine's TIME Immersive (Postprint)

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Abstract

The report of the 20th National Congress of the Communist Party of China emphasizes the implementation of a national cultural digitization strategy and the enhancement of the dissemination power and influence of Chinese civilization. To better leverage augmented reality technology to promote the supporting role of journal Apps as "cultural new infrastructure," and to tell China's stories well and disseminate them effectively through outstanding Chinese journal Apps, this study employs case analysis and comprehensive analysis methods to investigate the practice of TIME Immersive, the journal App of Time magazine. The analysis reveals that TIME Immersive's development and design principles of "immersive interaction" and "no additional entities," its content design featuring layered symbolic elements in medium-to-long stories, and its cross-boundary cooperative team building endow it with relatively prominent advantages among journal Apps that integrate augmented reality technology. Therefore, in the process of integrating with augmented reality technology, China's journal Apps can undertake new explorations across three dimensions: interactive relationships, scenario-based dissemination and services, and the industry-academia-research ecosystem, with the aim of incubating high-quality digital journal Apps in China and enhancing the nation's international influence.

Full Text

Exploring Development Strategies for Journal Apps Empowered by Augmented Reality Technology: A Case Study of TIME Magazine's TIME Immersive App

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Abstract

The report from the 20th National Congress of the Communist Party of China emphasizes the implementation of a national cultural digitalization strategy to enhance the dissemination and influence of Chinese civilization. To better leverage the advantages of augmented reality technology in promoting journal apps as a form of "cultural new infrastructure," and to enable outstanding Chinese journal apps to effectively tell China's stories, this paper employs case study and comprehensive analysis methods to examine the practices of TIME magazine's AR application, TIME Immersive. The analysis reveals that TIME Immersive's development design philosophy of "immersive interaction" and "do not multiply entities unnecessarily," its content design featuring symbolic elements layered within medium-to-long-form narratives, and its team building through cross-industry collaboration collectively confer distinctive advantages among AR-integrated journal apps. Consequently, as Chinese journal apps integrate with augmented reality technology, new explorations can be undertaken across three dimensions: interactive relationships, scenario-based communication and services, and industry-academia-research ecosystems, with the aim of incubating high-quality digital journal apps in China and enhancing the nation's international influence.

Keywords: augmented reality technology; journal app; TIME Immersive; development strategy

Introduction

Virtual Reality (VR) technology, which originated in the United States and is also known as virtual environment or artificial environment, refers to technology that uses computers to generate a virtual world that directly imposes visual, auditory, and tactile sensations on participants, allowing them to interactively observe and operate within it. Augmented Reality (AR) technology refers to the use of computer systems to overlay virtual objects or scenes onto real-world environments, enhancing users' perception of reality. From a historical perspective, the "combination of virtual and real" in augmented reality represents a new technology developed based on virtual reality—indeed, AR technology constitutes a new stage in the evolution of VR technology. As a favored technology in recent years, AR is working alongside big data, artificial intelligence, and other emerging technologies to drive the development of the technological ecosystem. Currently, AR technology has been applied across multiple fields including film, television, gaming, education, military, journalism, and publishing, with academic research concentrated at the intersection of journalism and communication, publishing, visual interaction design, and computer science.

Within the publishing and media industry, major publishing groups worldwide have been actively deploying AR applications.

Examples include the New York Times' NYTimes App, which uses AR technology to allow users to observe detailed content through 3D AR newsstands; NUSHU, an educational news magazine for students that presents articles and documentary stories through AR; Condé Nast's collaboration with HTC to develop the world's first AR/VR integrated reading platform; and TIME Immersive, the AR application launched by Time magazine. This demonstrates that amid the broader trend of digital publishing transformation, AR technology presents new development opportunities for digital publishing refinement, enhanced publishing development for periodicals and magazines, and app construction.

As one of the world's most influential magazines, Time has actively positioned itself within AR technology. In 2019, in collaboration with multiple institutions, it launched an integrated AR content application called TIME Immersive. Therefore, examining the necessity of combining AR technology with journal apps, analyzing the current application status of Time's AR app TIME Immersive, and deriving implications from it can provide valuable insights for the development of Chinese journal apps and for leveraging these platforms to tell China's stories effectively.

1.1 Building Independent Platforms to Tell China's Stories

Developing high-quality Chinese journal apps through AR technology represents a viable strategy for enhancing the international influence of Chinese periodicals and effectively communicating China's narratives. Since the 18th National Congress, General Secretary Xi Jinping has repeatedly emphasized the importance of telling China's stories well and disseminating China's voice effectively. Guided by the "going global" strategy, China's news media industry has been actively building its own influential overseas communication platforms, gradually transitioning from "borrowing ships to go to sea" (relying on foreign platforms) to "building ships to go to sea" (developing independent platforms). Meanwhile, the report from the 20th National Congress calls for accelerating the development of Digital China. Journal apps themselves constitute an important dimension of China's digital construction, playing indispensable roles at various levels.

However, as a mobile digital application format, apps have seen limited adoption and low attention in the dissemination of single Chinese scientific journals. Current journal app development faces challenges such as monotonous functionality and insufficient user stickiness. Globally, China has few leading journal apps with significant influence. In other words, in the practical efforts to tell China's stories through various means, Chinese journal apps have yet to fulfill their potential. Therefore, leveraging AR technology's advantage of "integrating virtual and real," and organically combining it with journal apps to proactively

"build ships to go to sea" by launching globally influential Chinese journal apps, represents not only a strategy for telling China's stories but also a means to enhance the nation's international influence and cultural soft power.

1.2 Enhanced Publishing: Content Derivation and Value Addition Through Digital Value-Enhancement

The integration of journal apps with AR technology represents a novel application ecosystem model within enhanced publishing practices. As technology iteratively evolves and AR publishing applications deepen, publication formats become more diverse and service effects more prominent. This new publishing model, which realizes "root publication + enhanced content," disrupts monotonous and dry knowledge analysis pathways, enabling value-added content extended from print materials to acquire greater meaning and value within journal apps. For instance, the "Renwei" app from People's Medical Publishing House leverages AR technology to create a virtual teaching platform, transforming two-dimensional text and images into more intuitive and vivid presentations in actual teaching.

1.3 From Entropy Increase to Entropy Decrease: Breaking Up Solidified Soil

Dissipative structure theory maintains that orderly processes cannot emerge from within a system; rather, increases in order must derive from the transfer of external order—negative entropy flow. The transformation of organizational systems from entropy increase to entropy decrease requires three aspects: active work, creating open systems, and reducing information entropy. Therefore, in today's rapidly developing digital era, if we can introduce new "nutrients" into the solidified soil of journal app development by integrating AR technology, we can achieve active work within journal apps, fully empowering users with technological capabilities, and inject fresh blood and new elements into content creation, operational models, and profit models. This process can delay or avoid internal disorderly entropy increase, guide the system toward entropy decrease, and thereby achieve efficient development through self-transformation.

2. Analysis of TIME Immersive's Application Status

2.1 TIME Immersive Development Design: "Do Not Multiply Entities Unnecessarily" and "Immersive Interaction"

The 14th-century English logician William of Ockham proposed the "Occam's Razor" principle, whose essence lies in "do not multiply entities beyond necessity." In 通俗 terms, this means that when facing complex matters, maintaining simplicity is the optimal solution. TIME Immersive's development design fundamentally adheres to Occam's Razor by reasonably avoiding cumbersome procedures in hardware system requirements, usage steps, operation interface, and

functional design, enabling the application to simplify complexity. By removing complicated processes, the streamlined operating system better highlights TIME Immersive's AR-centric features, allowing users to deeply experience the charm of immersive interaction.

2.1.1 Do Not Multiply Entities Beyond Necessity (1) Low Requirements: Lowered Thresholds for Hardware and System Versions

Through detailed examination of the information page accessed via TIME Immersive's FAQ & Support option, the application adheres to principles of simplicity, lightness, and minimalism in both hardware requirements and system versions, lowering user access barriers. For hardware, TIME Immersive only requires users to have mobile devices running iOS 11.0 or above or Android 8.0 or above. The app is available for download on both the Apple Store and Google Play, with software updates synchronized across both platforms. Android users must install the latest version of the ARCore component for proper functionality, while Apple users need only download the application itself. Thanks to this streamlined design principle, TIME Immersive's installation size of 63MB also frees users from storage constraints.

(2) Clarity: Simple and Clear Usage Steps to Bridge the Digital Divide

From a digital technology perspective, the access gap in the digital divide affects people's ability to consume new media. The TIME Immersion platform employs a combination of AR and VR, offering users two options. The first requires professional VR external equipment, while the second only needs a mobile client downloaded with the TIME Immersive app, supplemented by the ARCore component. This enables TIME Immersive users to access corresponding content services without expensive headsets. Furthermore, TIME Immersive's simple and clear usage steps better attract potential users to experience the product. The specific steps are: users first download the APK file through the Apple App Store or Google Play Store; after installation, they download content components within the app and point their phone camera at any flat surface to launch the corresponding content [Figure 1: see original paper].

(3) Unified Design: Simple Operation Interface and Functional Design to Highlight AR Features

To emphasize its AR product highlights and application characteristics, TIME Immersive's overall operation interface and functional design remain remarkably simple. Upon opening the app, a usage process guide appears [Figure 2: see original paper]. The application contains three modules: main content display, related settings, and usage notes. After skipping the usage process introduction, users can intuitively access all operation items [Figure 3: see original paper].

First, content display: presented in a waterfall flow format with large images and text introductions, it intuitively showcases all AR projects from TIME magazine within TIME Immersive. Second, related settings: containing two sections—Downloads (Manage downloads) and About (Sign up for our newsletter; FAQ

& Support; Privacy Policy; Terms of Service). Third, usage notes: redirecting to the operation process prompt, i.e., the user introduction on the splash page. Therefore, in terms of usage step simplicity, TIME Immersive not only more intuitively presents its AR technology applications but also more easily attracts potential user groups interested in new technologies and applications.

2.1.2 Embodied Communication: Immersive Interaction Under Narrative Structure Transformation H. Porter Abbott argues that narrative transformation is inseparable from the intervention of "interactivity," namely the participation of readers/viewers in constructing narrative discourse. The story-to-discourse model commonly used in narratology has now been disrupted by augmented reality. After overlaying enhancement technologies on its products, TIME Immersive reshapes the long-form textual symbolic discourse narrative model carried by print or electronic media, with embodied interactive communication systems endowing users with a sense of participatory interaction. In short, AR technology not only enriches narrative forms but also dissolves the perceptual boundaries between narrative content scenes and users' real spatiotemporal order. TIME Immersive recreates virtual stories for users, transforming storytellers into "technical creators" and "experiencers" of the interactive system—the users themselves.

Riding the wave of "immersive interaction," TIME Immersive's lengthy continuous narrative "Landing on the Moon" becomes fragmented into individual "nodes," with users themselves serving as the main drivers of the story. Scattered story nodes are connected by users, who can either click on the screen to gradually 推演 the entire lunar landing process or perceive the specific landing status by "observing spacecraft instrument panels and window views." Users drive story development from the perspective of "I," subsequently gaining an overview of the complete story and obtaining a fused interactive situational experience.

2.2.1 Content Design Language: Common Symbols Evoking Value Association

Media value association involves brand characteristics, information encoding and decoding, and the signifiers and signifieds of media symbols, influencing issues at the sociocultural level such as media reputation, media culture, and users' symbolic consumption and identity recognition. TIME Immersive centrally displays content in app form. Project content within the app is arranged in a waterfall flow, allowing users to intuitively select content of interest and preventing brand IP dilution caused by inter-project dispersion. Moreover, the color style and background align with TIME magazine's "black-red" thematic elements, effectively matching its brand identity. When users engage with TIME Immersive, they can evoke existing impressions of TIME magazine—achieving so-called value association through "common symbols" or "symbolic elements."

2.2.2 Content Selection Dimension: Medium-to-Long Stories Creating Harmonious Virtual-Real Linkage Spaces

TIME Immersive's content selection focuses on medium-to-long stories, which after AR integration are presented in forms compatible with local environments to achieve harmonious virtual-real linkage effects. First, medium-to-long stories provide richer information value and space for content creation. Given the long production cycles of AR technology products, integrated application platforms like TIME Immersive tend to select past major news stories rather than the most current news as their primary content. TIME Immersive's first content piece, "Landing On The Moon," which recounts humanity's first successful lunar landing mission on July 20, 1969, exemplifies such medium-to-long, significant narrative content that provides rich creative space.

Second, in scene construction, TIME Immersive first uses images and text in the main content display area for introduction. After entering specific content sections, users can experience story scenes presented by AR technology immersively. In "Inside The Amazon: The Dying Forest," villages in the jungle are displayed as signal markers; users simply click corresponding coordinate points on the screen to browse content, with these coordinates and visuals shifting according to the user's specific context. In "Landing On The Moon," users can choose between astronaut cockpit or lunar surface perspectives to experience the virtual lunar landing scenario. If selecting a desktop as the main visual, the app can present the effect of a spacecraft landing on the user's desk [Figure 4: see original paper]. Regardless of location, users can experience what Professor Shen Yang describes as the "infinite reality yet infinite virtual illusion" brought by AR technology.

2.3 TIME Immersive Team Creation: Cross-Industry Talent Collaboration

The rational application of AR technology relies on excellent creative teams, yet the shortage of composite talent currently hinders Chinese journal apps from incubating high-quality AR works. TIME Immersive effectively breaks industry barriers, leveraging its strong influence and appeal to collaborate with multiple companies and institutions on AR-integrated products. Its first content piece, "Landing On The Moon," was developed in partnership with the Smithsonian National Air and Space Museum. This work represents the culmination of nearly 20 years of research and artistic talent from John Knoll, Chief Creative Officer at Industrial Light & Magic, and utilizes research findings and 3D assets provided by Knoll and the Smithsonian's Digitization Program Office. It also employs immersive spatial sound design, with audio directed by Erik Lohr, Audio Lead at RYOT, and narration by TIME's Jeffrey Kluger. Leveraging its substantial influence, TIME magazine has assembled numerous outstanding industry professionals, compensating for the composite talent shortage prevalent in the publishing industry, and producing acclaimed AR products such as "The March" on Martin Luther King Jr. and "Space Explorers: The ISS Experience."

3.1 Technological Acceleration or Disorderly Entropy Increase: Dialectical Transformation Between Resonance and Alienation

In *Social Acceleration*, Rosa argues that a healthy world relationship capable of bringing a good life should be one of constant dialectical transformation between resonance and alienation. The combination of journal apps with AR technology symbolizes "technological acceleration," constructing a space that supports mutual resonance and harmonious coexistence between users and the world. Users can thereby achieve dimensional-upgraded interactive experiences, transforming unidirectional knowledge sharing into multi-dimensional linkage, with human-world connections evolving toward complete, practical experiential behaviors that generate possibilities for social advancement—what Rosa describes as "resonance relationships." However, behind technological acceleration lurks the deeper "escalation logic" of accelerated society and the "growth society" it creates. The growth society's development paradigm, which prioritizes quantity over quality, will affect the integration of journal apps and AR technology. If journal apps simply pile on novel AR technologies, it will lead to disorderly entropy increase, and the harmonious relationship between users and journal apps will devolve into disordered alienation. Therefore, journal apps must use AR technology as a driver for digital development while remaining vigilant against associated risks to achieve dialectical transformation between resonance and alienation.

3.1.1 Dimensional-Upgraded Interaction Stimulates Senses, Unlocking Deep Reading Market Potential

The integration of journal apps with AR technology can achieve the technological acceleration Rosa describes, which includes acceleration in transportation, communication, and goal-oriented technologies. Against this backdrop, human society embracing new technologies has greatly enhanced collaborative efficiency and information transmission timeliness. In terms of communication and increased information volume, journal apps employing AR technology fulfill the connotation of technological acceleration in Rosa's framework. Digitalized journal apps combining AR technology now possess the characteristic of interactivity in embodied communication, enabling them to disseminate higher-density value information through more diverse media presentation forms within the same time unit.

Therefore, identifying industry pain points and cleverly leveraging AR technology to seize first-mover advantage becomes a leading issue. Although domestic journal apps possess rich content advantages, they remain unable to attract audience attention and build sticky user bases due to fragmented reading habits in new media environments and poor interactive experiences caused by simply migrating print content to apps. The fourth part of the *Tracking Evaluation and Analysis Report on Digital Publishing Award-Winning Products in Recent*

Years also mentions that mobile app reading in journal digital transformation still lags behind overall mobile reading development. Scholars Luo Xian and Li Xuhua point out that pursuing sensory stimulation is an important criterion for users' media choices, concerning whether they can truly enjoy the experience, with sensory bias becoming a breakthrough in marketing models to attract consumers. If journal apps can fully utilize AR technology to create three-dimensional reading experiences, they can deliver a dimension-reducing blow to current two-dimensional planar interactions, satisfying users' pursuit of sensory stimulation while breaking the shallow reading paradox of the new media era, re-regulating media technology's power over users, unlocking the deep reading market potential, achieving product function innovation, and incubating influential cases in journal digital transformation.

The immersion provided by AR-integrated journal apps can also intercept attention fragmentation caused by "visual splitting" and "auditory splitting" when users consume general print or digital content. Just as lightweight apps intercepted print journals, user attention fragmented by media consumption can be aggregated through immersive AR experiences, achieving interception of user attention in new media scenarios and ultimately building a sticky user base. AR technology is becoming the next technological frontier. A global "Consumer Augmented Reality" report jointly released by Deloitte and Snap affirms AR's role as the next frontier. In this context, journal apps combining AR technology should actively expand existing production processes and paradigms, transforming 枯燥乏味 or highly demanding knowledge into academic game products similar to level-based models to satisfy users' pursuit of sensory stimulation and intercept fragmented attention. TIME Immersive's "Inside The Amazon" provides such a gamified personal interactive experience where users personally activate each "coordinate" location before entering the next scene. With AR technology, journal apps can attempt to emulate the monetization logic of current video websites or games, using free AR product experiences to attract user attention and interest initially, then implementing new profit growth through paywalls for subsequent content or membership systems.

3.1.2 From Growth Society to Post-Growth Society: Transforming Existing Development Paradigms

One dimension of accelerated society is technological acceleration, and we must guard against journal apps combining with AR technology being co-opted by accelerated society logic, leading to alienation where content-centric approaches yield to technology-centric ones. Rosa argues that under growth logic, accelerated society prioritizes quantity over quality. Due to constant social acceleration and change, modern society has developed a "move forward or fall behind" mindset, pursuing improvement based on "quantity" as the benchmark. His proposed solution is transitioning to a post-growth society where people should no longer pathologically pursue growth but must seek "quality" improvement within existing growth logic.

As analyzed previously, TIME Immersive's streamlined interface style and quality-over-quantity approach exemplify this post-growth society paradigm. TIME Immersive differs from apps like People's Medical Publishing House's "Renwei" or Beijing Chujiao Technology's AR learning app, where users must navigate numerous subdirectories to find content—complex app project designs that hinder direct access. The latter requires print journals as a medium for content access, also failing to achieve efficient reach. If journal apps aim to highlight AR technology as a selling point, they might 借鉴 the approach of Zhiyin Manke App, which sets up independent display zones. When promoting its AR product *GO! GO! Art Student*, Zhiyin Manke App allows users to directly view corresponding virtual comic characters by clicking on exclusive comic covers, avoiding tedious subdirectory searches. Journal app developers can use homepage carousel displays or simplify interface settings and layouts for AR products as new selling points, enabling 相关产品 to reach users' attention most quickly. Alternatively, they can consider solutions like TIME Immersive that consistently follow Occam's Razor principles, avoiding excessive cumbersome processes in design pages and application procedures, and attempt to develop more independent applications that allow users to access AR application ecosystems in the simplest way possible, achieving "quality" improvement in AR-integrated journal apps.

3.2 Virtual-Real Symbiosis in Scenario Communication: Diverse Scenario Services and Knowledge Sharing

In today's Web 3.0 media evolution context, audiences increasingly demand diverse media characteristics. Professor Yu Guoming notes that augmented reality scenarios, as products combining real and virtual scenarios, will become mainstream future development. Augmented reality scenarios refer to the combination of real scenarios constructed in real life based on real interfaces and virtual scenarios that provide audiences with media-expected virtual interface environments through online services. Journal apps should embrace this trend and cultivate diverse services based on augmented reality scenarios. In constructing virtual-real linkage scenario services, the accompanying user identity recognition psychology and "self-presentation" behaviors can drive popularized knowledge sharing, enabling AR-integrated journal apps to contribute to Digital China construction and cultural confidence building.

3.2.1 Dual-State Integration Matching Local Characteristics: Exploring Essential Scenario Services By combining AR technology with local environmental characteristics to construct story scenarios, journal apps overlay digital information onto real space, creating "dual-state integration" of real and virtual states. This not only achieves real-world enhancement but also creates more scenario services from the AR-journal app integration, such as AR+textbooks, AR+stories, and AR+news—essential services that meet diverse user needs. Each story experience in TIME Immersive similarly achieves virtual-real linkage effects through AR technology, allowing users to involuntar-

ily immerse themselves in story model scenarios constructed by creators.

Currently, the communication strategy of constructing augmented reality scenarios through virtual-real linkage has been widely applied across various fields with notable success. In education (classrooms), against the backdrop of national "informatization" teaching and "double reduction" policies, apps like Jiao Zhixing AR Classroom and AR Smart Classroom provide students with audio, video, and interactive applications related to subject content based on print textbooks. In physical goods trading and industrial fields, the Dewu App uses AR technology to authenticate products, allowing users to scan embedded AR programs in certificates to verify authenticity. Chint Group collaborated with Liang Fengtai to introduce an "AR Power Distribution Operation and Maintenance System," making operation guidance AR-visualized and improving novice employee efficiency.

Although Chinese journal apps have attempted AR integration with experiments like Sanlian Zhongdu's AR reading and Zhiyin Manke's AR comics, overall involvement remains limited, and most journal apps have not incubated mature AR products. Journal apps can seize the momentum of the emerging metaverse to fill gaps in AR technology applications and expand more diverse scenario services.

From a scenario curation perspective, journal apps can attempt to curate story-based AR products, giving users autonomy in choosing story-unfolding scenarios where any desktop or object serves as a fusion point between real-world displays and virtual stories. Users can freely 推演 stories from more autonomous perspectives and active random operations, experiencing contextualized story content in any real-world space. Additionally, journal apps can 借鉴 Sanlian Zhongdu App's approach of presenting personality columns in AR form. When reporting on figures like director Jiang Wen or host Dong Qing, beyond text and image introductions, AR technology fuses text, audio, and video to present more lifelike aspects, using specific life situations to bridge distances.

From a scenario service perspective, leveraging inherent resource advantages, journal apps can collaborate with relevant units and enterprises to produce AR-integrated textbooks or training manuals, particularly in fields with significant market potential like medical education and training. The convenience of mobile apps combined with AR technology can bring AR education into real life, changing how humans acquire knowledge and potentially deriving entirely new knowledge payment systems while opening new knowledge acquisition scenarios in the digital communication era. Furthermore, journal apps can explore diversified copyright protection services based on AR technology through chip implantation, device binding, and special experiences.

3.2.2 Scenario Construction Evoking Identity Recognition: Promoting Popularized Knowledge Sharing Tombs & McColl-Kennedy's "social service scenario" model emphasizes the importance of social and symbolic el-

ements in social service scenarios. Hu posits that symbolic elements refer to situational elements expressing certain emotions of consumer groups, which can evoke audience memories or group identity recognition. When constructing diversified scenario services, journal apps combining AR technology must consider the integration and application of symbolic elements. The user identity recognition evoked by various symbolic elements aligns with users' expectations of "digitally presenting their cultural positioning." Users sharing AR products with inherent appeal can be seen as fulfilling a psychological need for "self-presentation," where "individuals will perform for others' appreciation, such as what books they read or what types of friends they make," naturally shifting audience consumption attitudes from "resistance" to "preference."

As a frontier media technology, AR inherently possesses a "halo effect," making it easier to trigger fission-style dissemination when users share AR products. Therefore, when designing AR-related content products, domestic journal apps should emphasize their own brand tonality, highlighting brand IP elements like TIME Immersive's consistent "black-red" theme, using accumulated print journal brand IP to evoke user identity recognition, prompting users to actively disseminate and incubate "viral" AR cases that break through current user stickiness limitations. Simultaneously, the ubiquitous active dissemination of quality content can drive popularized knowledge sharing trends, advance generalized Digital China and Cultural China construction, promote cultural confidence, and contribute to journal apps "building ships to go to sea" to enhance China's international influence.

3.3 Building an Industry-Academia-Research Ecosystem to Jointly Incubate Technological Achievements

Journal apps' primary advantages lie in content and copyright, but their difficulty rests in technology and talent shortages. Currently, most priority AR technology cases produced by domestic and international journal apps have 集结 various forces, requiring substantial human, material, and financial resources rather than completion by single studios. For instance, when incubating digital innovation party-building cases, Banyuetan actively chose to collaborate with industry companies. TIME Immersive's projects are also mostly completed through industry-academia collaboration. Time magazine's Emmy Award-winning VR/AR documentary *Space Explorers: The ISS Experience* was similarly produced in collaboration with Felix & Paul Studios. If journal app development teams wish to achieve success in the frontier field of AR technology, they can actively seek connections with academia and industry. Such collaboration can involve single projects or establish long-term content partnerships.

This should unfold from two elements: team organization and process management. First, research relevant AR enterprises, AR-applying journal magazines, and academic and industry institutions with content or technological advantages to actively explore cooperation possibilities. From a process management perspective, research team organization strategies based on the working charac-

teristics of various specialties, including leadership organization forms, personnel scale requirements, skill requirements (panoramic photography, text mining, semantic annotation), training strategies, and production-driven models. Second, AR technology in the publishing industry generally comprises four parts: 3D model libraries, AR editors, output display systems, and book market sales. For collaborative production processes among publishing enterprises, AR companies, and academic/industry units, actively research technical aspects including 3D model libraries, AR editors, output display systems, as well as shooting requirements, post-production, version control, technical architecture, task allocation and handover, schedule management, critical link control, cost control, quality management, enhanced data storage, and communication cooperation. By addressing team organization and process management through multi-dimensional collaboration, talent conversion rates can be improved to compensate for the shortage of composite talent in Chinese journal apps' AR-driven high-quality application development.

After integrating AR technology, TIME Immersive provides users with interactive, immersive, and dimensionally-upgraded story performance experiences in augmented reality scenarios, aligning with Professor Shen Yang's concept of the metaverse as infinitely real yet infinitely virtual. Infinite reality represents humanity's first life curve, while infinite virtuality represents the second; the fusion of these dual curves reflects human social growth. Behind journal apps' attempts to integrate with AR technology lies not only humanity's use of frontier media technology to carry or disseminate human behavioral consciousness through journal apps but also the ability to reset consciousness across virtual-real boundaries. This represents not merely online access to journals and literature but a complete, practical experiential behavior. The connection of various communication behaviors where virtual worlds overlap with real worlds will disrupt existing communication paradigms and reconstruct human social relations. The fusion of journal apps and AR technology is precisely the key to opening this new world door. Future journal apps may employ AIGC to generate specific text, image, audio, and video content for embedded AR applications, or collaborate with PUGC and PGC in immersive education and immersive narrative fields, collectively driving human social development.

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Note: Figure translations are in progress. See original paper for figures.