

On the Application Status and Prospects of AR Technology in Book Publishing: Postprint

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Date: 2023-10-08T00:00:00+00:00

Abstract

In the new media era, continuous technological development brings new publishing opportunities to the publishing industry, propelling it into a new stage of development. In recent years, AR books that have emerged in the publication market represent the product of combining traditional print media with new media technology. While the application of AR technology in book publishing brings new reading experiences to readers, it also presents some urgent problems that need to be addressed. This paper attempts to summarize the current application status of AR technology in book publishing, propose solutions to the problems encountered in its application, and analyze its prospects.

Full Text

Abstract

In the era of new media, continuous technological development has brought new publishing opportunities to the publishing industry, propelling it into a new stage of development. In recent years, AR books that have emerged in the publications market represent the product of combining traditional print media with new media technologies. While applying AR technology to book publishing offers readers new reading experiences, it also presents several pressing issues that require resolution. This paper attempts to summarize the current application status of AR technology in book publishing, propose solutions to the problems encountered in its application, and analyze its future prospects.

Keywords: AR technology; book publishing; application

CLC Number: G2

Document Code: A

Article ID: 1671-0134(2018)03-123-02

DOI: 10.19483/j.cnki.11-4653/n.2018.03.052

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1. What Is “AR Technology”?

“AR technology” refers to Augmented Reality technology. Specifically, AR technology employs computer graphics and visualization techniques to overlay dynamic, virtual images onto real-world scenes, presenting users with a richly perceptual reality-based environmental experience. These virtual images can be audible digital information such as 3D model animations, audio, and video, or silent digital information such as pictures and text. Users experience this real-time interaction of virtual images superimposed onto the physical world through mobile terminal devices like tablet computers and smartphones, creating a powerful sense of immersion. Since its origins in the 1970s, when it was initially used only in scientific research such as military aircraft navigation and medical anatomy, AR technology has gradually moved out of research laboratories and into broad social life domains—including tourism, education, and gaming—thanks to the rapid development of new media technologies, particularly mobile terminals like tablet computers and smartphones, as well as digital technologies. It is precisely because AR technology can provide users with sensory experiences that transcend reality, especially by transforming flat, uninteresting content into vivid, three-dimensional, and interactive experiences, that it holds considerable promise in the book publishing field.

2. Current Application Status of AR Technology in Book Publishing

Creating AR books requires, on the one hand, the preliminary production of relevant 2D and 3D imaging or related audio and video content, and on the other hand, the design of application software for download onto mobile terminals such as smartphones and tablet computers. Users open the camera to scan and recognize predetermined information, thereby viewing related virtual image information through the pre-designed application software. Surveying the current publications market, we can see that as the digital era has progressed, people’s reading habits have gradually changed, with traditional reading facing increasing challenges and interactive, participatory reading experiences becoming a new preferred mode for readers. China’s publishing industry has keenly perceived and captured the advantages and potential of AR technology in realizing interactive reading experiences, with many publishing houses and enterprises beginning to apply this technology to book production and publication, combining augmented reality technology with book publications to expand into new publishing markets. Currently, AR technology applications in book publishing are concentrated primarily in three areas: children’s education publishing, mass-market books, and specialized professional publishing.

2.1 Children’s Education Publishing

Based on existing publication results, AR technology finds its most extensive application in children’s education publishing, and from a sales perspective, this

domain has also proven the most successful. The application of augmented reality technology in children's education publishing is particularly well-suited, effectively highlighting the vivid and lively characteristics of children's books. Publishers' application of AR technology has transformed the previously flat and monotonous paper reading experience, presenting dynamic, intuitive, three-dimensional, and multi-dimensional effects, and innovatively publishing a series of children's education book products. Research analyzing the publication and sales of AR books on three major online platforms—Amazon, JD.com, and Dangdang—reveals that children's education books currently account for over 90% of the entire AR book market. AR publications in the children's education sector mainly concentrate in three categories: early childhood knowledge learning publications, children's science popularization publications, and teaching supplementary materials.

2.1.1 Early Childhood Knowledge Learning Publications These AR publications target younger children, generally aged 3-6, and mostly take the form of knowledge enlightenment cards or picture books. These publications, primarily produced as learning cards and language cards, leverage AR technology's unique advantages in vividly and intuitively presenting knowledge content to young children, quickly capturing their attention and engaging them with interesting knowledge.

2.1.2 Children's Science Popularization Publications As one scholar notes: "Children's education worldwide consistently emphasizes helping children understand science and technology and their relationship to daily life" [1]. China's school science education curriculum standards and requirements are no exception. Applying AR technology to children's science popularization books can indeed highlight the strengths of interactive and three-dimensional knowledge dissemination, aligning well with the psychological development stage where children are dominated by concrete thinking. In current children's science popularization publications, AR technology transforms relevant characters or creatures from static, lifeless planar images into dynamic, lifelike three-dimensional figures, superimposing virtual information onto real-world scenes. This approach not only stimulates children's curiosity and thirst for knowledge more effectively than conventional science books but also achieves an engaging, entertaining affinity in the popularization of scientific knowledge, delivering excellent reading and audio-visual effects as children learn scientific and cultural knowledge.

2.1.3 Teaching Supplementary Materials In the domain of teaching supplementary materials, traditional educational publishers have applied AR technology relatively sparingly due to the influence of educational policies and the constraints of educational review systems, resulting in fewer published books, particularly textbook publications. Only a few innovative textbooks have employed AR technology to construct 3D models that vividly display teaching

content.

2.2 Mass-Market Books

The variety of AR mass-market books published to date remains limited, primarily involving illustrated guides to daily life knowledge or general information. For example, by simply pointing a smartphone camera at pictures of dishes in the book, readers can watch pre-recorded videos demonstrating the cooking methods for each dish—this is the essence of so-called “smart recipe books.”

2.3 Specialized Professional Publishing

In specialized professional publishing fields, AR technology has been applied to medical books, manufacturing books, photography books, and geographic map books, among others. In these professional domains, publishers often employ AR technology to display three-dimensional, dynamic 3D models of specialized knowledge that would otherwise be difficult to present intuitively and visually, enhancing readers’ comprehension of professional content through digital terminal devices. Notably, AR technology application in geographic and map publishing has already achieved initial success. Given that maps themselves possess unique advantages for three-dimensional interaction—particularly since maps are composite models that reflect objective reality through certain patterns and symbols—traditional paper maps can achieve the superimposition of the real world and virtual information through augmented reality technology, allowing readers to experience scenes that blend virtual and real elements. Currently, Beijing Chuangtu Future Technology Co., Ltd. has developed two AR product series—the “e-View Maps” and “Talking Maps” apps—which, by integrating modern digital publishing technology, have enriched product forms and user experience, continuously exploring the transformation and development path from traditional publishing to knowledge services on digital education platforms, and receiving positive feedback [2].

3. Analysis of Application Prospects for AR Technology in Book Publishing

3.1 Existing Problems

According to relevant scholars’ statistics, as of the first half of 2017, the total number of AR books on three major online e-commerce platforms—Amazon, JD.com, and Dangdang—reached 276 varieties [3]. Although AR technology application has brought enormous development potential to publishing and AR book varieties have developed rapidly in just a few short years, market sales data regrettably indicate that readers’ purchasing desire for AR books is not particularly strong, with numerous post-sale issues reported. These factors reflect certain deficiencies in such publications. First, compared with traditional books, AR books carry higher price tags, directly related to the relatively high technical costs of producing 3D models, audio and video materials, and program

design. In other words, the application cost of AR technology in book publishing is relatively high, directly leading to elevated pricing. Second, most AR books contain only a small proportion of knowledge content displayed using AR technology, leaving readers feeling that the high price does not match the limited AR content. Finally, regarding the presentation quality of AR content, there remain issues of suboptimal display effects and quality requiring improvement.

3.2 Solutions

To address these existing problems, three approaches can be undertaken. First, publishing houses need to create high-quality, rich AR knowledge resource platforms. In the publishing industry, “content is king,” and possessing a relatively systematic and abundant AR knowledge resource system is the prerequisite for publishing quality AR book content and the knowledge resource guarantee for promoting the long-term development of such books. Many AR books exhibit limited sophistication in their 3D models and video animations, with content that is monotonous and scarce, making effective superimposition of virtual information onto real scenes difficult and resulting in poor user experience. In fact, only when AR book content quality is excellent and optimal interactive reading experiences for readers are achieved can the unique value of these books compared to traditional books be truly realized. Second, publishing houses need to recruit and establish specialized editors proficient in operating AR editing systems, rather than relying entirely on new technology information companies and AR technology manufacturers, who are often only skilled in technical operations but lack professional publishing knowledge in content selection, presentation methods, internal logic, and suitability, making it difficult to achieve high integration of technology and publishing. Moreover, since most publishing house staff are engaged in traditional print media book production, many editors have limited understanding of AR books and lack experience in both topic planning and specific AR book editing and production. This necessitates establishing a professional editorial team that understands AR book production. Third, further advancement is needed in key technologies, data models, and standard specifications for AR technology application in the publishing field. Regarding readers’ complaints that some AR books exhibit crude and shoddy workmanship in displaying AR technology applications, this relates to both the existing AR technology’s own standard specifications and the establishment of quality inspection standards for applying this technology in publishing products. Thus, AR enterprises should collaborate with other relevant social organizations to rapidly formulate quality inspection and service standards for this technology in the publishing field to ensure the performance and quality of AR books. With the continuous development of new media and deepening research and exploration of new technologies, relevant standards for AR book publications will undoubtedly be established and applied in the near future. Simultaneously, as AR technology application in book publishing matures, an increasing number of high-quality, well-reputed AR books will emerge, becoming an indispensable part of the book publications market.

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

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