

Analysis of Short Video Development in the 5G Environment (Postprint)

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Abstract

The enhanced Mobile Broadband (eMBB) technology features of 5G satisfy the transmission requirements of future network video, provide network support for large-scale video applications, and short-video services will constitute a primary growth driver for the 5G business explosion. This paper analyzes 5G video transmission-related technologies, examines the development of network video and short video under 5G, and proposes recommendations for the standardized development of 5G short videos.

Full Text

Preamble

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Abstract: The enhanced mobile broadband technology characteristics of 5G meet the transmission requirements for future online video, providing network support for large-scale video applications, with short video services poised to become a primary growth point in the 5G business explosion. This paper analyzes 5G video transmission-related technologies, examines the development of online video and short videos under 5G, and proposes recommendations for the standardized development of 5G short videos.

Keywords: 5G; Short Video; Enhanced Mobile Broadband

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Fifth-generation mobile communication technology (5G) represents the latest cellular mobile communication technology. Compared with 4G, 5G offers substantial improvements in user experience rate, connection density, transmis-

sion latency, traffic density, mobility, and spectrum efficiency, effectively meeting future application scenario requirements for continuous wide-area coverage, hotspot high-capacity, low-power massive connections, and low-latency high-reliability. As traffic continues to upgrade, 5G's technical characteristics will undoubtedly provide more adequate infrastructure support for video, especially short video development and applications, granting short video platforms greater development space across various application scenarios. Reliable low-latency transmission will support numerous application scenarios. For instance, extremely low latency and multi-gigabit-per-second speeds will enable VR/AR user interactions with extremely high rate and latency requirements, applicable to remote teaching, telemedicine, field support, and more. Mobile VR/AR products, such as smart glasses, can break free from various equipment constraints, enabling virtual display under any circumstances. Enhanced mobile broadband can also facilitate long-distance resource exchange and sharing across many industries; for example, medical institutions can implement remote consultations and even perform remote surgeries requiring extreme latency and precision through surgical robots.

1. Analysis of 5G Enhanced Mobile Broadband Technology

Enhanced mobile broadband represents a primary characteristic of 5G and one of the three typical application scenarios defined by the International Telecommunication Union (ITU). Building upon existing mobile broadband service scenarios, enhanced mobile broadband provides users with greater throughput, lower latency, and more consistent experiences, thereby further improving user experience performance. 5G-based enhanced mobile broadband can support continuous wide-area coverage and hotspot high-capacity scenarios. First, continuous wide-area coverage constitutes the most fundamental coverage method of mobile cellular networks. Through large-scale 5G networking, user mobility and service continuity can be ensured, providing seamless high-speed service experiences. The 5G network enables anytime, anywhere access, delivering rates exceeding 100Mbps even at cell edges and in high-mobility environments. Second, hotspot high-capacity primarily targets local hotspot areas, with 5G networks providing extremely high data transmission rates to meet demanding network traffic density requirements. 5G networks can achieve 1Gbps user experience rates, tens of Gbps peak rates, and tens of Tbps/km² traffic density [1].

2. 5G Provides Opportunities for Video Industry Development

In the 5G era, systems will automatically connect users to the optimal network based on real-time network quality conditions, achieving truly seamless handover without requiring users to consider which network is better. This will bring fundamental transformation to speed and bandwidth issues in the video industry.

2.1 Video Industry Will Encounter More Development Opportunities

In the 4G era, the video industry already demonstrated rapid growth. Major media video platforms such as Netflix in the United States and iQiyi, Tencent Video, and Youku in China achieved substantial progress. Short video platforms including Douyin, Kuaishou, and Huoshan experienced explosive growth, prompting Tencent to not only revive Weishi but also launch three additional short video applications—"Xiafan Video," "Sukan Video," and "Shiguang Video"—while Taobao introduced the "Duoke" short video application. Evidently, video has become a battleground for internet giants. Additionally, video live streaming platforms like Momo and YY have also developed rapidly. In the 5G era, network speed constraints will be completely eliminated, allowing users to connect to various high-speed networks anytime and anywhere, with long videos, short videos, and live streaming all gaining more users and broader markets.

2.2 True Implementation of VR, AR, and MR

With the large-scale commercialization of 5G, the issues of low network speed and insufficient bandwidth that have constrained VR, AR, and MR development will be fundamentally resolved, enabling these technologies to truly implement and develop at high speed. The VR, AR, and MR video industries will experience explosive growth, particularly in video live streaming, which will become an important market providing users with enhanced scene experiences. 5G can increase download speeds to Gbit/s, with theoretical peak speeds even exceeding current household broadband. 5G-supported ultra-high-definition video transmission, VR/AR, and other applications will be widely promoted and used, especially for VR and ultra-high-definition video services, further improving user experiences. Enhanced mobile broadband will provide conditions for the development of such 5G video applications, primarily including 4K/8K ultra-high-definition video, virtual reality/augmented reality (VR/AR), telemedicine, remote education, remote monitoring, and field support.

2.3 Organic Integration of Video Industry with Other Industries

Leveraging the Internet of Everything enabled by 5G, the video industry can not only interconnect organically with automotive IoT to enrich in-vehicle video applications but also seamlessly integrate with smart home devices such as smart speakers to provide better user experiences. Naturally, various integrated application scenarios will emerge.

3. Analysis of Short Video Development Trends in the 5G Network Era

Based on an examination of widely used Apps, Weibo, and WeChat in China's internet market, current mobile internet information dissemination still primarily combines text and images, with visual image information having become an

important component of online communication content. Since 5G networks can provide more stable, extensive, and cost-effective connectivity, network-based social methods will change significantly. Moreover, under 5G networks, most mobile communication content will be dynamic, audible video content, which will promote the continued extension of social media into the video domain, with video content gradually occupying an important position in mobile internet [2]. Short video represents a unique media form based on mobile communication, typically consisting of videos under 10 minutes with low entry barriers for content creation. Its duration control enables rapid dissemination, simple production processes, and strong participation, carrying the inherent sensory experience advantages of the video medium itself. Simultaneously, it satisfies current fragmented video consumption demands, allowing people to record their life states and individual understandings of the world. Consequently, the short video industry possesses broad development prospects.

With the issuance of 5G commercial licenses in 2019, the short video industry will inevitably usher in a new round of development. 5G networks can provide higher-speed mobile network communication rates, while new media technologies offer more compatible and diversified content dissemination models. The combination of these two elements will compensate for shortcomings in short video applications and powerfully promote industry development. Short video transmission will face a new round of industry reshuffling.

3.1 5G Drives Industry Transformation

Short video has become the content of highest concern to mobile network users, who prefer to watch and share these vivid, concise clips during fragmented time periods. Although 5G networks cannot change short video content itself, their intelligent information distribution will reshuffle the content industry. The short video industry will enter a phase of eliminating inferior content and competitive elimination, with high-quality, vertical content reaching users and expanding circles more rapidly while ineffective, low-quality content is quickly filtered out. Large-scale 5G network construction will create more segmented scenario demands for short video, under which users will generate deeper-level needs, inevitably bringing more expressive opportunities for thousands of content creators.

3.2 5G Brings New Application Scenarios

5G will bring more short video formats, making many previously imagined scenarios a reality, such as the combination of 5G and VR. With 5G technology upgrades, VR's sense of presence and immersive audiovisual experiences will be enhanced, with significant improvements in visual clarity, latency, and interactivity. VR applications will also popularize into fields such as education, gaming, and design. Currently, video platforms have already explored VR in preparation for 5G's arrival; for example, iQiyi has launched the hardware "Qiyu VR" and software "iQiyi VR." As video becomes mainstream in the 5G era, improv-

ing user audiovisual experiences constitutes a crucial aspect. 5G's arrival will bring increasing business opportunities to the short video industry, with greater capital and resource investment inevitably intensifying competition within the sector.

4. Recommendations for Standardizing 5G Short Video Development

As 5G network construction gradually unfolds following the issuance of commercial licenses, short video services—already possessing viable business models—will inevitably become a key business form for 5G-based development. Therefore, it is necessary to formulate management and regulatory measures for 5G short video services in advance, aligning with national and industry development needs [3].

4.1 Strengthening Legal Foundations and Improving Institutional Systems

Since 2016, relevant national ministries and industry associations have issued numerous regulatory documents to purify the online environment, enhance governance capabilities, and disseminate positive energy. In December 2016, the State Administration of Radio and Television issued management regulations for audio-visual program dissemination on social platforms such as Weibo and WeChat, requiring relevant audio-visual program service platforms to obtain AVSP and other relevant certificates. On January 9, 2019, the China Net-casting Services Association officially released the “Detailed Rules for Review of Online Short Video Content” and the “Management Specifications for Online Short Video Platforms.” These two documents specify review mechanisms and copyright protection systems for short video platform content. Through multi-party efforts, China's online audio-visual industry standards have gradually improved, with the industry entering a phase of standardized development. Therefore, relevant departments should continue strengthening supervision of short video platforms from both qualification examination and content perspectives, while timely introducing relevant laws and regulations for short video platform and content supervision. They must not only unwaveringly adhere to bottom lines but also resolutely assume social responsibility for netizens and society.

4.2 Combining Policy and Technical Management to Strengthen Content Supervision

As regulatory efforts for the short video industry continue to increase and industry standards become more unified, the sector is gradually moving toward healthy development. Since 2017, relevant national departments have shut down and investigated multiple live streaming enterprises and platforms disseminating inappropriate content. In February 2017, Pear Video was ordered to rectify due

to lacking Internet audio-visual program service qualifications. In July 2017, the Cyberspace Administration of China required all national Internet live streaming service enterprises to register with local cyberspace administration offices. In April 2018, the State Administration of Radio and Television interviewed responsible persons from “Toutiao” and “Kuaishou,” ordering them to quickly rectify programs violating social morality. The “Detailed Rules” and “Specifications” issued in 2019 require implementing a pre-broadcast content review system, with all short videos broadcast on platforms requiring content review before broadcast. Online short video platforms must fulfill copyright protection responsibilities and may not unauthorizedly edit, adapt, or forward fragments of radio and television audio-visual works. Therefore, while prospering cultural product creation and production, copyright protection should be strengthened to promote cultural innovation through copyright protection, regulate networks, and form sound development and operation models. Thus, under the principles of adhering to political, value, and aesthetic orientation, promoting core socialist values should permeate the entire process of short video content review, dissemination, and recommendation. Strengthening standard formulation and using standards as a lever to complement policy management will truly promote healthy competition between platforms and content creators, driving the standardization and maturation of the short video market.

4.3 Enhancing Technical Capabilities and Strengthening Team Building

Short video platforms can leverage big data, artificial intelligence, cloud filtering, and other technologies to strengthen precise matching and rapid identification of content. This can not only reduce manual review costs but also minimize review blind spots, enabling intelligent tracking of users and content. Therefore, while improving platform review mechanisms, user experience can be enhanced. To ensure review effectiveness, short video platforms should also establish creative teams and reviewer teams with high political quality and strong professional capabilities according to their business scale. Creative teams should not only achieve direction positioning, topic planning, scriptwriting, and filming editing in content production but also possess strong operational capabilities to ensure high video viewership. Reviewers must consistently present works that reflect contemporary Chinese values and the spirit of Chinese culture to the public during program review.

5G mobile communication technology is drawing increasingly near. The internet in the 5G era will feature high bandwidth, low latency, ubiquitous connectivity, multi-directional interaction, and three-dimensional multidimensionality, providing more possibilities for short video development. Short video platforms can further collaborate with other platforms to enrich content and expand operation models. In response to short video development, it is necessary to implement corresponding measures in institutional, policy, and technical domains to ensure the healthy development of 5G short video services.

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