Technology Creates Brilliance, Intelligence Empowers Media—Viewing the Integrated Innovation and Post-Print Development of CMG Technology from the 2021 Two Sessions Coverage

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Abstract

The convening of the 2021 National Two Sessions was of profound significance and attracted global attention. Facing the impacts of pandemic prevention and control, major domestic media outlets in China vigorously pursued innovation, converging technological means and innovating modes of expression. China Media Group, centering on its "5G+4K/8K+AI" strategy, implemented a comprehensive new layout during the Two Sessions period, extensively deploying new technologies and methods including 8K, AI, and VR, innovating reporting models, constructing a new media product matrix for dissemination, leading audio-visual communication for new mainstream media, and thereby demonstrating the responsibility and commitment of the national mainstream media through convergence and innovation.

Full Text

Preamble

Title: Technology Creates Excellence, Intelligence Empowers Media—An Analysis of CMG's Converged Innovation and Development in Two Sessions Coverage from 2021

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Abstract: The convening of the 2021 Two Sessions held profound significance and captured worldwide attention. Amid pandemic prevention and control challenges, major domestic media outlets demonstrated innovation by integrating technological means and creative expression methods. Centered on its

"5G+4K/8K+AI" strategy, China Media Group (CMG) deployed a new layout during the Two Sessions, extensively employing new technologies such as 8K, AI, and VR to innovate reporting models and create a matrix of new media products for dissemination. This approach led audiovisual communication for new mainstream media, demonstrating the responsibility and commitment of national mainstream media through converged innovation.

Keywords: Two Sessions; China Media Group; technological innovation; 8K ultra-high definition; VR; C+ True Detective

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1. Overview

The Fourth Session of the 13th National People' s Congress and the Fourth Session of the 13th National Committee of the Chinese People' s Political Consultative Conference (CPPCC) were convened at a critical moment as the Party approached its centennial anniversary and at the historical intersection of the "Two Centenary Goals." These sessions held extraordinary significance and captured worldwide attention. During these sessions, CMG' s 8K achievements display at the Media Center attracted numerous Chinese and foreign journalists to experience China' s latest ultra-high-definition application technologies. At the residences of some delegates, many representatives enjoyed CMG' s first 8K Spring Festival Gala and the first 8K documentary "Beautiful China" during meeting breaks, experiencing the exquisite and realistic visuals and colorful visual impact of 8K ultra-high-definition television. This year, the "CPPCC Member Corridor" live coverage provided 4K public signals for the first time, marking the full transition to 4K throughout the entire process—from production at the news site to signal distribution at CMG.

In actively building an "all-media communication system rooted in content construction, supported by advanced technology, and guaranteed by innovative management" [1], CMG centered on its "5G+4K/8K+AI" strategy. Leveraging its all-media communication platform cluster with "audiovisual" content at its core, CMG led mainstream public opinion through powerful columns, innovative programs, and converged products. During the Two Sessions, CMG deployed a new layout, extensively employing new technologies such as 4K/8K, VR, and AI to innovate reporting models and create a matrix of new media products for dissemination. This achieved the integration of traditional broadcasting content resources with new technological means, leading audiovisual communication for new mainstream media.

2.1 Leading 8K Ultra-High Definition: Innovative Live Broadcasting and Multi-Screen Linkage

CMG' s Two Sessions coverage achieved "cross-media live broadcasting." With robust technical support and resource advantages, it realized integrated linkage between "real-time live broadcasting + integrated reporting" and "traditional large screen + mobile small screen," amplifying communication impact.

Real-time Live Broadcasting + Integrated Reporting: CMG vigorously implemented its 5G+4K/8K+AI strategy, employing domestically developed 8K acquisition, production, transmission, distribution, and terminal presentation systems to achieve the world' s first 8K ultra-high-definition television live broadcast and television broadcasting in a 5G network environment [2]. On February 1, CMG' s 8K ultra-high-definition trial channel launched. On New Year' s Eve, CMG achieved the world' s first 8K ultra-high-definition live broadcast of the Spring Festival Gala. During the Two Sessions, CMG transmitted the 8K ultra-high-definition channel trial broadcast signals via IP networks to the Media Center and some delegate residences. The Media Center hosted multiple press conferences and provided interview services for journalists. CMG' s 8K achievements display was set up in the first-floor lobby of the Media Center, attracting many Chinese and foreign journalists daily to experience China' s latest ultra-high-definition application technologies.

CCTV News New Media launched the special Two Sessions live program "Cloud Listening to Sessions, Watching Performance of Duties," which had accumulated 61.5 million views across all platforms by March 13. After the opening meeting, the current affairs team rapidly edited and produced over ten minutes of current affairs news, broadcasting it in prime positions on programs such as "News Broadcast" and rolling it out on news channels. Immediately afterward, they produced minimalist graphics like "Simplified Government Work Report Here" and "50 Major Tasks to be Done This Year!" This model of front-end linear live broadcasting combined with rapid back-end integrated editing not only delivers the strong sense of presence from television live broadcasting but also creates excellent communication momentum through secondary dissemination.

Traditional Large Screen + Mobile Small Screen: While long-form videos on traditional television represent existing assets, short videos on mobile platforms represent incremental growth. Leveraging television large screens as an entry point, CMG strengthened user-centric and traffic-oriented thinking through mobile platforms such as Yangshipin, "Weibo and WeChat," and third-party new media platforms, deeply cultivating content better suited for mobile small screens. On the afternoon of March 4, during the opening of the Fourth Session of the 13th CPPCC National Committee, CPPCC member and China Disabled Persons' Art Troupe Director Tai Lihua "sang" the national anthem in sign language. This refreshing "sign language version" of the national anthem (the "National Standard Sign Language Scheme for the National Anthem of the People' s Republic of China") officially took effect on March 1. CCTV

News captured this detail, supplemented it with internet-savvy subtitles and music, and rapidly launched the exclusive video "When the National Anthem Played in the Great Hall of the People, This Detail Was Moving," distributing it across multiple new media platforms. This less-than-one-minute short video both promoted the implementation of China' s latest sign language policy and demonstrated care for the deaf community, evoking emotional resonance through national spirit. Netizens commented: "Silent power, patriotic heart" and "Most beautiful 'translation.' "

CCTV.com' s "Quick Look" column produced and released the short video "Quick Look at Two Sessions Vaccines, Poverty Alleviation, Winter Olympics··· The First CPPCC Press Conference Answered These Hot Issues," launching it across multiple platforms and displaying it on 10,431 screens across 73 stations in the Beijing-Hong Kong subway, achieving over 27 million plays across the network.

2.2 AI Empowerment: Driving Media Innovation and Development

The year 2021 holds special importance in China' s modernization process, with heightened public attention to critical "news moments" such as the government work report and speeches by Party and state leaders during delegation deliberations. CMG comprehensively optimized its reporting logic, transforming from text products to audiovisual products. Using AI as a pioneering force in content creation and adopting an "intelligent" production mindset, CMG re-innovated current affairs reporting products, updating the expression tone of serious topics to align with contemporary contexts led primarily by youth groups.

During the 2021 Two Sessions, CCTV.com launched the special program "C+ True Detective," featuring the debut of CMG' s digital virtual editor Xiao C. This fresh, unique, and entertaining approach to Two Sessions reporting quickly gained popularity, particularly among young netizens. The "3D hyper-realistic digital human"became an innovative expression in CMG's Two Sessions coverage and successfully "broke circles."

C+ True Detective: The host "Xiao C" is a 3D hyper-realistic virtual digital human driven by AI facial recognition, conducting cloud-connected interviews with representatives and committee members and completing multiple interview live broadcasts, creating a new and interesting human-computer interaction scenario. Relying on CCTV.com' s latest AI middle-platform technology, host "Xiao C" possesses more subtle facial expression changes and can complete higher-precision, higher-fidelity action commands. The "C+ True Detective" column was the first to organically combine 3D hyper-realistic virtual human technology with cloud connection technology, largely solving the problem of inability to conduct face-to-face interviews during pandemic prevention and control. As a new achievement of CMG' s triple-network AI editorial department, this human-computer interaction reporting model is full of technological sense,

freshness, and interest, attracting attention from numerous young netizens and providing new ideas for media convergence at the technical level and for creating brand-new reporting scenarios.

Additionally, CCTV.com launched "AI Assistant Takes You Into the Ministers' Corridor," using an "AI light interaction" model to transform the Ministers' Corridor Q&A into exclusive "one-on-one interaction" for netizens, breaking temporal and spatial barriers and providing users with a strong sense of interaction and presence. For the dissemination of Two Sessions topics, this spatially-driven intelligent media innovation product is obviously softer, more disseminable, and more acceptable. While presenting ministers' good images, it also enhanced netizens' sense of participation and gain regarding the Two Sessions, focusing on establishing an immediate usage experience of "related to me." This experience depends on detailed product settings. For example, the sharing segment of "AI Assistant Takes You Into the Ministers' Corridor" simulates a mobile phone lock screen interface, presenting a creative pop-up box of "Minister Replied to You" through username authorization. In fact, the closer it approaches users' online behaviors in network life and the more accurately it restores familiar scenes of their mobile phone usage, the easier it is to connect with individual netizens' "usage tracks." The H5 interactive product "Two Sessions 'Cloud Interview' " adopts an interactive "group chat" model, guiding users to actively share on social platforms, promoting social connection and dissemination, and enhancing user stickiness.

The 3D hyper-realistic digital human "Digital Editor" and "Two Sessions AI Assistant" launched this time represent important attempts by CMG to expand AI' s application boundaries in major news reporting and explore more possibilities of "news reporting + AI," providing vivid practical samples for promoting the integration and innovation of technology and media.

2.3 VR Offers a Different Perspective on the Two Sessions

In video reporting innovation, CMG launched multiple VR products during this year' s Two Sessions to compensate for the limitations of traditional video reporting in landscape presentation and to truly reflect local changes and Two Sessions topics.

During the 2021 Two Sessions, CMG launched the series "VR Takes You to Places Xi Jinping Has Visited." This series followed the General Secretary' s "delegation group visits," interpreting his speech spirit from inside the venue and sorting out hot topics of public concern, then extending outside the venue. VR lenses took netizens with one click to "travel" to the original locations of delegations, using vivid, direct 360° panoramic images to truly reflect local development achievements and people' s livelihood changes, creating a good effect of resonance and correspondence between inside and outside the Two Sessions venue. Additionally, this reporting integrated diverse expression methods including news videos, AI voice, aerial photography, hand-drawn illustrations,

data, and graphics, achieving "visualization of achievements and data."

In text reporting innovation, based on massive data, computing power, and artificial intelligence algorithms, CMG launched the intelligent media product "AI Looks at Two Sessions," interpreting high-frequency words from the General Secretary' s Two Sessions speeches over the years since the 18th Party Congress, key content of government work reports, and topics of netizen concern from multiple dimensions and comprehensively, assisted by rich forms such as charts and animated graphics. This design leverages a "technology gene" to empower innovation in Two Sessions text reporting and realizes a new combination of "current affairs + AI." For example, "AI Looks at Two Sessions | 46 'Delegation Group Visits'in 8 Years, What High-Frequency Words Did the General Secretary Use?" relied on the artificial intelligence "I-Learning Intelligent Database" to summarize, sort out, and conclude relevant reports, "highlighting key points" for young netizens who prefer light reading through clear and intuitive word cloud images.

On March 8, CMG launched "VR Takes You to See the Ecological 'Butterfly Change' of Beautiful Qinghai That the General Secretary Cares About." Centered on the General Secretary' s participation in the Qinghai delegation deliberation and focusing on the theme of "adhering to ecological priority, promoting high-quality development, and creating high-quality life," this report focused on the earth-shaking changes in Qinghai' s ecological governance, industrial development, and livelihood security in recent years. Through VR panoramas, GIF animations, short videos, and other progressive reporting forms, it told a unique Qinghai development story. The report was recommended on CCTV.com, Toutiao, and multiple platforms, fermenting dissemination across all terminals.

2.4 Converged Media Interactive Products: Opening Leader Thought Dissemination Through Youthful Expression

On March 9, CMG launched the interactive poster "Guess Which Flower I Am," 切入 colorful ethnic costumes, using hand-drawn cartoon images to 拉近 distance with youth groups, then increasing user stickiness through quiz interaction. Combining warm stories of the General Secretary with ethnic minority groups, it demonstrated his care and concern for ethnic minorities and conveyed his thought on the Chinese national community consciousness. The innovative current affairs expression tone and "unified" converged media manifestation achieved "stronger positive energy and higher main melody" through quality content. This planning was forwarded by PC and mobile terminals of major websites.

In recent years, CMG has produced vivid current affairs reporting product lines and "source" creative micro-video product lines, precisely occupying the public opinion high ground with mainstream quality. The intelligent upgrade of cur-

rent affairs products in this Two Sessions coverage essentially relies on the deep cultivation of the current affairs content "source pool," using intelligent technology to accurately categorize and amplify key points, ensuring that technology always serves mainstream value dissemination. For example, the "I-Learning Intelligent Database" relied upon by "AI Looks at Two Sessions" possesses comprehensive intelligent news material data and has developed functions such as intelligent archiving, multi-strategy search, precise statistics, and graph association, pioneering new ideas for news reporting in the new era.

3.3 Virtual Reality Technology

Theoretically, virtual reality (VR) is a computer simulation system that can create and experience virtual worlds. It uses computers to generate a simulated environment that immerses users in that environment. VR technology utilizes real-life data, generates electronic signals through computer technology, and combines them with various output devices to transform them into phenomena that people can perceive. These phenomena can be real objects from reality or substances invisible to the naked eye, expressed through three-dimensional models [4]. Because these phenomena are not directly visible to us but are simulated real worlds created by computer technology, they are called virtual reality.

A typical application of VR is panoramic video, which can be played on spherical or cylindrical screens to provide an immersive experience. CMG' s VR adopts fully platform-independent research and development technology, independently implementing functions including backend uploading, VR texture transcoding, multi-bitrate production and distribution, and a player supporting PC and mobile browser viewing.

Among these, to address the challenge that VR content consumes large bandwidth and makes it difficult to balance clarity and smoothness, CCTV.com actively tracked new technology trends and closely integrated them with actual business scenarios to strive for technological breakthroughs. Originally, producing raw VR videos mostly used the Equirectangular Projection (ERP) method for texture mapping. This compromise method would cause high-quality areas to concentrate at the "poles" like the North and South due to uneven pixel density distribution, while the "equator" area had the worst image quality. This contradicts conventional filming techniques that place subjects in the center of the frame, resulting in blurred subjects while irrelevant parts like the sky and floor were clearer, which did not meet audience viewing expectations.

To solve this problem, CCTV.com independently developed corresponding backend transcoding and VR players based on Equi-Angular Cubemap (EAC) texture technology. This can achieve the same clarity while consuming only 60%-75% of the bandwidth required by ERP encoding, realizing reduced bandwidth costs without degrading user experience. Additionally, after independent upgrades and transformations on CCTV.com' s self-developed extreme

high-definition scene encoding cluster platform, by optimizing backend texture transcoding processing methods, it added transcoding capabilities supporting various VR formats (ERP, EAC, Cubemap, ESP, etc.), significantly improving transcoding quality and speed. What previously took several hours can now be completed in minutes for video production and CDN distribution.

To achieve multi-browser compatibility, CCTV.com independently developed a full-featured VR player based on H5 basic frameworks such as WebGL, WebASM, and WebAudio, supporting multiple VR technologies including ERP, CubeMap, and EAC. It supports live and on-demand functions from 1080P to 8K and is widely compatible with Safari and Chrome browsers in Windows/Mac PC, iOS, and Android operating systems.

Relying on the above technologies, 360-degree cloud viewing can be achieved, with VR panoramic ultra-high-definition restoring real scenes at nearly 100-megapixel levels, while simultaneously achieving three-dimensional space reconstruction. Wearing VR glasses provides a 6DOF spatial freedom experience. Additionally, integrating diverse information technologies such as polygonal video, AI voice, and embedded graphics greatly enhances product interactivity, technological sense, and information volume, providing an innovative expression method for information display.

3.4 Natural Language Processing Technology

"I-Learning" is China' s first AI innovation product for current affairs, primarily used to assist current affairs editors in topic planning. This system is China' s most comprehensive and intelligent leader material database. By comprehensively collecting Xi Jinping' s related images, videos, audio, publicly published literature, governance records across various fields, and CCTV' s large-scale political commentary films, it has been built into a fully functional "current affairs encyclopedia." This product combines artificial intelligence and big data, possessing multiple underlying capabilities including intelligent archiving, multi-strategy search, precise statistics, and graph association. It is practically applied in current affairs topic planning, current affairs manuscript verification, and current affairs event statistics, effectively assisting editors in planning topics and improving creation and production efficiency. Among these, the constructed current affairs knowledge graph is the product' s core highlight.

According to business scenario innovations, it defines graph schema construction methods, combines entity extraction and manual annotation, builds relationships between manuscripts and entities, and achieves associations among eight categories of entities: people, locations, items, phrases, literary works, poems, idioms, and events across different manuscripts. For each current affairs event, automatically constructed event graphs help editors quickly understand the full picture of events, extract key entities related to events, and then discover clues and refine highlights. The current affairs knowledge graph is the first application of knowledge extraction in the current affairs field, filling the gap in knowledge

structuring in the current affairs field caused by high text extraction difficulty.

The I-Learning upgrade project, built on the first-phase intelligent leader material database, further conducts deep knowledge structuring of manuscripts. Using NLP algorithms such as general entity recognition, nested entity recognition, dependency parsing, event type classification, and event element recognition, it extracts various current affairs news elements to generate knowledge graphs of Xi Jinping' s various schedules and integrates Xi Jinping' s theoretical thoughts to build a structured database, achieving multi-dimensional interpretation of leader reporting.

Natural language processing technology and knowledge graph technology play significant roles in this process. Natural language processing technology can first segment Chinese articles, breaking coherent articles into meaningful words. Then, using syntax tree parsing technology, it parses the semantics in sentences and relationships between entities.

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