

THIRD GENERATION AVS VIDEO CODING STANDARD (AVS3): FEATURES AND APPLICATIONS

(LIVE WEBINAR, 9 APRIL, BY YUN ZHOU, ACADEMY OF BROADCASTING SCIENCE (ABS), NRTA)

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The Speaker

Third Generation AVS Video Coding Standard (AVS3): Features and Applications

She received the B.S. and M.S. degree from Beijing University of Posts and Telecommunications, Beijing, China, in 2013. She is currently serving as a Senior Engineer at Academy of Broadcasting Science (ABS), National Radio and Television Administration (NRTA). She has dedicated years to advancing the frontiers of technology in broadcasting and television. Her main research interests are related to Ultra-High Definition Television (UHDTV), audio-visual coding, and immersive media technologies. She has got involved in the establishment of broadcasting industry standards such as AVS2 and AVS3 coding standards in China.



Zhou Yun
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On 9 April 2024, the Asia Pacific Broadcasting Union hosted a webinar titled “Third Generation AVS Video Coding Standard (AVS3): Features and Applications”, presented by **Ms Zhou Yun**, Senior Engineer at the Academy of Broadcasting Science, NRTA-China. The session provided an in-depth exploration of AVS3, highlighting its features, applications, and the advancements it brings to video coding technology.

Zhou Yun began by introducing the basic concepts of video coding, also known as video compression. Video coding aims to reduce the amount of video data while maintaining a certain level of quality. This process involves an encoder and a decoder system, collectively known as a codec. The encoder compresses the video data, which is then transmitted or stored, and the decoder reconstructs

the original video data for display.

The discussion moved on to the four main types of redundancies in video coding: spatial, temporal, visual, and statistical. Zhou explained how these redundancies are exploited to achieve compression. For instance, temporal redundancy leverages the similarities between consecutive frames to reduce the bit rate.

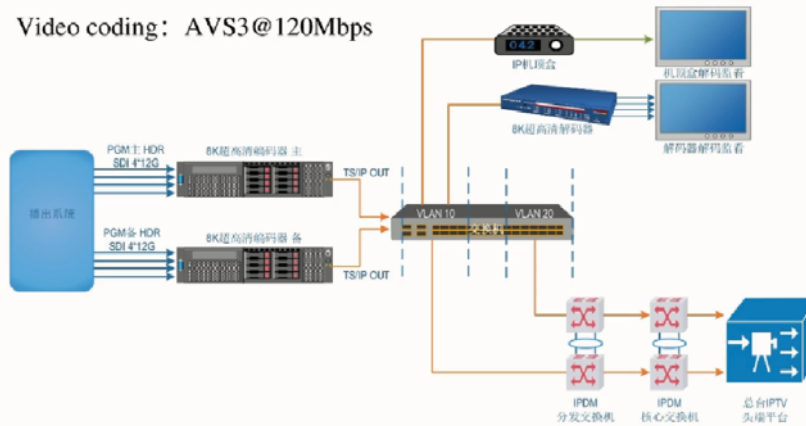
The presentation provided an overview of the evolution of video coding standards, both internationally and within China. International standards such as MPEG and ITU-T's H.264 and H.265 were mentioned alongside China's own AVS standards. Zhou highlighted the continuous efforts of the AVS working group in China, which has developed AVS1, AVS2, and now AVS3 over the past two decades.

Application of AVS3

8K channels launched in China

CCTV 8K

- Began trial broadcasts in February, 2021
- Video Format: 7680×4320/50P/10bit/HLG/BT.2020
- Video coding: AVS3@120Mbps



Zhou Yun detailed the key features of the AVS3 standard, emphasizing its advanced and efficient video coding capabilities. AVS3 achieves significant bit rate savings compared to its predecessors and other international standards. The development process of AVS3 was outlined, including its two-phase approach that resulted in substantial coding gains.

1. **Flexible Partition Mechanism:** AVS3 supports a more flexible block structure, adapting to higher resolution videos like 8K. It uses binary tree and extended coding tree partitions to enhance prediction accuracy.
2. **Improved Prediction and Transform:** The standard introduces new inter and intra-prediction modes, motion vector prediction techniques, and adaptive transform methods to improve compression efficiency.
3. **Enhanced Filtering Techniques:** AVS3 incorporates advanced filtering techniques such as deblocking and sample adaptive offset filters to improve video quality by reducing artifacts.

The webinar included a performance evaluation of AVS3, showing its comparable efficiency to H.266 (VVC) while achieving a 50% bit rate reduction compared to AVS2 and HEVC. Zhou Yun also discussed the practical applications of AVS3 in various domains, such as 8K UHD TV broadcasting, real-time software encoding, and hardware support for consumer electronics.

AVS3 has been adopted as a broadcasting industry standard in China, with applications spanning satellite, cable TV, IPTV, and mobile networks. The webinar



highlighted several successful deployments, including the first 4K live TV channel using AVS2 and the recent launch of 8K UHD TV channels by China Media Group and Beijing Radio Television.

Zhou Yun concluded the webinar by summarizing the significance of AVS3. As the third generation of video coding standards in China, AVS3 offers advanced and efficient video coding solutions, playing a crucial role in the promotion and application of 4K and 8K UHD TV. The standard's ability to achieve substantial bit rate savings while maintaining high video quality positions it as a key technology for the future of broadcasting.

The webinar provided valuable insights into the technological advancements and practical applications of AVS3, showcasing China's leadership in the development of cutting-edge video coding standards. The session was well-received, offering attendees a comprehensive understanding of AVS3's capabilities and its impact on the broadcasting industry. ■