Standard-related patent landscape: AVC

Patent Mapping to the AVC standard in LexisNexis® IPlytics®

General Scope

AVC, which stands for Advanced Video Coding, represents a widely adopted standard in the domain of video compression. Also known as H.264 or MPEG-4 Part 10, AVC is designed to efficiently compress and transmit video data, ensuring high-quality visuals while optimizing bandwidth usage. It plays a pivotal role in video streaming, video conferencing, digital television, and various multimedia applications. The AVC standard focuses on achieving a balance between compression efficiency and video quality, making it a cornerstone technology for delivering seamless and high-resolution video content across diverse platforms.

References

- As stated by the International Telecommunication Union (ITU), AVC is a globally recognized video coding standard that "provides an advanced compression technology for video coding, delivering superior video quality while efficiently utilizing available bandwidth." The ITU emphasizes the widespread adoption of AVC in broadcasting, video conferencing, and internet streaming services, highlighting its role in shaping the digital video landscape.
  Source: *itu.int*

- Industry reports from the Video Coding Experts Group (VCEG) and the Moving Picture Experts Group (MPEG) underline the significance of the AVC standard in modern multimedia applications. These groups, responsible for the development of AVC, highlight its broad compatibility and integration into a variety of consumer electronics, professional video equipment, and online streaming platforms, making it a fundamental technology for video content delivery.
  Source: *vceg-mpeg.org*

AVC standard	Topics (positive concepts)
Relevant concepts	▪ **H.264 Features/Components:** Macroblock Layer: ▪ Macroblock is the basic unit for the coding process in a picture. ▪ Consists of a 16x16 block of luma samples and two corresponding blocks of chroma samples. ▪ The blocks can be further split up into smaller partitions. Network Abstraction Layer Unit (NAL Unit): ▪ A syntax structure containing an indication of the type of data to follow and bytes containing that data in the form of an RBSP interspersed as necessary with emulation prevention bytes. Intra Prediction: ▪ Intra Prediction modes in H.264 improve the compression, exploiting spatial redundancy. ▪ 9 Modes of Intra Prediction for a 4x4 sub-block (DC Mode + 8 angular intra prediction modes). Intra Prediction: ▪ Inter prediction involves using previously encoded frames as references to predict the current frame's pixels. ▪ H.264 uses block-based motion compensation. Transformation and Quantization: ▪ Residuals obtained from Intra & Inter Prediction are transformed using Integer Discrete Cosine Transform (IDCT). ▪ Quantization – Purpose of quantization is to map the output values from the transformation, which are continuous, onto discrete values that can be coded into the bitstream. In-Loop Filtering: ▪ In-loop filtering is a process used to reduce or completely remove coding artifacts. ▪ H.264 incorporates a deblocking filter. Entropy Coding: ▪ Reduces the average bitstream length, or equivalently, the average number of bits required to represent information within a picture. ▪ H.264 uses Context-Based Adaptive Binary Arithmetic Coding (CABAC) and Context-Based Adaptive Variable Length Coding (CAVLC).

AVC standard	Topics (negative concepts)
No relevant concepts	Image Compression: ▪ Image compression shares similar concepts to video compression (e.g. Transform Coding, Quantization and Entropy Coding). Image compression has its own set of standards including JPEG, PNG, GIF etc. Audio Coding: ▪ Shares similar concepts to video compression (e.g. Transform Coding, Quantization and Entropy Coding). Audio coding standards include Advanced Audio Coding (AAC), MP3 etc. Point Cloud Compression (PCC): ▪ Point Clouds are sets of tiny "points" grouped together to make a 3D image. Point Cloud has become a popular method for AR and VR video composition and was standardized in 2020 (V-PCC, S-PCC & L-PCC). ▪ **H.26X Features/Components (Not in H.264):** Coding Tree Units (CTU) / Largest Coding Unit (LCU): ▪ Introduced in H.265 as an improvement to the macroblock layer. Provides a hierarchical and flexible structure for encoding and decoding video frames efficiently. Quadtree with Nested Multi-Type Tree: ▪ Introduced to H.266 as an improvement to block partitioning that supports Binary-Tree and Ternary-Tree splits in both vertical and horizontal directions. Increased Intra Prediction Modes: ▪ Increased Intra Prediction modes in H.265/H.266 which improves the accuracy of the prediction. Discrete Sine Transform (DST): ▪ Initially introduced in H.265 as a transforming method. It is used alongside Integer Discrete Cosine Transform (IDCT). Dependent Quantization: ▪ H.266 adopts dependent quantization, which can be a form of sliding block vector quantization. In-Loop Filtering: ▪ Further In-Loop Filtering methods were introduced to following standards including the Sample Adaptive Offset Filter, Adaptive Loop Filter, Cross-Component Adaptive Loop Filter, and Luma Mapping with Chroma Scaling.