TYPES OF VIDEO FORMATS AND THEIR

DIFFERENCES AND QUALITY

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Annotation: The progenitor of this format - MPEG-1, can not hesitate to call it truly revolutionary, because nothing like it existed before. The first video discs and satellite TV broadcasts in MPEG-1 format seemed like a miracle - such quality at such a relatively low bitrate. Compressed digital video had a quality comparable to that of a home VCR and had a lot of advantages over analog media. But time passed, progress in the field of digital technologies marched by leaps and bounds, and now the old man MPEG-1 needed a significant revision to keep up with the wonders of science and technology.

Key words : MPEG-1 format, MPEG-2 format, DVD-discs, video formats.

The result was the MPEG-2 format, which is not revolutionary, but rather an evolutionary format, resulting from the rework of MPEG-1 for the needs of customers. And the customers of this format were the largest mass media companies, which relied on satellite television and nonlinear digital video editing. This is now the MPEG-2 format is associated primarily with DVD-discs, and in 1992, when work on the creation of this format began, there were no widely available media on which it would be possible to record compressed MPEG-2 video information, but most importantly, computer equipment of that time could not provide the required bandwidth - from 2 to 9 Mbit per second. But this channel could provide satellite television with the latest equipment for those times. Such high requirements for the channel did not mean that the compression ratio of MPEG-2 is lower than that of MPEG-1, on the contrary,

it is much higher! But the image resolution and the number of frames per second are much higher, since it was the high quality with a reasonable bit rate that was the main goal that the customers set for the MPEG committee. It is thanks to MPEG-2 that the emergence of high-definition television - HDTV, in which the image is much clearer than that of conventional television, became possible.

Several years after the start of work, in October 1995, the first 20-channel TV broadcast using the MPEG-2 standard was carried out via the Pan Am Sat satellite television. The satellite has carried out and still carries out broadcasting in Scandinavia, Belgium, the Netherlands, Luxembourg, the Middle East and Africa. HDTV is currently undergoing extensive expansion in the Far East in Japan and China. Compressed MPEG-2 video streams with a bit rate of 9 Mbps are used for studio recording and high-quality digital video editing. With the advent of the first DVD-players with colossal storage capacity and relatively affordable price, MPEG-2 was naturally chosen as the main video compression format for its high quality and high compression ratio. It is films that use MPEG-2 that are still the main argument in favor of DVD. Let's finish with a retrospective review of MPEG-2 and try to delve into its internals. As already mentioned, the MPEG-2 format is evolutionary, which is why it is appropriate to consider it, comparing it with its eminent progenitor MPEG-1, indicating what was new in the original format.

It must be said that the MPEG-2 developers approached the solution of the problem in a creative way. The brainstorming session unleashed on the search for the possibility of removing extra bits and bytes from an already compressed image (remember, MPEG-1 already existed, now it was necessary to shrink it) was started from three sides at once. In addition to improving the compression algorithms for video (one side) and audio (other), an alternative way to reduce the size of the final file was found, which had not been used before.

As it became known from the studies of the MPEG committee, over 95% of the video data, one way or another, is repeated in different frames, and more than once. This data is ballast or, to use the term proposed by the MPEG committee, redundant. Redundant data is removed with little or no damage to the image; a single original fragment is substituted in place of the repetitive sections during playback. Along with the already known algorithms for compressing and removing redundant information, which we met in the MPEG-1 format, one more, apparently the most effective, has been added. After splitting the video stream into frames, this algorithm analyzes the contents of the next frame for duplicate, redundant data. A list of original parcels and a table of duplicate parcels are compiled.

It is also possible to load a separate quantization matrix just before each frame, which allows for very high image quality, albeit quite time consuming. How can I improve image quality using a quantization matrix? It's no secret that fast moving areas are traditionally a weak point for the MPEG family, while static areas of the image are encoded very well. From this it follows that it is impossible to encode statics and areas with movement in the same way. Since the image quality depends on the quantization stage, which largely depends on the used quantization matrix, changing these matrices for different parts of the video can improve the image quality.

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