



Survey of Compression Algorithm of MPEG Format

Hussein Nick Khah*

Islamic Azad University science and research branch Sirjan
Student of M.S. Computer
Sirjan, Iran
Hossein.nick.khah@live.com

Shirin Abbaslou

Islamic Azad University science and research branch Baft
Student of M.S. Computer
Sirjan, Iran
abbaslooshirin@gmail.com

Abstract: MPEG standard is one of the most important standards for compressing video files, which is one of the most significant standards from ISO/IEC Company. For this standard, different parts are defined. We try to define four basic part of it that are MPEG1, MPEG2, MPEG3, and MPEG4. In this article, we glanced up at different standard in different part and also we provide a short brief for their usage of them.

Keywords: Compression algorithm, ISO/IEC, MPEG, MPEG-1, MPEG-2, MPEG-3, MPEG-4

I. INTRODUCTION

MPEG video compression is used in many current and emerging products [1, 2]. It is at the heart of digital television set-top boxes, DSS, HDTV decoders, DVD players, video conferencing, Internet video, and other applications [3]. These applications benefit from video compression in the fact that they may require less storage space for archived video information, less bandwidth for the transmission of the video information from one point to another or a combination of both [4, 5]. Besides the fact that it works well in a wide variety of applications, a large part of its popularity is that it is defined in two finalized international standards, with a third standard currently in the definition process.

II. THE MPEG CATEGORIES

A. MPEG-1[6]:

This standard in 5 parts:

Part 1: (ISO/IEC 11172-1) System: addresses the problem of combining one or more data streams from the video and audio

Part 2: (ISO/IEC 11172-2) Video: specifies a coded representation that can be used for compressing video sequences

Part 3: (ISO/IEC 11172-3) Audio: specifies a coded representation that can be used for compressing audio sequences

Part 4: (ISO/IEC 11172-4) Compliance testing: specifies how tests can be designed to verify whether bit streams and decoders meet the requirements as specified in parts 1, 2 and 3 of the MPEG-1 standard

Part 5: (ISO/IEC 11172-5) Software simulation: technically not a standard, but a technical report, gives a full software implementation of the first three parts of the MPEG-1 standard. The source code is not publicly available.

B. MPEG-2[7]:

This standard in 9 parts:

Part 1: (ISO/IEC 13818-1) Systems: Addresses the combining of one or more elementary streams of video and audio, as well as, other data into single or multiple streams which are suitable for storage or transmission.

Part 2: (ISO/IEC 13818-2) Video: builds on the powerful video compression capabilities of the MPEG-1 standard to offer a wide range of coding tools.

Part 3: (ISO/IEC 13818-3) Audio: is a backwards-compatible multichannel extension of the MPEG-1 Audio standard.

Part 4: (ISO/IEC 13818-4) Conformance testing: it has been finally approved in March 1996.

Part 5: (ISO/IEC 13818-5) Software simulation: As in part 4.

Part 6: (ISO/IEC 13818-6) Extensions for DSM-CC: Digital Storage Media Command and Control (DSM-CC) is the specification of a set of protocols which provides the control functions and operations specific to managing MPEG-1 and MPEG-2 bit streams.

Part 7: (ISO/IEC 13818-7) Advanced Audio Coding (AAC): will be the specification of a multichannel audio coding algorithm not constrained to be backwards-compatible with MPEG-1 Audio.

Part 8: (ISO/IEC 13818-8): was originally planned to be coding of video when input samples are 10 bits. Work on this part was discontinued when it became apparent that there was insufficient interest from industry for such a standard.

Part 9: (ISO/IEC 13818-9) Extension for real time interface for systems decoders: is the specification of the Real-time Interface (RTI) to Transport Stream decoders which may be utilized for adaptation to all appropriate networks carrying Transport Streams.

Part 10: (ISO/IEC 13818-10) Conformance extensions for Digital Storage Media Command and Control (DSM-CC): is the conformance testing part of DSM-CC, under development.

C. MPEG-3:

Regulated by the Moving Picture Experts Group, MPEG-3 refers to coding standards for high definition television (HDTV) signals. The group is part of the International Organization for Standardization. Since 1988, the group has been responsible for creating both video and audio coding standards.

Regulated by the Moving Picture Experts Group (MPEG), MPEG-3 refers to coding standards for high definition television (HDTV) signals. The group is part of the International Organization for Standardization. These relate to the way digital broadcasts are transmitted and formatted to media, respectively. MPEG-3: The intention was to make this standard compatible with high definition TV (HDTV), but this became unnecessary when MPEG-2 extensions expanded that standard's ability to encompass HDTV.

D. MPEG-4[8]:

This standard is an ISO/IEC 14496 standard developed by MPEG (Moving Picture Experts Group), the committee that also developed the Emmy Award winning standards known as MPEG-1 and MPEG-2. These standards made interactive video on CD-ROM, DVD and Digital Television possible. The fully backward compatible extensions under the title of MPEG-4 Version 2 were frozen at the end of 1999, to acquire the formal International Standard Status early in 2000.

The MPEG-4 standard provides a set of technologies to satisfy the needs of authors, service providers and end users alike.

For authors, MPEG-4 enables the production of content that has far greater reusability, has greater flexibility than is possible today with individual technologies such as digital television, animated graphics, World Wide Web (WWW) pages and their extensions. Also, it is now possible to better manage and protect content owner rights.

For network service providers MPEG-4 offers transparent information, which can be interpreted and translated into the appropriate native signaling messages of each network with the help of relevant standards bodies. The foregoing, however, excludes Quality of Service considerations, for which MPEG-4 provides a generic QoS descriptor for different MPEG-4 media. The exact translations from the QoS parameters set for each media to the network QoS are beyond the scope of MPEG-4 and are left to network providers. Signaling of the MPEG-4 media QoS descriptors end-to-end enables transport optimization in heterogeneous networks.

For end users, MPEG-4 brings higher levels of interaction with content, within the limits set by the author. It also brings

multimedia to new networks, including those employing relatively low bitrates, and mobile ones. An MPEG-4 applications document exists on the MPEG Home page (mpeg.chiariglione.org), which describes many end user applications, including interactive multimedia broadcast and mobile communications. For all parties involved, MPEG seeks to avoid a multitude of proprietary, non-interworking formats and players.

III. ACKNOWLEDGMENT

This tutorial paper is just an introduction to some of the various components of MPEG video compression. Textbooks have been written about individual techniques such as the discrete cosine transform, and this and other components are the subjects of current academic and industry research. The reader is encouraged to search out more in-depth information on these topics, MPEG syntax, applications, etc., which can be found in the references listed below.

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