Chapter 1
A Review on the Technological and Literary Background of Multimedia Compression

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ABSTRACT

Data compression is the process of encoding data using a representation that decreases the overall size of data, where this reduction is possible when the original dataset contains some type of redundancy. Data compression, also called compaction, is the process of reducing the amount of data needed for storage or transmission of a given piece of information, typically using encoding techniques. Multimedia compression is employing tools and techniques to reduce the file size of various media formats, taking up less space. Both downloading and uploading a compressed file takes a lot less time. Data compression is one of the factors that contributed most to the great growth of information and communication technologies. Without compression, most consumer and entertainment technology products, which are today commonplace, would never have come into existence. This chapter provides an updated review of multimedia compression, showing and approaching its success relationship, with a concise bibliographic background, categorizing and synthesizing the potential of both technologies.

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INTRODUCTION

Internet users are consuming more and more multimedia content. It is estimated that the audiovisual format will account for 80% of online content by 2020. However, files are often heavy and may not run easily on all devices, so it is essential to understand what audio and video compression are (Kaplan et al., 2014).

Data compression is the process of encoding data using a representation that reduces the overall size of data. This reduction is possible when the original dataset contains some type of redundancy. Data compression, also called compaction, the process of reducing the amount of data needed for the storage or transmission of a given piece of information, typically by the use of encoding techniques. Multimedia compression is employing tools and techniques in order to reduce the file size of various media formats. Compression consists of reducing the physical size of blocks of information. A compressor uses an algorithm that serves to optimize the data by taking into account considerations specific to the type of data that will be compressed. Therefore, it is necessary to decompress to reconstruct the original data thanks to the algorithm opposite that used for compression (Sayood, 2017).

The compression method depends intrinsically on the type of data to be compressed, that is, it does not compress an image in the same way as an audio file. It is reducing a large amount of data in a file so that it takes up less space in the memory of a device or requires less of the broadband transmission. It can happen with or without loss, although most eliminate some almost imperceptible details. However, the greater the compression of audio and video, in general, results in lower quality, when compressing sound files, it reduces or simplifies bit repetition and eliminates data considered imperceptible to the human ear (Sayood, 2017; Uthayakumar et al., 2018).

Modern techniques explore the perception of the human ear and provide a compression that has apparently suffered no loss. The most popular is FLAC (Free Lossless Audio Codec: lossless compression) unlike most, it does not delete any information from the sound file but can reduce it by up to 50% in size. Despite the decrease, it can be up to ten times heavier than the MP3 format; ALAC (Apple Lossless; no loss): audio data compression produced by Apple; MP3 (MPEG-1/2 Audio Layer 3 with loss) the most popular audio compression format decreased file size considerably and still maintained its quality. It was officially discontinued in 2017, but is still very popular; Ogg Vorbis (lossy) an audio format that offers lower bitrates and higher quality than MP3. It is divided into two parts, Ogg, responsible for the metadata of the file, and Vorbis, encoder that compresses the songs; AAC (lossy) designed to be the successor to MP3, AAC is the standard format for playing audio on devices such as iPhone, iPad and PlayStation (Uthayakumar et al., 2018; Siegert et al., 2016; Firmansah et al., 2016; Ahmed et al., 2018; Hennequin et al., 2017; Hennequin et al., 2017).

Like audio, video compression involves reducing the size of the file, but in this case removing the parts that have already been projected. When it occurs without loss, no part of the data is discarded from the image. In lossy compression, the bits are selectively discarded. One of the ways to do this is to reduce the number of frames, which is usually the same as the TV (30 per second). Some of the most popular compression formats are MKV (Matroska Video) widely used for high-resolution video, MKV offers an effective compression and maintains quality. For this to occur, the codec encapsulates the audio, video, and subtitle tracks into a single container; MPEG (Moving Picture Experts Group) defined by ISO as the standard video compression format, it can vary between MPEG-1 (for VCD), MPEG-2 (DVD) and MPEG-4; AVI (Audio Video Interleave) like MKV, AVI encapsulates audio and video in a single container. With this, both are played synchronously. As it was produced by Microsoft, the format