Chapter 12
A Review of the Digital Cinema Chain: From Production to Distribution

Andreja Samčović
University of Belgrade, Serbia

ABSTRACT

This chapter deals with digital cinema chain as digital cinema (DC) offers an enhanced viewing experience for audiences, content flexibility, and distribution cost savings. Taking into account that the transition from physical media to electronic one represents a paradigm shift in video compression techniques and applications, archival requirements have been analyzed. A brief overview of the DC specification has been provided as was also discussed how JPEG 2000 was utilized within this specification. The current status of digital cinema was surveyed with a focus on the compression part of the DC system. To make the system practical and economic, various coding techniques have been applied to compress DC data for archive and distribution purposes. Standardization process for archival applications is considered. Features used for shot cut detection that are robust against the artifacts in film material have also been presented.

ABBREVIATIONS

The abbreviations used in this chapter are shown in Table 1.

INTRODUCTION

By definition, digital cinema (DC) is a digital technology which distributes and projects motion pictures instead of traditional analogue technology (DCI, 2007). It was conceived and designed to provide a completely new business model for producing digitized feature movies. Movies are shown on screens in digital cinema theaters throughout the world, without the necessity of film prints and film-based

DOI: 10.4018/978-1-4666-8850-6.ch012

Table 1. List of abbreviations

Abbreviation	Meaning
DC	Digital Cinema
JPEG	Joint Photographic Expert Group
DCI	Digital Cinema Initiatives
DVD	Digital Versatile Disc
DSM	Digital Source Master
DCDM	Digital Cinema Distribution Master
DCP	Digital Cinema Package
TIFF	Tagged Image File Format
MXF	Material eXchange Format
WAV	Waveform Audio File
DPX	Digital Picture eXchange
XML	eXtensible Markup Language
MPEG	Motion Picture Expert Group
PNG	Portable Network Graphics
3D	three-dimensional
M-JPEG	Motion-JPEG
KDM	Key Delivery Message
RSA	Rivest Shamir Adleman
USB	Universal Serial Bus
DLP	Digital Light Processing
ISO	International Organization for Standardization
DCT	Discrete Cosine Transform
HEVC	High Efficient Video Coding
PSNR	Peak Signal-to-Noise Ratio
JCT-VC	Joint Collaborative Team on Video Coding
SMPTE	Society of Motion Picture and Television Engineers
HD	High Definition
SD	Standard Definition

projectors. Digital Cinema is a distinct application; cinema is the latest and final analogue medium to go digital. The motion picture industry is one of many in the media sector consisting of mature players, which have entertainment focus in common. Both broadcasting and mobile media are digital services, while the motion picture industry is currently in the process of forming standards for digitization of its complete value chain. The speed of digitization of the entire chain of cinema in the whole world is different with other media; it is quite slow. This is particularly evident, when compared to the field of television.

In broadcasting, digital satellite and cable services have been available for quite some time, and terrestrial digital television broadcast has been introduced in a number of locations around the world (Yagi, Egami, Shimidzu, & Haseyama, 2013). Production studios, broadcasters and network providers have been