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Information technology — MPEG video technologies —

Part 2: Fixed-point 8×8 inverse discrete cosine transform and discrete cosine transform

Technologies de l'information — Technologies vidéo MPEG —

Partie 2: Transformation de cosinus discret inverse 8×8 *point fixe et transformation de cosinus discret*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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ISO/IEC 23002-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 23002 consists of the following parts, under the general title *Information technology — MPEG video technologies*:

— *Part 1: Accuracy requirements for implementation of integer-output* 8×8 *inverse discrete cosine transform*

— *Part 2: Fixed-point* 8×8 *inverse discrete cosine transform and discrete cosine transform*

— *Part 3: Representation of auxiliary video and supplemental information*

Introduction

A number of visual-coding-related specifications (see Ref. [1] to [6] in the Bibliography) include a requirement for decoders to implement an integer-output 8×8 inverse discrete cosine transform (IDCT) for the generation of inverse-transformed samples with a nominal range from 0 to (2^B)–1, or sample differences with a nominal range from -2^B to (2^B)–1, for some integer number of bits B, where B is greater than or equal to 8.

This part of ISO/IEC 23002 provides the following benefits.

- It provides an example IDCT (and also an example forward DCT) approximation method to ease the implementation community in their design of decoders and encoders.

- It can help to ensure that decoders are implemented in full conformance with relevant video and image coding specifications (such as those listed in Refs. [2] to [6] in the Bibliography). Decoders that are designed to use the specified method will be assured to conform to the IDCT conformance requirements of the relevant image and video coding standards.

- It specifies a single deterministic result as the output of an image or video decoding process, such that video analysis tools can operate on decoded video with precisely predictable results. This provides the assurance to source material providers, for example, of exactly what results will be obtained from a video target detector, segmentation mask operator, or other classification, analysis, or post-processing process that operates on the decoded video. Such certainty is not achievable without a deterministically-specified decoding result.

- It can improve the quality of delivered video and image representations, as encoders designed to target their encoding process for the IDCT approximation specified herein can be assured that the decoding process will be free of encoder-decoder drift error on all decoders that conform to this part of ISO/IEC 23002.

Information technology — MPEG video technologies —

Part 2:
Fixed-point 8×8 inverse discrete cosine transform and discrete cosine transform

1 Scope

This part of ISO/IEC 23002 specifies a particular implementation of an integer-output 8×8 IDCT that fully conforms to the accuracy requirements specified in ISO/IEC 23002-1 (see Ref. [7] in the Bibliography) and additionally meets or exceeds all accuracy requirements specified for IDCT precision in a number of international video coding standards (see Ref. [2] to [6] in the Bibliography). It additionally provides a (non-normative) specification of an integer-output 8×8 forward DCT based on the same factorization structure.