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Information technology — JPEG AI learning-based image coding system —

Part 5: File format

Reference number
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This document was prepared by ITU-T (as Rec. ITU-T T.840.5) and drafted in accordance with its editorial rules, in collaboration with Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Summary

Recommendation ITU-T T.840.5 | ISO/IEC 6048-5 specifies the container file format for the JPEG AI learning-based image coding technology as defined in Rec. ITU-T T.840.1 | ISO/IEC 6048-1.

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This Recommendation | International Standard was developed collaboratively by ITU-T Study Group 21 and ISO/IEC JTC 1/SC 29, and is published as common text Rec. ITU-T T.840.5 | ISO/IEC 6048-5.

History*

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* To access the Recommendation, type the URL https://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID.

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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – JPEG AI learning-based image coding system: File format

1 Scope

This Recommendation | International Standard specifies container file formats for JPEG AI codestreams as specified in Rec. ITU-T T.840.1 | ISO/IEC 6048-1 and Rec. ITU-T T.840.2 | ISO/IEC 6048-2. It defines file formats for working with image and motion sequence files on computer platforms, allowing Internet-based and other communications.

This Recommendation | International Standard uses already existing specifications for file formats and extends them for the embedding of JPEG AI codestreams.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- Rec. ITU-T T.840.1 (2025) | ISO/IEC 6048-1:2025 – *Information technology – JPEG AI learning-based image coding system: Core coding system.*
- Rec. ITU-T T.840.2 (2026) | ISO/IEC 6048-2:2026 – *Information technology – JPEG AI learning-based image coding system: Profiling.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- Rec. ITU-T H.273 (2024) | ISO/IEC 23091-2:2025, *Coding-independent code points for video signal type identification.*

2.3 Additional references

- ISO/IEC 14496-12:2022, *Information technology – Coding of audio-visual objects – Part 12: ISO base media file format.*
- ISO/IEC 23008-12:2025, *Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 12: Image File Format.*

3 Definitions

For the purposes of this Recommendation | International Standard, the terms and definitions given in Rec. ITU-T T.840.1 | ISO/IEC 6048-1, Rec. ITU-T T.840.2 | ISO/IEC 6048-2, ISO/IEC 14496-12, ISO/IEC 23008-12 and the following apply:

3.1 **box**: Structured collection of data describing the image or the image decoding process.

3.2 **JPEG AI codestreams**: Codestreams specified in Rec. ITU-T T.840.1 | ISO/IEC 6048-1 and Rec. ITU−T T.840.2 | ISO/IEC 6048-2.

3.3 **image collection**: Unordered set of images without an implied or signalled presentation order or presentation time stamps.

3.4 **motion sequence / movie**: Timed sequence of images.

3.5 **timed sequence**: Linearly ordered sequence of media entities such as images where each entity is presented at a well defined time stamp.

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4 Abbreviations

For the purposes of this Recommendation | International Standard, the abbreviated terms given in ISO/IEC 14496-12, Rec. ITU-T T.840.1 | ISO/IEC 6048-1, Rec. ITU-T T.840.2 | ISO/IEC 6048-2, ISO/IEC 23008-12 and the following apply:

HEIF	High Efficiency Image File format
ISOBMFF	ISO Base Media File Format

5 Naming conventions and formats for numerical values

The naming conventions and formats for numerical values used in this Specification, including the use of double quote and single quote, e.g., in "\016Motion JPEG AI" and 'jai0', are the same as in ISO/IEC 14496-12 and ISO/IEC 23008-12.

6 Conformance

This Specification shares common definitions for the structure of files (a sequence of objects, called boxes here, and atoms in other similar file formats) and a common definition of the general structure of an object (the size and type).

File formats representing either images, or image sequences shall be as specified in Annexes A and B. All these specifications require that readers ignore objects that are unrecognizable to them.

This Specification takes precedence over those on which it is based, in any case where there may be differences or conflicts; however, no such conflicts are known to exist.

For better readability and understanding, the syntax description for the different file formats is done in the same way as in the base formats.

7 Colour specification

JPEG AI (as defined in Rec. ITU-T T.840.1 | ISO/IEC 6048-1) describes only the encoded bitstream of an image. In order to properly display or interpret the image, it is required that the colour space of that image data is properly characterized. For this purpose, the respective container file format shall signal the correct colour space. The colour space signalled by the defined formats in this Specification for JPEG AI shall be as specified in Rec. ITU-T H.273 | ISO/IEC 23091-2.

8 Organization of the document

Annex A specifies the integration of JPEG AI codestreams in the ISO base media file format (ISOBMFF) (as defined in ISO/IEC 14496−12) for use of motion sequences as a movie in a container file.

Annex B specifies the integration of JPEG AI codestreams in the high efficiency image file format (HEIF) (as defined in ISO/IEC 23008-12) allowing the integration of both images as well as movies in one format.

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