



ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.263

(02/98)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Coding of moving
video

Video coding for low bit rate communication

ITU-T Recommendation H.263

(Previously CCITT Recommendation)

NETFLIX, INC

ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Characteristics of transmission channels used for other than telephone purposes	H.10–H.19
Use of telephone-type circuits for voice-frequency telegraphy	H.20–H.29
Telephone circuits or cables used for various types of telegraph transmission or simultaneous transmission	H.30–H.39
Telephone-type circuits used for facsimile telegraphy	H.40–H.49
Characteristics of data signals	H.50–H.99
CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.399

For further details, please refer to ITU-T List of Recommendations.

VIDEO CODING FOR LOW BIT RATE COMMUNICATION

Summary

This Recommendation specifies a coded representation that can be used for compressing the moving picture component of audio-visual services at low bit rates. The basic configuration of the video source coding algorithm is based on Recommendation H.261 and is a hybrid of inter-picture prediction to utilize temporal redundancy and transform coding of the remaining signal to reduce spatial redundancy. The source coder can operate on five standardized video source formats: sub-QCIF, QCIF, CIF, 4CIF and 16CIF, and can also operate using a broad range of custom video formats.

The decoder has motion compensation capability, allowing optional incorporation of this technique in the coder. Half pixel precision is used for the motion compensation, as opposed to Recommendation H.261 where full pixel precision and a loopfilter are used. Variable length coding is used for the symbols to be transmitted.

In addition to the basic video source coding algorithm, sixteen negotiable coding options are included for improved compression performance and the support of additional capabilities. Additional supplemental information may also be included in the bitstream for enhanced display capability and for external usage.

Source

ITU-T Recommendation H.263 was revised by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 6th of February 1998.

Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 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.

NOTE

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

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 1998

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

1	Scope	1
2	References	1
3	Brief specification	2
3.1	Video input and output	2
3.2	Digital output and input.....	2
3.3	Sampling frequency.....	2
3.4	Source coding algorithm	2
3.4.1	Continuous Presence Multipoint and Video Multiplex mode.....	3
3.4.2	Unrestricted Motion Vector mode	3
3.4.3	Syntax-based Arithmetic Coding mode	3
3.4.4	Advanced Prediction mode	3
3.4.5	PB-frames mode.....	3
3.4.6	Forward Error Correction.....	3
3.4.7	Advanced INTRA Coding mode.....	4
3.4.8	Deblocking Filter mode.....	4
3.4.9	Slice Structured mode	4
3.4.10	Supplemental enhancement information.....	4
3.4.11	Improved PB-frames mode	4
3.4.12	Reference Picture Selection mode	4
3.4.13	Temporal, SNR and Spatial Scalability mode.....	5
3.4.14	Reference Picture Resampling mode	5
3.4.15	Reduced-Resolution Update mode.....	5
3.4.16	Independent Segment Decoding mode.....	5
3.4.17	Alternative INTER VLC mode	5
3.4.18	Modified Quantization mode	5
3.5	Bit rate	6
3.6	Buffering	6
3.7	Symmetry of transmission.....	6
3.8	Error handling.....	6
3.9	Multipoint operation.....	7
4	Source coder	7
4.1	Source format	7
4.2	Video source coding algorithm	9
4.2.1	GOBs, slices, macroblocks and blocks	9
4.2.2	Prediction	11

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.