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Information technology — Coding of audio-visual objects —

Part 5: Reference software

AMENDMENT 27: Scalable complexity 3D mesh coding reference software

Technologies de l'information — Codage des objets audiovisuels —

Partie 5: Logiciel de référence

AMENDEMENT 27: Logiciel de référence d'encodage de maille en 3D de complexité atteignable

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Foreword

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Amendment 27 to ISO/IEC 14496-5:2001 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 14496-16:2009 introduced a scalable complexity mesh coding. This Amendment deals with the reference software of the SC3DMC tool.

Information technology — Coding of audio-visual objects —

Part 5:
Reference software

AMENDMENT 27: Scalable complexity 3D mesh coding reference software

Add 7.5 Reference Software for the Scalable Complexity 3D Mesh Compression:

7.5 Reference Software for the Scalable Complexity 3D Mesh Compression (SC3DMC)

7.5.1 Introduction

This is the description of the reference software for SC3DMC.

7.5.2 Description of Classes

7.5.2.1 SC3DMC Classes

Class	Function	Files	Description
SC3DMCEncoder	void SetIFS(IndexedFaceSet * ifs)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Links the S3DMCEncoder to the IndexedFaceSet to be compressed
SC3DMCEncoder	void SetParams(EncodingParams params)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Sets the encoding parameters
SC3DMCEncoder	unsigned int GetEstimatedCompressedStreamSize()	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Returns the number of bytes to be allocated for the compressed stream
SC3DMCEncoder	int Encode(unsigned char * compressedStream, unsigned int & compressedStreamSize)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Encodes the IFS

SC3DMCEncoder	void EncodeHeader (unsigned char * compressedStream, unsigned int & compressedStream Size)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Writes the header information to the binary stream
SC3DMCEncoder	void EncodeDataBuffer (unsigned char * compressedStream, unsigned int & compressedStream Size)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Writes the data buffer to the binary stream
SC3DMCEncoder	void Insert_Data(unsigned char * compressedStream, unsigned int & compressedStream Size, int symbol, int length)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Insert symbol into char array with length bits
SC3DMCEncoder	void Flush(unsigned char * compressedStream, unsigned int & compressedStream Size)	SC3DMC_SC3DMCEncoder.h SC3DMC_SC3DMCEncoder.cpp	Performing the zero-padding
SC3DMCDecoder	void SetIFS(IndexedFaceSet * ifs)	SC3DMC_SC3DMCDecoder.h SC3DMCDecoder.cpp	Connects the S3DMCdecoder to the output IFS
SC3DMCDecoder	IndexedFaceSet * GetIFS()	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Returns a pointer to the output IFS
SC3DMCDecoder	unsigned int GetStreamSize()	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Returns the size of the compressed bitstream
SC3DMCDecoder	int Decode(unsigned char * compressedStream, unsigned int compressedStream Size)	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Decodes the compressed stream
SC3DMCDecoder	void DecodeDataBuffer (unsigned char * &compressedStream)	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Decodes the buffer data

SC3DMCDecoder	bool DecodeHeader (unsigned char * & compressedStream	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Decodes the header information
SC3DMCDecoder	unsigned int ReadBitsFromStorage(unsigned int unReadLength, unsigned char * &compressedStream)	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Reads unReadLength bits from bitstream
SC3DMCDecoder	void CheckFlush(unsigned char * &compressedStream)	SC3DMC_SC3DMCDecoder.h SC3DMC_SC3DMCDecoder.cpp	Checks the zero-padding

7.5.2.2 QBCR Classes

Class	Function	Files	Description
QBCR_EncoderforMMW	DumpBitstream(string filename)	SC3DMC_QBCR_Encoder.cpp, SC3DMC_QBCR_Encoder.h	Dump the compressed bitstream into file
QBCR_EncoderforMMW	Encode_Geometry()	SC3DMC_QBCR_Encoder.cpp, SC3DMC_QBCR_Encoder.h	Encode the geometry of input mesh
QBCR_EncoderforMMW	Encode_Connectivity()	SC3DMC_QBCR_Encoder.cpp, SC3DMC_QBCR_Encoder.h	Encode the connectivity of input mesh
QBCR_EncoderforMMW	QuantizationGeometry(int QP)	SC3DMC_QBCR_Decoder.cpp, SC3DMC_QBCR_Decoder.h	Quantize with QP value
QBCR_DecoderforMMW	DecoderGeometry()	SC3DMC_QBCR_Decoder.cpp, SC3DMC_QBCR_Decoder.h	Decode the geometry of compressed bitstream
QBCR_DecoderforMMW	DecoderConnectivity()	SC3DMC_QBCR_Decoder.cpp, SC3DMC_QBCR_Decoder.h	Decode the connectivity of compressed bitstream
QBCR_DecoderforMMW	InverseQuantization(unsigned quantCoord, float quantRange, float quantMin, float quantValue)	SC3DMC_QBCR_Decoder.cpp, SC3DMC_QBCR_Decoder.h	De-Quantize with given parameter
QBCR_DecoderforMMW	ReadBitsFromStorage(unsigned int unReadLength)	SC3DMC_QBCR_Decoder.cpp, SC3DMC_QBCR_Decoder.h	Read unReadLength bits from the storage (buffer)

7.5.2.3 SVA Classes

Class	Function	Files	Description
SVA_EncoderforMMW	Encode_Geometry()	SC3DMC_SVA_Encoder.cpp, SC3DMC_SVA_Encoder.h,	Encode the geometry of input mesh with SVA method
SVA_EncoderforMMW	ConnectivityAnalyze()	SC3DMC_SVA_Encoder.cpp, SC3DMC_SVA_Encoder.h,	Analyze the connectivity to compute mode, position, difference of index value and direction
SVA_EncoderforMMW	Encode_Connectivity()	SC3DMC_SVA_Encoder.cpp, SC3DMC_SVA_Encoder.h,	Encode the analyzed vertex index with BPC
SVA_EncoderforMMW	Rotation(int faceIndex, int move)	SC3DMC_SVA_Encoder.cpp, SC3DMC_SVA_Encoder.h,	Rotate the given face “move” times
SVA_DecoderforMMW	DecoderGeometry()	SC3DMC_SVA_Decoder.cpp, SC3DMC_SVA_Decoder.h,	Decode the geometry of compressed SVA bitstream
SVA_DecoderforMMW	DecoderConnectivity()	SC3DMC_SVA_Decoder.cpp, SC3DMC_SVA_Decoder.h,	Decode the connectivity of compressed SVA bitstream
SVA_DecoderforMMW	InverseCircularDifference(unsigned int previous, int differential)	SC3DMC_SVA_Decoder.cpp, SC3DMC_SVA_Decoder.h,	Perform the inverse circular difference with the given parameters
SVA_DecoderforMMW	BPLInit()	SC3DMC_SVA_Decoder.cpp, SC3DMC_SVA_Decoder.h,	Initialize the BPC table for BPC decoding

7.5.2.4 TFAN Classes

Class	Function	Files	Description
BaseConnectivityDecoder	void SetTriangleList(int * triangles)	SC3DMC_BaseConnectivityDecoder.h SC3DMC_BaseConnectivityDecoder.cpp	Sets the array that will hold the decoded list of triangles
BaseConnectivityDecoder	void SetNTriangles(int nTriangles)	SC3DMC_BaseConnectivityDecoder.h SC3DMC_BaseConnectivityDecoder.cpp	Sets the number of triangles
BaseConnectivityDecoder	void SetNVertices(int nVertices)	SC3DMC_BaseConnectivityDecoder.h SC3DMC_BaseConnectivityDecoder.cpp	Sets the number of vertices

BaseConnectivityDecoder	int Decode(unsigned char * &compressedStream)	SC3DMC_BaseConnectivityDecoder.h SC3DMC_BaseConnectivityDecoder.cpp	Decodes the connectivity information
BaseGeometryDecoder	void SetGeometryList(float * geometry)	SC3DMC_BaseGeometryDecoder.h SC3DMC_BaseGeometryDecoder.cpp	Set the array that will hold the decoded geometry information
BaseGeometryDecoder	void SetNVertices(int nVertices)	SC3DMC_BaseGeometryDecoder.h SC3DMC_BaseGeometryDecoder.cpp	Sets the number of vertices
BaseGeometryDecoder	void SetDim(int dim)	SC3DMC_BaseGeometryDecoder.h SC3DMC_BaseGeometryDecoder.cpp	Sets the dimension of the geometry information
BaseGeometryDecoder	int Decode(unsigned char * &compressedStream)	SC3DMC_BaseGeometryDecoder.h SC3DMC_BaseGeometryDecoder.cpp	Decodes the geometry information
TFANConnectivityDecoder	void ReOrderTab(float * tab, int D, int nVertices)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Reorders the array of geometry according to the new order of triangles defined by the TFAN encoder
TFANConnectivityDecoder	void ReOrderTab(int * tab, int D, int nTriangles)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Reorders the connectivity array according to the new order of triangles defined by the TFAN encoder
TFANConnectivityDecoder	void ReOrderConnec(int * coordIndex, int nCoordIndex)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Reorders the connectivity array according to the new order of vertices defined by the TFAN encoder
TFANConnectivityDecoder	void ReOrderPerm(int * coordIndex, int nCoordIndex)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Reorders the connectivity array to inverse the permutation generated by the TFAN encoder

TFANConnectivityDecoder	void SetTrianglePermPres(int trianglePermPres)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Sets the parameter controlling the triangles permutation preservation
TFANConnectivityDecoder	void SetVertexOrderPres(int vertexOrderPres)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Sets the parameter controlling the vertex order preservation
TFANConnectivityDecoder	void SetTriangleOrderPres(int triangleOrderPres)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Sets the parameter controlling the triangles order preservation
TFANConnectivityDecoder	MultiVectOpt * GetTFans()	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Returns the list of triangle fans
TFANConnectivityDecoder	MultiVectOpt * GetV2T()	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Returns the vertex to triangles incidence information
TFANConnectivityDecoder	int Decode(unsigned char * &compressedStream)	SC3DMC_TFANConnectivityDecoder.h SC3DMC_TFANConnectivityDecoder.cpp	Decodes the connectivity information
TFANDecoder	void SetIFS(IndexedFaceSet * ifs)	SC3DMC_TFANDecoder.h SC3DMC_TFANDecoder.cpp	Links the TFANDecoder to the output IFS
TFANDecoder	IndexedFaceSet * GetIFS()	SC3DMC_TFANDecoder.h SC3DMC_TFANDecoder.cpp	Returns a pointer to the output IFS
TFANDecoder	unsigned int GetStreamSize()	SC3DMC_TFANDecoder.h SC3DMC_TFANDecoder.cpp	Returns the compressed binary stream size
TFANDecoder	DecodeTFANData (unsigned char * &compressedStream)	SC3DMC_TFANDecoder.h SC3DMC_TFANDecoder.cpp	Decodes the TFAN stream
TFANGeometryDecoder	void SetTriangleList(int * triangles)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Sets a pointer to the list of triangles used for prediction

TFANGeometryDecoder	void SetNTriangles(int nTriangles)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Sets the number of triangles
TFANGeometryDecoder	void SetPredMode(int predMode)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Sets the prediction mode
TFANGeometryDecoder	void SetTFANS(MultiVectOpt * tfans)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Sets a pointer to the triangle fans list
TFANGeometryDecoder	void SetV2T(MultiVectOpt * V2T)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Sets a pointer to the vertex/triangles incidence information
TFANGeometryDecoder	int Decode(unsigned char * &compressedStream)	SC3DMC_TFANGeometryDecoder.h SC3DMC_TFANGeometryDecoder.cpp	Decodes the geometry information
BaseConnectivityEncoder	void SetTriangleList(int * triangles)	SC3DMC_BaseConnectivityEncoder.h SC3DMC_BaseConnectivityEncoder.cpp	Sets the list of triangles to be encoded
BaseConnectivityEncoder	void SetNTriangles(int nTriangles)	SC3DMC_BaseConnectivityEncoder.h SC3DMC_BaseConnectivityEncoder.cpp	Sets the number of triangles
BaseConnectivityEncoder	void SetNVertices(int nVertices)	SC3DMC_BaseConnectivityEncoder.h SC3DMC_BaseConnectivityEncoder.cpp	Sets the number of vertices
BaseConnectivityEncoder	unsigned int GetEstimatedCompressedStreamSize()	SC3DMC_BaseConnectivityEncoder.h SC3DMC_BaseConnectivityEncoder.cpp	Returns the estimated stream size for the compressed connectivity information

BaseConnectivityEncoder	int Encode(unsigned char * &compressedStream, unsigned int & compressedStreamSize)	SC3DMC_BaseConnectivityEncoder.h SC3DMC_BaseConnectivityEncoder.cpp	Encodes the connectivity information
BaseGeometryEncoder	void SetGeometryList(float * geometry)	SC3DMC_BaseGeometryEncoder.h SC3DMC_BaseGeometryEncoder.cpp	Sets a pointer to the geometry information to be encoded
BaseGeometryEncoder	void SetNVertices(int nVertices)	SC3DMC_BaseGeometryEncoder.h SC3DMC_BaseGeometryEncoder.cpp	Sets the number of vertices
BaseGeometryEncoder	void SetNQuantizationBits(int nQBits)	SC3DMC_BaseGeometryEncoder.h SC3DMC_BaseGeometryEncoder.cpp	Sets the number of quantization bits for the geometry information
BaseGeometryEncoder	void SetDim(int dim)	SC3DMC_BaseGeometryEncoder.h SC3DMC_BaseGeometryEncoder.cpp	Sets the dimension of the geometry information
BaseGeometryEncoder	unsigned int GetEstimatedCompressedStreamSize()	SC3DMC_BaseGeometryEncoder.h SC3DMC_BaseGeometryEncoder.cpp	Returns an estimated size for the compressed geometry stream
BaseGeometryEncoder	int Encode(unsigned char * &compressedStream, unsigned int & compressedStreamSize)	SC3DMC_BaseGeometryEncoder.h BaseGeometryEncoder.cpp	Encodes the geometry information
TFANConnectivityEncoder	void ReOrderTab(float * tab, int D, int nVertices)	SC3DMC_TFANConnectivityEncoder.h SC3DMC_TFANConnectivityEncoder.cpp	Reorders the array of geometry according to the new order of triangles defined by the TFAN encoder
TFANConnectivityEncoder	void ReOrderTab(int * tab, int D, int nTriangles)	SC3DMC_TFANConnectivityEncoder.h SC3DMC_TFANConnectivityEncoder.cpp	Reorders the connectivity array according to the new order of triangles defined by the TFAN encoder