SMPTE STANDARD

Depth Map Representation

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Approved
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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in its Standards Operations Manual.

SMPTE ST 2087 was prepared by Technology Committee 10E.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

Depth information can be useful for improving a number of production and post-production processes. For example, accurate depth information is necessary for the adjustment of the camera point of view during post-production. Depth information can also be used to assist in the compositing of multiple elements in a production that includes live action and CGI, for the proper placement of overlays on multi-view content, and to improve the ability to render stereoscopic content for a wide variety of viewing environments. Depth information could also be included as part of the distribution package for multi-view content where getting the information close to the source is desirable.

Depth information can be derived from a number of sources including animation rendering, multi-camera capture, and on-scene depth measurements. Each captured or synthesized view can have its own depth map. Disparity maps can be more conducive to some operations so a direct conversion between depth and disparity representations is desirable.

It is expected that this information will be carried within a file structure defined in companion document(s).

1 Scope

This standard provides a data representation for depth information. This information allows for simple interchange during production and post-production, and provides the essence for distribution of single-view and multi-view content. The standard specifies a 32-bit floating point representation and a 16-bit floating point representation for depth information.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then Figures; and then any other language forms.

3 Normative Reference

The following standard contains provisions that, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

IEEE 754-2008, IEEE Standard for Floating-Point Arithmetic