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Information technology — Coded representation of immersive media —

Part 28: Interchangeable scene-based media representations

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Partie 28: Représentations de médias basés sur des scènes interchangeables

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Foreword

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

A list of all parts in the ISO/IEC 23090 series can be found on the ISO website.

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.

Introduction

Emerging display technologies capable of creating fully formed holograms, e.g. 3D aerial images comprised of waveforms emitted from a display panel surface, require input source media that are sufficiently dense in information such that each of the objects in a holographic visual scene is described in terms of its complete and explicit geometry, and surface properties to characterize how the surface responds to the presence of light. Such visual information can furthermore facilitate display technologies to produce visual scenes of objects that cannot be distinguished from the same objects when viewed in the natural world; i.e., the visual information of the media is sufficiently dense such that the display is enabled to produce a photorealistic result.

Commonly used raster media formats such as those specified in ITU-R BT.601, ITU-R BT.709, ITU-R BT.2020, ITU-R BT.2100 were originally developed to efficiently provide information sufficient for 2D displays to produce 2D visual presentations, albeit with varying degrees of spatial resolutions, frame rates, and pixel depth. These raster formats, however, neither provide sufficient information in a practical nor efficient manner, to enable a holographic display to produce holograms. As an alternative to raster media, 3D graphics formats used in digital content creation tools and production workflows offer a solution to provide sufficiently dense information to enable photorealistic results where raster formats do not. The use of 3D graphics technologies hence serves as a fundamental technology in enabling immersive displays to create their optimal visual presentations.

To date, immersive displays provide a media input interface that is capable of ingesting 3D graphics formats for presentation by the display. Such interfaces can be enabled and shipped as part of the onboard processing features in the display by use of game engine software development kits. However, 3D scene media that are targeted for processing by the display's choice of renderer must first be translated into a format that is consistent with the internal scene representations of the renderer. To facilitate the translation and distribution of 3D scene media into the renderer interface provided by the display, an independent mapping space (IMS) is specified as a part of the ISO/IEC 23090 series.

At the core of the IMS is a vocabulary of terms and definitions that can be used to annotate a scene graph or scene asset with metadata, i.e. to facilitate the translation of media from one format to another. Such translation from one format to another format is a commonly encountered challenge in the distribution of scene-based media, as a number of formats have emerged to gain popularity in various application areas, e.g., gaming, social media, e-commerce, and content production. The corresponding vocabulary of terms and definitions describes nodes, media formats, media attributes, and render processing instructions of commonly-used scene graph formats and media representations. Elements from the IMS can be used to annotate a scene graph or media format so that its translation to another format is more straightforward and consistently performed. Thus, the IMS facilitates the distribution and interoperability of a variety of scene-based media into render applications that are limited in the types of formats that they are designed to support.

Another application of this document is to guide the translation of media assets for use across a diverse set of applications comprising the Metaverse, e.g., gaming, social media, retail applications. In the absence of a common format that specifies media for use across the variety of Metaverse applications, the IMS can facilitate the translation from one asset representation to another.

Information technology — Coded representation of immersive media —

Part 28: Interchangeable scene-based media representations

1 Scope

This document specifies an architecture and data model for interchange of scene-based media for use in systems and applications that employ renderers for the presentation of immersive media, including audio, visual, tactile and other representations of media types.

The architecture and data model specified in this document applies to use cases where there is a need for interchange of scene-based media for presentation by systems with 3D render-based technologies. One specific application of this document is immersive display technologies that utilize a real-time renderer of 3D media to create their visual presentations, as opposed to a video decoder and renderer of 2D raster-based media. Another application of this document is for the distribution of media assets for use across a large variety of applications comprising the Metaverse.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 General

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
scene graph
general data structure commonly used by vector-based graphics editing applications and modern computer games, that arranges the logical and often (but not necessarily) spatial representation of a graphical scene; a collection of nodes and vertices in a graph structure

3.1.2
immersive technology media format
ITMF
suite of specifications developed by the Immersive Digital Experiences Alliance

3.1.3
node
fundamental element of the scene graph comprised of information related to the logical or spatial or temporal representation of visual or audio information