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Information technology — Computer graphics, image processing and environmental data representation — Live actor and entity representation in mixed and augmented reality (MAR)

Technologies de l'information — Infographie, traitement de l'image et représentation des données environnementales — Représentation d'acteurs et d'entités réels en réalité mixte et augmentée (MAR)



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 24, *Computer graphics, image processing and environmental data representation*.

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

This document defines the scope and key concepts of a representation model for a live actor and entity (LAE) to be included in a mixed and augmented reality (MAR) world. The relevant terms and their definitions, and a generalized system architecture, together serve as a reference model for MAR applications, components, systems, services and specifications. It defines representing and rendering an LAE in an MAR scene, and interaction interfaces between an LAE and objects in an MAR scene. It defines a set of principles, concepts and functionalities for an LAE applicable to the complete range of current and future MAR standards. This reference model establishes the set of required modules and their minimum functions, the associated information content, and the information models that shall be provided and/or be supported by a compliant MAR system. It includes (but is not limited to) the following content:

- an introduction to the mixed and augmented reality standards domain and concepts;
- a representation model for including an LAE in an MAR scene;
- 3D modelling, rendering and simulation of an LAE in an MAR scene;
- attributes of an LAE in an MAR scene;
- sensing representation of an LAE in an MAR scene;
- representation of the interfaces for controlling an LAE in an MAR scene;
- functionalities and base components for controlling an LAE in an MAR scene;
- interactive interfaces between an LAE and an MAR scene;
- interface with other MAR components;
- relationship to other standards;
- use cases.

The objectives of this document are as follows:

- provide a reference model for LAE representation-based MAR applications;
- manage and control an LAE with its properties in an MAR environment;
- integrate an LAE into a 2D and/or 3D virtual scene in an MAR scene;
- achieve interaction of an LAE with a 2D and/or 3D virtual scene in an MAR scene;
- provide an exchange format necessary for transferring and storing data between LAE-based MAR applications.

This document has the following document structure:

- [Clause 4](#) describes the concepts of LAE-based systems represented in MAR.
- [Clause 5](#) illustrates how a sensor captures an LAE in a physical world and a virtual world.
- [Clause 6](#) describes mechanisms to track the position of an LAE and specifies the role of a spatial mapper between physical space and the MAR space.
- [Clause 7](#) describes mechanisms to recognize the behaviour of an LAE and specifies an association or event between an MAR event of an LAE and the condition specified by the MAR content creator.
- [Clause 8](#) describes a scene, which consists of a virtual scene, sensing data, a spatial scene, events, targets and so on, for an LAE.

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- [Clause 9](#) describes how the MAR scene system renders the scene, LAE mapping, event and so on for presentation output on a given display device.
- [Clause 10](#) describes types of displays, including monitors, head mounted displays, projectors, haptic devices and sound output devices for displaying an LAE in an MAR scene.
- [Clause 11](#) identifies and describes virtual LAE, such as virtual 3D model (avatar) and virtual LAE, such as real human model in an MAR system.
- [Clause 12](#) makes statements regarding any system performance related issues of an LAE in MAR.
- [Clause 13](#) makes statements regarding any operational safety related issues of an LAE in MAR.
- [Clause 14](#) makes statements regarding any conformance related issues of an LAE in MAR.
- [Annex A](#) gives examples of representative LAE representation systems in MAR.