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Australian STANDARD®

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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)



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The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

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Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee IT-031, Modelling and Simulation.

The objective of this document is to define a reference model and base components for representing and controlling a single LAE or multiple LAEs in an MAR scene. It defines concepts, a reference model, system framework, functions and how to integrate a 2D/3D virtual world and LAEs, and their interfaces, in order to provide MAR applications with interfaces of LAEs. It also defines an exchange format necessary for transferring and storing LAE-related data between LAE-based MAR applications.

This document specifies the following functionalities:

(a) Definitions for an LAE in MAR.

(b) Representation of an LAE.

(c) Representation of properties of an LAE.

(d) Sensing of an LAE in a physical world.

(e) Integration of an LAE into a 2D/3D virtual scene.

(f) Interaction between an LAE and objects in a 2D/3D virtual scene.

(g) Transmission of information related to an LAE in an MAR scene.

This document defines a reference model for LAE representation-based MAR applications to represent and to exchange data related to LAEs in a 2D/3D virtual scene in an MAR scene. It does not define specific physical interfaces necessary for manipulating LAEs, that is, it does not define how specific applications need to implement a specific LAE in an MAR scene, but rather defines common functional interfaces for representing LAEs that can be used interchangeably between MAR applications.

This document is identical to, and has been reproduced from, ISO/IEC 18040:2019, *Information technology — Computer graphics, image processing and environmental data representation — Live actor and entity representation in mixed and augmented reality (MAR).*

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The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see http://patents.iec.ch).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

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.

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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.

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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)

1 Scope

This document defines a reference model and base components for representing and controlling a single LAE or multiple LAEs in an MAR scene. It defines concepts, a reference model, system framework, functions and how to integrate a 2D/3D virtual world and LAEs, and their interfaces, in order to provide MAR applications with interfaces of LAEs. It also defines an exchange format necessary for transferring and storing LAE-related data between LAE-based MAR applications.

This document specifies the following functionalities:

a) definitions for an LAE in MAR;

b) representation of an LAE;

c) representation of properties of an LAE;

d) sensing of an LAE in a physical world;

e) integration of an LAE into a 2D/3D virtual scene;

f) interaction between an LAE and objects in a 2D/3D virtual scene;

g) transmission of information related to an LAE in an MAR scene.

This document defines a reference model for LAE representation-based MAR applications to represent and to exchange data related to LAEs in a 2D/3D virtual scene in an MAR scene. It does not define specific physical interfaces necessary for manipulating LAEs, that is, it does not define how specific applications need to implement a specific LAE in an MAR scene, but rather defines common functional interfaces for representing LAEs that can be used interchangeably between MAR applications.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 18039, *Information technology — Computer graphics, image processing and environmental data representation — Mixed and augmented reality (MAR) reference model*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 18039 and the following apply.

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

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

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

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