

ICS 35.240
CCS L 81



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 44020-2024

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

信息技术 计算机图形图像处理和环境数据表示 混合与增强现实中实时人物肖像
和实体的表示

(English Translation)

Issued on: April 25, 2024

Implemented on: November 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and definitions, abbreviations
3.1 Terms and Definitions
3.2 Abbreviations
4 Concept of LAE representation in MAR
4.1 Overview
4.2 Components
5 LAE Capture and Sensors
5.1 Overview
5.2 Calculation View
5.3 Information View
6 LAE Tracker and Spatial Mapper
6.1 Overview
6.2 Calculation View
6.3 Information View
6.4 Examples of LAE Tracking and Spatial Mapping in MAR
7 LAE Identifier and Event Mapper
7.1 Overview
7.2 Identifier
7.3 Event Mapper
7.4 Event Execution
7.5 Examples of LAE Identification and Event Mapping in MAR
8 LAE scene representation
8.1 Overview
8.2 Scenario Description
9 Renderer 21
9.1 Overview
9.2 Calculation View
9.3 Information View

- 10 Display and User Interface
- 11 Extensions of Virtual Actors and Entities
- 12 System Performance
- 13 Security
- 14 Consistency 24
- Appendix A (Informative) Use Case Example
 - A:1 3D Virtual Studio
 - A:2 Event Mapping of LAE in MAR Scenario
 - A:3 Interactive control of virtual objects in MAR scenes through LAE actions
 - A:4 Enhancing Objects with Special Effects
 - A:5 3D Virtual Meeting
- Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting:

This document is equivalent to ISO/IEC 18040:2019 Information technology - computer graphics, image processing and environmental data representation - hybrid and Real-time portrait and entity representation in augmented reality:

Introduction

This document defines a representation model for real-time human figures and entities (LAE) in mixed and augmented reality (MAR) worlds:

Scope and key concepts: Related terms, definitions, and a common system architecture together constitute the MAR applications, components, systems, services this document defines the representation and rendering of LAE in MAR scenes, as well as the the LAE defines a set of principles, concepts and functions applicable to all current and future MAR standards:

The reference model specifies the necessary functional modules, basic functional requirements, relevant information content, and the information that should be provided and (or) supported information models: Including (but not limited to) the following:

- Introduction to the fields and concepts of mixed and augmented reality standards;
- Representation model of LAE in MAR scene;

- 3D modeling, rendering and simulation of LAE in MAR scenes;
- Attributes of LAE in MAR scene;
- Sensing representation of LAE in MAR scenario;
- Interface representation for controlling LAE in MAR scenario;
- Functions and basic components used to control LAE in MAR scenarios;
- Interaction interface between LAE and MAR scenes;
- Interface with other MAR components;
- Relationship with other standards;
- Example:

The objectives of this document are as follows:

- Provide a reference model for MAR applications based on LAE representation;
- Use the attributes of LAE to manage and control it in the MAR environment;
- Integrate LAE into 2D and/or 3D virtual scenes in MAR scenes;
- Realize the interaction between LAE and 2D and/or 3D virtual scenes in MAR scenes;
- Provide the exchange format required to transfer and store data between (LAE-based) MAR applications:

This document has the following document structure:

- Chapter 4 describes the concept of LAE-based systems represented in MAR;
- Chapter 5 explains how sensors can capture LAE in the physical and virtual worlds;
- Chapter 6 describes the mechanism for tracking the position of the LAE and specifies the spatial mapper between physical space and MAR space:
effect;
- Chapter 7 describes the mechanism for identifying LAE behaviors and defines the MAR events of LAE and the MAR content creator specified the association between conditions or events;
- Chapter 8 describes a LAE-oriented scenario, which consists of virtual scenes, sensor data, spatial scenes, events, targets, etc.;
- Chapter 9 describes how the MAR scene system renders scenes, LAE maps, events, etc., so that they can be displayed on a given display device:

Rows present output;

--- Chapter 10 describes types of displays, including monitors, head-mounted displays, projectors, tactile devices, and sound output devices:

Equipment, used to display LAE in MAR scene;

---Chapter 11 identifies and describes virtual LAEs, such as virtual 3D models (avatars) and virtual LAEs (such as those in MAR systems):

real human body model);

--- Chapter 12 states any issues related to system performance in the LAE of the MAR;

--- Chapter 13 states any issues related to operational safety in the LAE in the MAR;

--- Chapter 14 states any consistency-related issues with LAE in MAR;

--- Appendix A gives examples of representative LAE representation systems in MAR:

Information Technology Computer Graphics Image Processing and Environment Data
representation of real-time characters in mixed and augmented reality Representation of
portraits and entities

1 Scope

This document defines a reference model and basic constructs for representing and controlling a single LAE or multiple LAEs in a MAR scenario:

The concept, reference model, system framework, functions and how to integrate 2D/3D virtual world and LAEs and the interface between them are defined:

It also defines the transmission and storage of LAEs between MAR applications based on LAE:

The exchange format required to store LAE related data:

This document specifically describes the following features:

- a) Definition of LAE in MAR;
- b) representation of LAE;
- c) Representation of LAE attributes;
- d) LAE's perception of the physical world;
- e) Integrate LAE into 2D/3D virtual scenes;
- f) Interaction between LAE and objects in 2D/3D virtual scenes;
- g) Transmit LAE related information in MAR scenarios:

This document defines a reference model for MAR applications based on LAE