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Information technology — Computer graphics, image processing and environmental data representation — Benchmarking of vision-based spatial registration and tracking methods for mixed and augmented reality (MAR)

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National foreword

This British Standard is the UK implementation of ISO/IEC 18520:2019.

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Foreword

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This document was prepared by 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

In the development of mixed and augmented reality (MAR) applications, one of the most important technologies involves spatial registration and spatial tracking methods, especially vision-based methods. The research and development on registration and tracking based on computer vision technologies is flourishing and many new algorithms have been proposed every year.

Therefore, this document aims at fostering objective evaluation and comparison of diverse registration and tracking methods, in order to facilitate fairer competition among small and major companies/institutes involved in MAR technologies, applications and services.

Moreover, this document can be the baseline to standardize spatial registration and tracking methods which not only utilize a video camera but combine a video camera with other sensors such as another video camera, a depth camera, inertial sensors and infrastructure-based positioning technologies, and which utilize technologies such as IoT (Internet of Things) and GNSS (Global Navigation Satellite System).

The target audience of this document includes stakeholders of benchmarking activities. The following are examples of how this document can be used directly or indirectly:

— by a benchmarking service provider, a benchmark provider or a benchmarking competition organizer who wishes to align their benchmarking activities including self-benchmarking and open/closed competitions to be consistent with this document;

— by a technology developer/supplier who wishes to estimate and evaluate the performance of a vision-based spatial registration and tracking (vSRT) method for MAR appropriately with a benchmarking service provider, a benchmark provider or a benchmarking competition organizer who aligns their benchmarking activities to be consistent with this document; or

— by a technology user who wishes to obtain benchmarking results based on a benchmarking activity, which is consistent with this document, or to compare the existing vSRT methods for MAR in terms of their performance.

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1 Scope

This document identifies the reference framework for the benchmarking of vision-based spatial registration and tracking (vSRT) methods for mixed and augmented reality (MAR).

The framework provides typical benchmarking processes, benchmark indicators and trial set elements that are necessary to successfully identify, define, design, select and apply benchmarking of vSRT methods for MAR. It also provides definitions for terms on benchmarking of vSRT methods for MAR.

In addition, this document provides a conformance checklist as a tool to clarify how each benchmarking activity conforms to this document in a compact form by declaring which benchmarking processes and benchmark indicators are included and what types of trial sets are used in each benchmarking activity.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, acronyms and abbreviated terms

For the purposes of this document, the following terms and definitions 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/

3.1 Terms and definitions

3.1.1
benchmark
reference point against which comparisons can be made

Note 1 to entry: In the context of this document, the performance of vSRT methods for MAR is the object of comparison.

Note 2 to entry: See ISO/IEC 29155-1.

3.1.2
benchmark indicator
indicator that qualitatively shows a particular aspect of a *benchmark* (3.1.1) with appropriate metrics

3.1.3
benchmarking
activity of comparing objects of interest to each other or against *benchmarks* (3.1.1) to evaluate relevant characteristics

Note 1 to entry: In the context of this document, the object of interest is the performance of vSRT methods for MAR, and the characteristics are particular aspects of the performance such as reliability, temporal characteristic, etc.