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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 35, *User interfaces*.

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

The purpose of this document is to provide a method for describing whole-body movement sequences used in utilizing information and communication devices, both for gesture inputs to the system (e.g. in immersive environments) and for outputs for the system that present different body movements (e.g. in training applications). Whole-body movement sequences make use of movement(s) of major body parts (other than hands and feet and their components) that can be detected by cameras or other input devices.

This document covers describing whole-body movement sequences used in user interfaces. To describe whole-body movement sequences, the human body is represented in a skeletal structure, including joints. Individual movements are expressed by depicting the desired postures, starting with the start posture and finishing with the finish posture, and representing the transitions to intermediate postures if necessary. Movements are expressed by specifying the movement for each joint to describe the whole-body movement sequence.

In this document, duration was intentionally excluded to avoid imposing strict timing constraints on users who may exhibit varying interaction speeds. While this decision allows for greater flexibility and inclusivity in natural user performance, it is also acknowledged that broader considerations—such as the documentation of adaptive or alternative movements for individuals with physical disabilities—are important for future work but remain beyond the scope of this version.

This document is intended for individuals and organizations developing and using whole-body movement sequences in their user interfaces or those involved in developing information and communication standards related to gesture-based interfaces.

This document does not intend to infringe the intellectual properties of the whole-body movement sequences (i.e. dance, choreography, etc.).

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Information technology — User interfaces — Describing whole-body movement sequences

1 Scope

This document specifies a method to describe whole-body movements for user interfaces. It is based on skeleton's relative angle change.

This document is applicable to user interfaces used in many domains, including immersive systems, health care application, education application, entertainment application.

In this document, whole-body movement sequences are formed by the motion between major postures of the body. Also, description of this document is based on static postures and expressed using a human-centered coordinate system.

Movements involving details of the hands, feet, fingers, or toes involve additional elements beyond those dealt with in this document. This document also does not deal with sign language.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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:

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

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

3.1
whole-body movement sequence
series of combinations of *posture* (3.3) and *movement* (3.2) of the body

Note 1 to entry: The body does not include the hand, foot or toe.

3.2
movement
transition across start, intermediate, and finish postures

3.3
posture
pose that corresponds to an identifiable start, intermediate, or finish stage of a *movement* (3.2)

Note 1 to entry: This is an important moment in the entire movement, and it's where the whole-body movement is showcased.

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3.4
extension
movement (3.2) that increases the angle between two adjacent body segments, typically resulting in the straightening of a joint

Note 1 to entry: Extension for joints is shown in Annex A using the graphical forms.

3.5
flexion
movement (3.2) that decreases the angle between two adjacent body segments, typically resulting in the bending of a joint

Note 1 to entry: Flexion for joints is shown in Annex A using the graphical forms.

3.6
abduction
movement (3.2) of a limb or other body part away from the midline of the body

Note 1 to entry: Abduction for joints is shown in Annex A using the graphical forms.

3.7
adduction
movement (3.2) of a limb or other body part toward the midline of the body.

Note 1 to entry: Adduction for joints is shown in Annex A using the graphical forms.

3.8
rotation
movement (3.2) that rotates a body part around its longitudinal axis

Note 1 to entry: Rotation for joints is shown in Annex A using the graphical forms.

3.9
lateral flexion
movement (3.2) that bends a body part to the side, away from the midline

Note 1 to entry: Lateral flexion for joints is shown in Annex A using the graphical forms.

3.10
plantar flexion
movement (3.2) that extends the ankle joint, causing the foot to point downward

Note 1 to entry: Plantar flexion for joints is shown in Annex A using the graphical forms.

3.11
dorsiflexion
movement (3.2) that flexes the ankle joint, raising the foot upward toward the shin

Note 1 to entry: Dorsiflexion for joints is shown in Annex A using the graphical forms.

3.12
horizontal abduction
movement (3.2) of the arm away from the midline in the horizontal plane after shoulder flexion

Note 1 to entry: Horizontal abduction for joints is shown in Annex A using the graphical forms.

3.13
horizontal adduction
movement (3.2) of the arm toward the midline in the horizontal plane after shoulder flexion

Note 1 to entry: Horizontal adduction for joints is shown in Annex A using the graphical forms.

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3.14
external rotation
movement (3.2) that rotates a body part outward around its axis

Note 1 to entry: External rotation for joints is shown in Annex A using the graphical forms.

3.15
internal rotation
movement (3.2) that rotates a body part inward around its axis

Note 1 to entry: Internal rotation for joints is shown in Annex A using the graphical forms.

3.16
pronation
movement (3.2) that rotates the forearm inward, turning the palm downward or backward

Note 1 to entry: Pronation for joints is shown in Annex A using the graphical forms.

3.17
supination
movement (3.2) that rotates the forearm outward, turning the palm upward or forward

Note 1 to entry: Supination for joints is shown in Annex A using the graphical forms.

4 Describing whole-body movement sequences

4.1 General

Whole-body movement sequences are described by expressing them through postures and individual movements between postures (representing the movements of joint motions.)

To describe whole-body movement sequences, the human body is represented in skeletal structure. The skeletal structure is depicted using LOA-2 joints as specified in ISO/IEC 19774-1:2019. The LOA-2 joints include finger and toe joints, but in describing whole-body movement sequences, those joints are excluded. The skeletal structure is expressed using joint names based on ISO/IEC 19774-1:2019, and abbreviation is used to describe a whole-body movement. The human skeletal structure, as shown in Figure 1(left), includes 3 central joints, comprising the pelvis, torso, neck and 12 joints on the right and left: shoulders, elbows, wrists, hips, knees, ankle joints. The skeletal structure in Figure 1(left), is represented by joint information, which is detailed in Figure 1(right).

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