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Information technology — User interfaces — Evaluating usability of natural user interfaces

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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*.

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Introduction

As smart devices such as smart phones and smart speakers have become popular, new forms of user interfaces have been introduced. One aspect of the new interfaces is mimicking natural ways of interacting with the devices and utilizing speech, gestures, body language, eye gaze and other natural features of human communication through natural user interfaces (NUIs), which allow for faster, smoother, intuitive, and smarter interaction. However, while the concept of NUI is well defined, practical applications of NUI still need to be developed. This is strongly related to the lack of usability of NUI in smart devices.

When specified users of systems, products or services achieve their specified goals with effectiveness, efficiency and satisfaction in a specified context of use (as defined in ISO/IEC 9241-11), usability can be evaluated. Effectiveness is considered as the ability of users to complete tasks with the system (e.g. the NUI). Efficiency measures resources taken by users to complete specified tasks. Satisfaction measures comfort levels of user experience along with acceptance.

It is important that the usability evaluation of NUI concentrates on recognizing the user's intention and focuses on multiple modalities of information flows between the users and the devices.

This document describes a framework for evaluating the usability of NUI. Although the framework can be applied in most general contexts, it is specifically focused on optimizing user experiences in terms of NUI.

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Information technology — User interfaces — Evaluating usability of natural user interfaces

1 Scope

This document provides a framework, requirements and recommendations for evaluating the usability of a natural user interface (NUI) for systems, products or services. Measuring and reporting the usability of the NUI are also described. The usability evaluation focuses on the efficiency, effectiveness and satisfaction of the NUI. This document can also be applied to the usability evaluation of other user interfaces (UIs) for emerging technologies.

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 9241-11, *Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9241-11 and the following apply.

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

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

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

3.1 Terms related to natural user

3.1.1
user interface
UI
set of all the components of an interactive system that provide information and controls for the user to accomplish specific tasks with the interactive system

[SOURCE: ISO 9241-110:2020, 3.10]

3.1.2
natural user interface
NUI
user interface where the user operates the interface through a manner related to everyday human behaviours in a real world

Note 1 to entry: Natural refers to the user's expectations, behaviour and feelings that are involved in interacting with a NUI.

Note 2 to entry: Everyday human behaviours refer to behaviours that the user can be expected to have already learned.

Note 3 to entry: Interactions with NUIs typically model interactions performed in the natural world, including (but not limited to) touch, gestures or vocal interactions, or a combination thereof.

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