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Information technology — User interface requirements and recommendations on menu navigation —

Part 1: Framework

Technologies de l'information — Exigences et recommandations d'interface portant sur la navigation dans les menus —

Partie 1: Cadre

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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*.

A list of all parts in the ISO/IEC 17549 series can be found on the ISO website.

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 and www.iec.ch/national-committees.

Introduction

Menus are frequently used for human–machine interface navigation of functions and contents. But many different types of menus exist and many different manipulation procedures occur. Such a variety of procedures often disturbs the user.

Menus and associated means of action should offer users an easy and continuous ergonomics experience.

The ISO/IEC 17549 series defines menu navigation logic associated to a set of directional devices. It provides descriptions of functions for supporting navigation and activation.

The ISO/IEC 17549 series consists of three parts:

— This document provides an overview of the design of navigation methods based upon menu selection for human–machine interfaces. It provides a framework of the "menu" user-interface element to help design an effective, efficient and satisfactory interactive system.

— ISO/IEC 17549-2, provides guidelines on the design of navigation methods for selection menus with use of a 4-direction device. It also provides recommendations for parameters to display screen settings, character sets and languages in use.

— ISO/IEC 17549-3 provides requirements and recommendations on the design of navigation methods for selection menus with use of a 1-direction device. It also provides recommendations for parameters to display screen settings, character sets and languages in use.

Information technology — User interface requirements and recommendations on menu navigation —

Part 1: Framework

1 Scope

This document provides a framework for the ISO/IEC 17549 series describing user interface guidelines on menu navigation. It specifies requirements and recommendations on how to design usable and consistent navigation through the interface component called a "menu". This document specifies how to select and validate elements displayed on menus.

This document covers design-consistent navigation inside menus. It does not include testing or organization of menus.

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 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
navigation command
action means that enables the user to operate navigation function(s), such as selecting the next item, the previous one, activating the focused item, or going back in the menu hierarchy

Note 1 to entry: It can be operated through a key press, a gesture, a vocal command, a click on a pointed item.

3.2
direct action command
action means that enables the user to operate navigation or activation function(s) directly through a shortcut

Note 1 to entry: It can be operated through a key press, a gesture, a vocal command, a click on a pointed item.

3.3
menu
set of selectable options giving access to objects or actions

Note 1 to entry: A menu primarily provides access to functions and/or specified locations within an interactive system.

Note 2 to entry: A menu can be displayed vertically and/or horizontally.

Note 3 to entry: A menu can be in a loop.

Note 4 to entry: A menu can be visually displayed, audibly played and/or displayed in a tactile manner.

3.4
ladder menu
set of options displayed vertically or horizontally

3.5
tile menu
set of options displayed with a number of rows and columns, one of which is to be selected

3.6
tab menu
set of options displayed vertically or horizontally enabling the sublevel of the selected tab to be displayed at the same time

3.7
drop-down menu
set of options displayed that can be coiled or uncoiled vertically and/or horizontally

Note 1 to entry: It needs to be manipulated continuously in order to be displayed.

3.8
contextual menu
set of options displayed vertically or horizontally that are contextualized to the pointing or focus area

3.9
pie menu
set of options displayed in a circle

4 Conformance

A menu is in conformance with this document if it meets the requirements of Clause 5.

5 Framework of the ISO/IEC 17549 series

5.1 Software interfaces

Interface objects that are addressed in the ISO/IEC 17549 series are menus. Most menus are explored as ladder menus, tabs menus, pie menus, tile menus, drop-down menus or contextual menus.

Menus are the main component of human–machine interaction. They are useful for freeing screen space, as an alternative to place functionality in buttons or other user controls in the content area of the application. Menus provide a means for performing operations and for navigating to other parts of the application or even to other applications. A menu is a list of items; several menus are hierarchical trees of item lists. Navigation inside such menus depends upon available device keys and the kind of operating system used.

This document focuses on guidelines regarding the design of navigation menus, taking into account coherency and adequate adjustment between commands and displays.

5.2 Menus heterogeneity

5.2.1 Manipulation of menus

There are various ways to manipulate menus and it can be a source of trouble for some users.

Sometimes, the device includes several ways to manipulate similar menus through several input peripherals. The options of a ladder menu can be directly pointed at with a mouse or on a touchscreen and can also be selected from the keyboard.

Sometimes, one single device includes several different menus with their own different manipulation logics. The tabs menu, ladder menu and tiles menu are often mixed on the interface.

5.2.2 Several menus on different devices

A user switches frequently between different devices from mobile phone to landline, to television set or game console and can also frequently use the same service provided on these different devices.

It is confusing for a user to deal with such diversity. It is also completely unusable for a user in situations without visual feedback (for example, in the use case of a user with visual impairments or a user who is driving at the time).

5.2.3 Same menu for different users

Menus remain immutable even as user knowledge changes or when different users have different needs. A novice user does not need the same kind of functionality as an expert user, and vice versa, but menus stay the same and cannot be configured to match the expertise of the user.

5.2.4 Hardware interfaces (devices)

Different form factors impact menu organization and a variety of input peripherals (direct or indirect pointing, sequential pointing) impacts menu navigation.

5.3 Menu accessibility

5.3.1 General requirements

Users have varieties of constraints, i.e. cognitive, perceptual or actionable.

In order to be acceptable to everyone, an interface shall be coherent between rendering and action means but it also needs to take into account each kind of user constraint.

Some people have visual, hearing, cognitive or physical constraints. In case of a severe impairment, the user needs sequential navigation through menus. Some other users need direct access. An efficient menu navigation shall enable both possibilities.

5.3.2 Cognitive aspect

Menus should be usable for users with either different knowledge or different cognitive abilities, or both. Menus with few items, reduced hierarchy, multimodality, explanations, and coherency between interface rendering and available commands are recommended.

Such menus shall provide appropriate actions and display, such as large items and good feedback, to avoid unintended manipulations.

EXAMPLE 1 A user who has difficulties to categorize efficiently needs menus containing few categories and reduced hierarchical organized categories.

EXAMPLE 2 An illiterate user has difficulties to access menu textual information and needs emphasized visual menus (with pictograms or animated pictograms) and associated audio information.

EXAMPLE 3 A novice user who is cognitively constrained needs menus with few sub-categories, few items and many explanations. They also need secured navigation (good feedback buttons, large items to touch).

5.3.3 Perceptual aspect

Menus shall be usable by users with vision impairments. Menus shall be accessible through audio or tactile means. Such menus shall be usable through appropriate non-visual sequential action, such as selection and execution.

NOTE Guidance about the verticality or horizontality of the displayed items is still valuable as users have a mental representation of lists that are vertically or horizontally displayed.

Menus shall be usable by users with vision impairments. A menu shall be accessible by using audio, tactile and enhanced visual modalities. Visual elements shall be scalable in sizes and adjusted to high contrasts. To avoid unintended manipulations, such menus shall be usable through appropriate visually enhanced pointers, or focus.

Menus shall be usable by users with hearing difficulties (deaf users or users in a noisy environment). A menu shall be accessible by using tactile and enhanced visual modalities. Visual elements shall be emphasized (animated, coloured) and associated to tactile modality. To avoid unintended manipulations, such menus shall be usable through appropriate pointers enhanced in a visual or tactile manner, or focus.

5.3.4 Motor and speech ability aspect

Menus shall be usable by users with reduced motor ability. A menu shall be accessible with limited manipulations, without pointing commands.

EXAMPLE Menu navigation is achieved with the keypad or the keyboard shortcuts.

Menus shall be usable for users without motor ability. A menu shall be accessible with voice commands and with automatic scrolling functions.

NOTE The voice command system needs to accommodate users with slower, hesitant speech, higher pitched voice or reduced articulation.

5.4 Displays and commands coherency

5.4.1 Global coherency

As several menus and devices exist, many parameters shall be taken into account in order to adapt interfaces to users' specificities. In order to help the user to switch from one context of use to another and to deal easily with menus and controls, it is important to offer consistent navigation modes through menus. Interface rendering constraints, interface action means, user constraints and context of use need to be consistently mixed.

Menu contents shall be consistent on the same device at different periods of time or in different contexts of use.

NOTE 1 A menu's content can be simplified for a novice user including only a sub-list of items from the complete menu.

NOTE 2 A menu's content can be contextualized when applied to a specific interface element, or in a specific period of time, including only a sub-list of items from the complete menu.

Menu rendering shall be consistent on the same device at different periods of time or in different contexts of use.

NOTE 3 Menu rendering can be adapted to the context of use in terms of colour, contrast, vertical or horizontal display.

NOTE 4 Menu rendering can be adapted to a novice user with some highlighting on some items in order to help selection.