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Information technology — User interface guidelines on menu navigation —

Part 2:
Navigation with 4-direction devices

Technologies de l'information — Directives sur la navigation dans les menus d'interfaces utilisateurs —

Partie 2: Navigation avec des commandes quadridirectionnelles

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

This second edition cancels and replaces the first edition (ISO/IEC 17549-2:2015), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

— in Figures 2, 3, and 4 supplementary explanations have been moved into notes;

— the alternative text for all figures has been included as alternative text in the PDF rather than provided in notes beneath the figures;

— an editorial error in Table 2 has been corrected;

— Annex B (informative), which was erroneously included, has been deleted;

— ISO/IEC Guide 37 and IEC 82079-1 have been moved from Clause 2 to the Bibliography as they are not cited normatively in the text;

— minor editorial corrections have been made throughout the document to fully align with ISO/IEC Directives.

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.

Introduction

Contemporary information equipment, on which the display area is associated with 4-direction devices, includes sophisticated and complex functionalities within one piece of such equipment.

The equipment needs to be operated in terms of changing default settings and to be customized for the individual user. In such a scenario, a 4-direction device is used to navigate the menu shown in the display area, where the menus are normally structured.

This document provides guidelines for the design and use of menu structures, as well as recommended types of navigation with 4-direction devices.

Note that each figure in this document, although it is not always an "image", includes the alternative text(s) in accordance with ISO/IEC/TS 20071-11. The alternative text(s) are informative only.

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Information technology — User interface guidelines on menu navigation —

Part 2:
Navigation with 4-direction devices

1 Scope

This document gives guidelines on the design of navigation methods for selection menus with the use of a 4-direction device. The guidelines are applicable to any information equipment on which the display area is associated with a 4-direction device.

This document also provides recommendations for parameters for display screen settings, character sets and languages in use.

This document is not applicable to safety-related uses on menu navigation.

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 1503, *Spatial orientation and direction of movement — Ergonomic requirements*

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:

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

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

3.1
4-direction device
set of physical controls, commonly keys, only one of which is activated at any time, consisting of up-, down-, left- and right controls for respective functionality

Note 1 to entry: The 4-direction device is a mechanism directly manipulated by users, for example, a cross-key of a remote controller.

3.2
ladder menu
list of items displayed vertically in one dimension, one of which is to be selected

3.3
menu bar
set of one dimensional smenu items that is always standing-by at the root of a menu hierarchy

Note 1 to entry: A menu bar provides tabular functionality and it is different from a "rolling menu".

3.4
focus
<4-direction devices> highlighted result of action done by a user through an input device

Note 1 to entry: If the number of keys used is one, the action is "next". If the number of keys used is two, the actions are "previous" and "next". Selecting a key enables highlighting of the next item visually, auditorily, and/or tactually to show the action can be activated.

3.5
activating
action done by a user through a validation key, which enables activation of a focus or an item pointed at

3.6
navigation history feedback
visual, tactile and/or audio interface output displayed after a user navigation, which enables a user to know the paths he has already explored

Note 1 to entry: For example, items already explored are highlighted in a different colour if the user already navigated to there.

3.7
separator bar
visual, tactile and/or audio interface output that is rendered in order to facilitate recognition of groups of items categorizations or the start or end of a list

3.8
sub-menu indicator
visual, tactile and/or audio interface output that is rendered in order to facilitate navigation when a sub-list of items is available and which enables user to know if they are dealing with a navigation item or not

3.9
tile menu
set of items displayed with a number of rows and columns, one of which is to be selected

4   Conformity

A navigation method conforms to this document if it meets all requirements of 5.1, 5.2.2, and 7.1.

5   Basic considerations

5.1   Common and general ergonomic aspects

The following basic ergonomic aspects are taken into account when designing user interfaces where navigation with a 4-direction device is considered:

a)   users should be able to change menu languages at the highest level of the menu hierarchy;

b)   control shall be consistent both in design and operation, including meeting the requirements in ISO 1503;

c)   menu items should be in plain texts or comprehensible icons as far as applicable, and in agreement with the relevant provisions in ISO/IEC Guide 37 and IEC/IEEE 82079-1;

d)   control shall be bi-directional and enable the user to return to the previous operation;

e)   clear feedback should be given when the user is at the end of the list and when they are at the start, and the end and start feedback should be different;

f)   for broad and deep menu lists, navigation history feedback shall be provided;

g) important and most frequently-used menu items should be simple and comprehensible, and placed at the start of the list;

h) a ladder menu including an item that should logically be first selected by a user should be short and such a menu item shall be placed as the first item in the list;

i) in the case where a substantial number of options is required for an item of a ladder menu, the most frequently selected option should be the default option;

j) item categorisation that depends on functionality should be shown to the user (by separation bars, sounds, etc.); a sub-menu should present a title semantically linked to the upper-menu and, as far as possible, all the cascading hierarchy should be shown to the user;

k) the user interface should make a clear separation between navigation functions (browsing between items without any modification) and action functions (implying system modification such as adding something, deleting something, calling someone, activating something, etc.); consequently, items for navigation should be displayed differently from items for action;

l) where possible, hierarchies shall be organized to be broader rather than deeper; it has been shown[1] that a two-level hierarchical menu (32 items at the first level and 16 for each sub-level) is better than a three-level hierarchical menu ($8 \times 8 \times 8$); moreover that 32×16 is better than 16×32;

m) a list longer than three items should enable wraparound manipulation;

EXAMPLE   Scrolling beyond the end of the list should return to or render the beginning of that list (see 5.2 for this screen rendering).

n) focusing rendering should be available through visual and audio information, and should also be available through tactile information as appropriate;

o) separator bar rendering should be available through visual and audio information;

p) start/end list rendering should be available through tactile information;

q) tactile display should be available at least for end/start feedback and item validation;

r) each list element (items, feedbacks, separator bars, sub-menu indicators, focus indicators, etc.) shall enable visual display, audio display and, if possible, tactile display;

s) the menu list for attributes and the menu list for selecting associated values should not be in the same list;

t) when the user goes back in a hierarchical menu, the item selected from the upper menu shall be the one linked to in the sub-menu previously selected;

u) navigation items should be displayed through texts or icons, with an added visual icon and with audio alternative (specific sound such as «bip», «sub-menu» or «link»), for example:

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1)   Miller, D. P. (1981). *The depth/breadth tradeoff in hierarchical computer menus.* Proceedings of the Human Factors Society, 296-300; Parkinson, S.R., Sisson, N., & Snowberry, K. (1985). Organization of broad computer menu displays. International Journal of Man-Machine Studies, 23, 289-297.

Function	Preferred graphical symbol	ISO/IEC registration number
Move right		IEC 60417-5107B
		IEC 60417-5022

5.2 Designing rendering (display screen, audio display, tactile display)

5.2.1 Visual design of ladder menu

The provisions given in 5.1 apply.

5.2.2 Visual designing of tile menu

Where a 4-direction device is used with a tile menu visible on a screen, design of the navigation through tile menus on the screen is an important consideration. Guidance provided by this document is limited to the design of the focus operation through the tile menu and does not deal with the design of menus and the remote controller. Design issues of the tile menu navigation within a display screen (e.g., the navigation of focus between menus) are only addressed with respect to the ergonomic issues related to user controls.

The following general rules apply for navigating in the tile menu:

a) moving wraparound shall be so that the user continues to move to any menu item by activating one direction key in a remote controller;

b) moving from left to right shall be so that the user moves a highlighted item in the menu from left to right by pressing the right-key;

c) moving from up to down shall be so that the user moves a highlighted item in the menu from up to down by clicking the down-key; and

d) moving in a zigzag way shall be so that the user moves a highlighted menu item in the shortest path between the initial and final menu items.

6 Recommended practice on structure of, and operation of, ladder menus

6.1 Ladder structure

The ladder menus should be structured as shown in Figure 1 as an example, where the menu bar laid vertically at the top is optional. The lists of items depicted vertically are the ladder menus classified according to hierarchies. The highlighted ones are selected options among menu items. In most cases, one of the horizontal or vertical ladder menus is activated and shown on the screen.

Focus on one of the menu items in the menu bar is moved by down- or up-keys, or left- or right-keys. Focus on one of the items in the ladder menu is moved by left- or right-keys, or up- or down-keys, respectively, depending on vertical or horizontal layouts. Among the ladder menus in the hierarchy, focus is moved by an up- or down key, or a left- or right key.