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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 30113 series can be found on the ISO website.

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Introduction

A multi-point gesture is generated by a user with several pointers (which includes an input device such as a multi-touchpad, multi-touchscreen or body parts such as fingertips, hands, etc.) providing gesture actions using a multi-point of interest. Multi-point gestures are used in several commercially available ICT systems including personal computers, smartphones and video game consoles.

There is a need for an international standard to define the multi-point gesture so that users do not get confused. Potential variety and inconsistency among multi-point gestures might cause a serious usability problem in using applications on the ICT systems.

This document presents descriptions of multi-point gestures and their corresponding gesture commands for system-level functions and common functions across applications on ICT systems. The system-level functions include functions for selecting and initiating applications which are handled by operating systems or platforms. The common functions across applications are also identified. These functions include menu navigation, “help”, “undo”, “redo”, and so on.

Information technology — User interfaces — Gesture-based interfaces across devices and methods — Part 12: Multi-point gestures for common system actions

1 Scope

This document defines multi-point gestures for common system actions used in information and communication technology (ICT) systems.

It specifies movements and conditions for describing multi-point gestures recognized by the systems and applications. The multi-point gestures are performed using an input device (multi-touchpad, multi-touchscreen, etc.) or body parts (fingertips, hands, etc.). These multi-point gestures are intended to operate in a consistent manner regardless of systems, platforms or applications.

The gestures for common system actions denote system-level functions and common functions across applications of ICT systems. The system-level functions are executed at a system or a platform level. They include initiation, resume, restart and termination, etc. The common functions across applications are commonly executed among applications of a system or a platform. The functions include navigation of menus, opening an object, closing an object, etc.

NOTE ICT systems include, but are not limited to, digital televisions, set-top boxes, video game consoles, communication devices, internet devices, entertainment devices, and personal computers (PCs).

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/IEC 24786:2009, *Information technology — User interfaces — Accessible user interface for accessibility settings*

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 http://www.electropedia.org/

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

3.1
gesture-based interface
gesture interface
user interface that provide information and controls for a user to accomplish specific tasks with the interactive system by his/her gestures

[SOURCE ISO/IEC 30113-1:2015, 3.2]

3.2

application
app
software application or application software

[SOURCE: ISO/TR 17427-2:2015, 2.1]

3.3
gesture software
software for implementing *gesture-based interface* (3.1) functionality including gesture recognition, command processing and feedback generation

Note 1 to entry: The gesture software could be an embedded combination of input devices, operating systems or applications. An application such as a web browser can contain a gesture software module for handling functions for the application.

[SOURCE: ISO/IEC 30113-1:2015, 3.4 — modified, Note 1 to entry revised.]

3.4
point of interest
POI
specific point location that a user utilizes to formulate a gesture

EXAMPLE Fingertip, pen points, hand etc.

[SOURCE: ISO/IEC 30113-11:2017, 3.1, modified — examples added.]

3.5
movement metaphor
metaphor for expressing relationship between gesture direction and moving object when moving content in a scrollable window to desired position

3.6
content-mover metaphor
movement of content focused
movement metaphor (3.5) for describing the movement of content by a user in a viewing window along a gesture direction

EXAMPLE If a “2-point down” gesture is assigned for page scroll with the metaphor of “movement of content”, users see the upper part of the page by using the gesture. The function of the gesture is similar to “page up”.

3.7
window-mover metaphor
movement of viewing window focused
movement metaphor (3.5) for describing the movement of content by a user in a viewing window in the opposite direction of a gesture

EXAMPLE If a “2-point down” gesture is assigned for page scroll with the metaphor of “movement of viewing window”, users see the lower part of the page by using the gesture. The function of the gesture is similar to “page down”.

3.8
mediated gesture
gesture utilized with pointing input(s) such as a mouse, a touchpad, a joystick, a track ball, etc.

3.9

direct touch gesture
gesture utilized with a body part (e.g. a finger) or a physical object (e.g. a stylus) on an input device (e.g. a touchpad or a touchscreen)

3.10
non-contact gesture
gesture utilized with a sequence of movements of a body part (e.g. a finger) without physical contact on an input device

3.11
content window
viewing window
part of a display image with defined boundaries in which one or more content(s) is(are) displayed

3.12
accelerator keys
shortcut keys
key combinations which invoke a menu option without displaying the menu on which the option appears or intermediate menus

[SOURCE: ISO 9241-171:2008, 3.1]

3.13
sticky keys
keyboard enhancement in which modifier keys, such as control, shift, and alt, "stick", act as if held down while a second key is depressed manually

Note 1 to entry: The sticky keys functionality is available on Microsoft® Windows®[1] as StickyKeys™, on macOS®* as Sticky Keys™,, and on Unix/X11®* systems as part of the AccessX™* utility. The sticky keys are designed for people who cannot use both hands, or who use a dowel or stick to type. The sticky keys work with those keys defined as "modifier" keys, such as the Shift, Alt and Control keys. Usually the sticky keys status is shown on-screen at the user's option.

[SOURCE: ISO/IEC 24751-1:2008, 0000_11, modified — Note 1 to entry has been added.]

3.14
tap
touch real (or virtual) surface briefly, typically for less than one second, with a point(s) of interest and then lift-off in approximately the same position

[SOURCE: ISO/IEC 14754:1999, 4.13, modified — changing from digitizer to real (or virtual) surface and from pen to point(s) of interest.]

3.15
double-tap
to touch twice rapidly surface with a point(s) of interest

3.16
touch and hold

[1] Microsoft® Windows® (StickyKeys™), macOS® (Sticky Keys™), and Unix/X11® (AccessX™) are examples of a suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of these products.

long touch
touch surface for extended period of time

3.18
rotation
touch surface with one or more POIs and move the POIs in a clockwise or counter-clockwise direction

Note 1 to entry: Rotation with two or more POIs means revolving around a centre of the POIs or revolving around a POI among the POIs.

3.19
pinch
touch surface with two or more POIs to bring the POIs closer together

3.20
spread
touch surface with two or more POIs to move the POIs apart

3.21
context menu
pop-up menu
menu in a graphical user interface that appears upon user interaction offering a limited set of choices that are available in the current state

Note 1 to entry: A context menu is usually shown by a right-click mouse operation.

3.22
common system action
function executed at an OS level or a platform level or common functions among application software

EXAMPLE Going to the previous/next application, showing desktop, executing an application, going the previous/next page of content.

4 Visual description of multi-point gestures

For describing multi-point gestures, this document follows ISO/IEC 30113-1:2015, A.3 and ISO/IEC 30113-11:2017, 5.4.

The starting points of a multi-point gesture are visually represented by circles with solid line as shown in Figure 1. The number of circles is the number of POIs for describing multi-point gestures. The ending points of the multi-point gesture are visually represented by circles with dotted line as shown in Figure 2. If there are no descriptions for the relative positions of the POIs, any relative position is permitted.

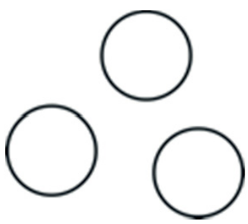

Figure 1 — Circles representing POIs for starting points of a multi-point gesture

Figure 2 — Dotted circles representing POIs for ending points of a multi-point gesture

If the multiple POIs move same direction simultaneously, the POIs are grouped with a rectangle shown in Figure 3.

a) Starting position **b) Ending position**

Figure 3 — Rectangle representing grouping POIs

If the multiple POIs of a multi-point gesture move simultaneously in a direction, a line with an arrow (indicating the moving direction) is used for describing movement.

The example in Figure 4 shows a multi-point gesture when the POIs move from left to right simultaneously.

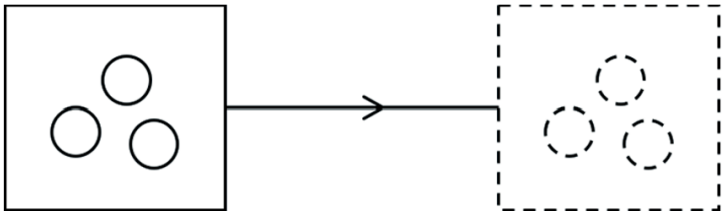

Figure 4 — Multi-point gesture when 3 POIs move from left to right simultaneously

If the multiple POIs move in different direction respectively, each POI has their own line with an arrow. The example in Figure 5 shows a multi-point gesture when the POIs move in different direction.

Figure 5 — Multi-point gesture when 2 POIs move in different direction

A multi-point gesture with a "faster" stroke can be described with two arrows (Figure 6). A representation of the speed of performing gestures is described in ISO/IEC 30113-11:2017, 5.4 in detail.

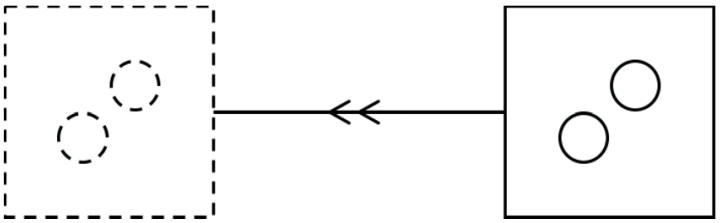

Figure 6 — A multi-point gesture moving fast to the left direction.

5 General requirements and recommendations

5.1 Alternatives for multi-point gestures

An ICT system utilizing multi-point gestures shall provide one (or more) alternative methods for the gestures. The examples of alternative methods are described in Clause 6.

NOTE There are many users who are not able to use gestures or who are only able to use single-point gestures due to various reasons including physical disability.

5.2 Simple movements

Multi-point gestures with change(s) of movement direction should not be used for a common system action.

NOTE It is not easy for users to handle multiple POIs with change of movement direction.

5.3 Priority in assigning multi-point gestures

A gesture using fewer POIs should be assigned for a command (or a function) which is used more frequently.

EXAMPLE Functions such as turning a page or page scroll are used more frequently than functions such as viewing desktop or moving working space.

The number of POIs of multi-point gestures which are applied to similar actions should be the same.

NOTE Users have difficulties in using multi-point gestures if the "3-point up" gesture is used for displaying virtual desktops and the "3-point left" gesture is used for turning pages.

5.4 Choice of movement metaphor

Gesture software utilizing mediated gestures should provide one or more method for the user's choice of movement metaphor.

Unless the user changes the movement metaphor for mediated gestures, the movement metaphor shall be used for the system and applications consistently.

5.5 Description of multi-point gestures

All multi-point gestures shall have both a visual description (see Clause 4) and a text description (which could be rendered in any modality).

6 Alternatives for multi-point gestures

There are several alternative methods for utilizing multi-point gestures.

1) Using accelerator keys

   Accelerator keys could perform common actions activated by multi-point gestures. Sticky keys are useful for satisfying user's accessibility requests in using accelerator keys.

   EXAMPLE 1 A multi-point gesture for swipe between full-screen apps could be the "3-point left" and the corresponding accelerator keys are 'ctrl' and '←'.

2) Using single-point gestures with accelerator keys

   By single-point gestures with accelerator keys, a user could invoke system commands. There are two ways of using this method.

   During pressing accelerator keys, a user performs a single-point gesture. Then the corresponding command is invoked.

   EXAMPLE 2 When pressing "ctrl" key, a user performs the "left" gesture. Then the previous page is shown on the screen. This could give the same result as the 2-point left gesture.

   After the user activates accelerator keys, the system waits for a single-point gesture. After the user performs the gesture, the corresponding command is invoked.

   Sticky keys can be used to activate accelerator keys for supporting accessibility.

   If the computer implements the sticky keys, the setting for the sticky keys shall be in accordance with ISO/IEC 24786:2009, 5.2.1.

   EXAMPLE 3 A user sequentially presses the "Ctrl" key and "1" key and performs the "left" gesture. Then the previous app is invoked and shown on the screen. This could give the same result as the 3-point left gesture.

3) Activating a multi-point gesture using a "touch and hold" gesture

   When a user touches the surface of a touchpad or touchscreen and holds it for a sufficient time (for example, less than 10s), the system sequentially displays an increasing number of points, from 1 to 4. When the display reaches the number that the user wants, the user performs a single-point gesture and the corresponding command is invoked.

   If the user has difficulties to see the screen, a sufficient delay for reading the numbers is provided.

   EXAMPLE 4 While a user touches the touchscreen, a number is displayed near the point that the user touches. The number starts from "1" to "3". When the number changes to "2", the user performs the "left" gesture. Then the previous app is invoked and shown on the screen. This could give the same result as the 3-point left gesture.

7 Descriptions of the multi-point gestures

7.1 The "2-point left" gesture

7.1.1 General

The parameters for the "2-point left" gesture are:

— Unique (internal) identifier: G12-1