
Information technology — Gesture-based interfaces across devices and methods —

**Part 60:
General guidance on gestures for
screen readers**

Technologies de l'information — Interfaces gestuelles entre dispositifs et méthodes —

Partie 60: Recommandations générales relatives aux gestes pour les lecteurs d'écran



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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*.

A list of all parts in the ISO/IEC 30113 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

Even if users with visual impairments utilize the same hardware as sighted users, it is possible that they will prefer to use different gestures, or to perform the same gestures differently from the sighted users. Sighted users can also perform gestures differently when they lack visual feedback.

Users with visual impairments experience problems in understanding shapes or outlines of gestures for ICT devices, even though they appear simple to sighted users. The critical problem is basically visual information and feedback from ICT devices. Therefore, it is necessary to provide special gestures for users with visual impairments.

Screen readers support their users in identifying and understanding content displayed on a screen of an ICT device. The information about the content is read back to the users out loud by the screen readers which might utilize text-to-speech or braille output devices. While sighted users visually scan and understand the content of the screen, the users with visual impairments utilize screen readers to understand the content. The screen is generally composed of page regions, headings, navigation elements, text links, images, etc. It is necessary for users of screen readers to identify the elements and navigate the pages. Therefore, specially designed gestures of screen readers are required. The gestures need to be standardized for the users of screen readers.

This document provides a general guidance on the standard gestures for screen readers running on various ICT devices. The gestures are primarily utilized by the users of screen readers when they interact with ICT devices. [Annex A](#) provides descriptions about specific instances of the gestures for screen readers.

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Information technology — Gesture-based interfaces across devices and methods —

Part 60: General guidance on gestures for screen readers

1 Scope

This document provides general guidance on gestures for screen readers running on various ICT devices. The document does not define or require specific technologies for recognizing the gestures. It focuses on descriptions of gestures and functions for screen readers running on ICT devices.

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 <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

gesture command

instruction to the system resulting from a gesture input by the user, e.g. select, move, delete

[SOURCE: ISO/IEC 30113-1:2015, 3.3]

3.2

screen reader

function that reads the characters and other information on the screen aloud to the user to allow access to the information on screen without viewing the screen

[SOURCE: ISO/IEC 24786:2009, 4.11]

3.3

point of interest

POI

specific point location that a user utilizes to formulate a gesture

Note 1 to entry: A POI is used by a user to interact with an object on a screen and does not need to be a specific location on an object. It could be located anywhere on an object.

[SOURCE: ISO/IEC 30113-11:2017, 3.1, modified — Note 1 to entry added.]

3.4

closed gesture

gesture of which its starting point and its ending point coincides

3.5

learnability

degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use

Note 1 to entry: Can be specified or measured either as the extent to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use, or by product properties corresponding to suitability for learning as defined in ISO 9241-110.

[SOURCE: ISO/IEC 25010:2011, 4.2.4.2]

3.6

accessibility

extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified contexts of use

Note 1 to entry: Context of use includes direct use or use supported by assistive technologies.

[SOURCE: ISO 9241-112:2017, 3.15]

3.7

path-based gesture

gesture which starts from a start point and goes through at least one intermediate point before arriving at an end point to complete the gesture

3.8

length

cumulative sum of Euclidean distance (in pixels) between adjacent points of the path of a gesture

4 Guidance

4.1 General

This document builds on the guidance in ISO/IEC 30113-1 by focusing on gestures specific for screen readers.

The gestures for screen readers shall be accessible by all users of screen readers including people with visual impairments. The syntax of the gestures shall be as simple as possible in terms of time, shape, length, number of POIs, and path. If gestures for screen readers are complicated, it is quite difficult or impossible for users of screen readers to accomplish a task using the gestures.

4.2 Guidance on syntax

4.2.1 Time

Time required for completing a gesture or a sequence of gestures shall be adjustable to allow users to perform their gestures for a task.

NOTE 1 If there is a time constraint on performing gestures for screen readers (such as a double-tapping gesture), it would increase the chances of making errors (such as failures in gesture recognition) by users of screen readers. Speed of performing gestures by the people with disabilities is generally slow.

NOTE 2 It takes approximately twice as long for people with visual impairment to perform the same gestures as sighted people.

4.2.2 Number of POI

The number of POIs to perform a gesture shall be reduced as much as possible. As the number of POIs of a gesture increases, the complexity of performing the gesture increases.

NOTE When multiple POIs are required to perform gestures for a task, it is difficult for users of screen readers to perform the gestures and accomplish the task.

4.2.3 Path

A complicated path-based gesture shall be avoided. The complexity of the path-based gesture can be generally defined in terms of its shape and length. The number of cusps (i.e., points where the direction of the path changes) of the path-based gesture shall be minimized. If a complicated path-based gesture is required to accomplish a task, users of screen readers tend to deviate from the required path of the gesture.

NOTE People with visual impairments have difficulties in making gestures with a right angle or steep angles. They prefer to use gestures with rounded angles, e.g., larger than 28 degrees.

4.2.4 Closed gesture

The closed gestures shall be avoided.

NOTE It is difficult for people with visual impairments to complete a closed gesture, such as drawing a complete circle. They should be allowed to create a closed gesture, if a starting point and an ending point of the closed gesture are sufficiently close (i.e., the distance of the two points is shorter than a pre-defined value).

4.3 Guidance on semantics

4.3.1 Denotation

The intention of the gestures shall conform to user expectations.

NOTE ISO 9241-110 describes conformity with user expectations.

EXAMPLE The left gesture is used to move a POI to the previous applications. Since it resembles an action of moving a window on a document, the users can easily comprehend the meaning of the gesture.

4.3.2 Consistency

The gestures shall be consistent across context and functions.

NOTE The tapping gesture with a single POI is designed to read aloud an item under a POI. In the same context, the tapping gesture with three POIs is for reading aloud a page number or row number to find the user's location.

4.3.3 Learnability

The gestures shall be easy to learn.

NOTE If gestures are easy to learn, it reduces time for training and the chance of making errors while performing the gestures.

4.4 Guidance on evaluation

4.4.1 Feedback

A screen reader shall provide feedback on a gesture. Users of screen readers should be able to know the progress and/or result of performing a gesture by means of non-visual feedback (i.e. audible feedback or tactile feedback).

Audible and/or tactile feedback may be provided while a system is recognizing a gesture being performed.

NOTE The feedback can be helpful in informing user whether the gesture is being recognized and completed.

4.4.2 Feedforward

A screen reader shall provide feedforward on a gesture. Non-visual feedforward (i.e., audible feedforward or tactile feedforward) cues should improve performances of users of screen readers in their executing gestures.

NOTE 1 The users of screen readers would be able to complete the screen reader gestures and achieve their goals with less time and higher success rates if the feedforward cues are properly provided.

NOTE 2 It would support the users of screen readers if feedforward cues with audible and/or tactile signals guide them for completing screen reader gestures correctly.

4.4.3 Customization

A screen reader shall provide a mechanism to customize functions with preferred gestures.

NOTE There exist various types of differences among users of screen readers in terms of their profiles and preferences. It follows that the users have different needs for the gestures.

4.4.4 Cultural sensitivity

The design of the screen reader gestures shall reflect a culturally sensitive approach.

NOTE It is important to consider international contexts in designing gestures for screen readers. Each culture has its own symbolic, iconic and metaphoric influence on gestures.

4.4.5 Tolerance

The gestures for screen readers shall be flexible in terms of their accuracy. The screen readers shall allow variations of the gestures during their recognition.

NOTE It is not easy for visually impaired users to pinpoint an object on a screen with their fingers or other objects. If they are asked to complete a complicated gesture, their success rates of completing the gesture correctly will decrease.

5 Common functions across screen readers

5.1 General

This clause identifies several functions which are commonly used across screen readers.

5.2 Functions

5.2.1 Reading aloud an item under a POI

A user of a screen reader navigates the screen of an ICT device by moving a POI with a screen reader. A function shall be provided to support the user to navigate the screen of an ICT device by moving a POI with a screen reader. If an item is selected by a gesture of the user (i.e., tapping the item on the screen), the screen reader reads it aloud. The “reading aloud” function shall support the navigation process of the user.

5.2.2 Activation of a selected item

A function shall be provided for users of screen readers to make an application selectable and active for execution. The application is represented by an item, i.e., an icon on a screen.

EXAMPLE The “Double-tap” gesture is regularly used to activate a selected application.

5.2.3 Movement of a POI to a next or a previous application

A function shall be provided for users of screen readers to navigate a list of applications on an ICT device. Given a list of applications, the users of screen readers are able to move a POI to find an application. The direction of moving the POI determines whether the next application or the previous application is selected.

EXAMPLE If the direction of a gesture for moving a POI is left, the previous application is chosen. The next application is selected by the gesture of moving a POI right. If the direction of a gesture for moving a POI is up, the previous item in a list is chosen. If the direction of a gesture for moving a POI is down, the next item in a list is chosen.

5.2.4 Movement of a POI to a next or a previous page

A function shall be provided for users of screen readers to navigate pages of content. The direction of the movement determines whether the next page or the previous page is visited.

EXAMPLE If the direction of a gesture for moving a POI is up, the previous page is visited. The next page is visited by the gesture of moving a POI down.

5.2.5 Movement of a POI to a next or a previous item

A function shall be provided for users of screen readers to navigate items on a screen of an ICT device. The direction of the movement determines whether the next item or the previous item is visited.

EXAMPLE If the direction of a gesture for moving a POI is up, the previous item is visited. The next item is visited by the gesture of moving a POI down.

5.2.6 Starting/stopping a current activity

A function shall be provided for users of screen readers to be able to start and stop the current activity of a screen reader.

EXAMPLE The “Double-tap” gesture with 2 POIs is used to start/stop the current activity.

5.2.7 Pausing/resuming speech

A function shall be provided for users of screen readers to be able to pause and resume speech.

EXAMPLE The “Tap” gesture with 2 POIs is used to pause/resume the speech.

5.2.8 Turning on and off a screen curtain

A function shall be provided for users of screen readers to be able to turn on and off a screen curtain to have his/her privacy.

EXAMPLE The “Triple-tap” gesture with 3 POIs is used to turn on and off a screen curtain.

5.2.9 Starting a help function of a screen reader

A function shall be provided for users of screen readers to be able to start the help function of a screen reader.

EXAMPLE The “Double-tap” gesture with 4 POIs is used to start a help function.

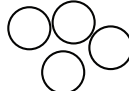
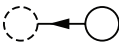
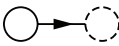
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Annex A (informative)

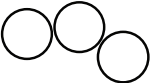
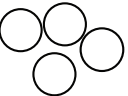
Gestures for screen readers of Apple® VoiceOver™, Google® TalkBack™, Samsung® Voice Assistant™ and Orange® MenuDfA™

The following gestures are instances of specially designed gestures for screen readers which are used in smart phones:

- Apple® VoiceOver gestures™ (A);
- Google® TalkBack gestures™ (G);
- Samsung® Voice Assistant gestures™ (S);
- Orange® MenuDfA™ (O).¹⁾

Name	Visual Description	1-point	2-points	3-points	4-points	1-point	2-points
							
Left		Move to the previous item (A), (S) Go back to the upper level(O)	Change pages and screens (G)	Cut (S)	Context menu: setting (S)	Move to the previous pages/ screens (A)	
Right		Move to the next item (A), (S) Validation of selected item(O)		Paste (S)		Move to the next pages/ screens (A)	
Up		Move up (S) Select the previous option(A), (O)	Scroll lists and pages (G)	Copy (S)	Context menu: granularities (S)	Move or scroll up	
Down		Move down (S) Select the next option (A), (O)		Select all (S)		Move or scroll down (A)	
Tap		Read aloud an item under a POI (point of interest) (A), (S) Get information (vocal, visual tooltip) on the current selection(O)	Pause/resume speech (A), (S)		Read from top (S)	Speak page number or rows (A)	(near top of screen) Move to the first element/ (near bottom of screen) Move to the last element (A)

1) Apple® VoiceOver™, Google® TalkBack™, Samsung® Voice Assistant™ and Orange® MenuDfA™ are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC of these products.

Name	Visual Description	1-point	2-points	3-points	4-points	1-point	2-points
							
Tap and Hold		Activate a selected item (O)					
Double-tap		Activate a selected item (A), (S) Get information about context and current focused item (O)	Start/stop the current activity (S)		Read from the next item (S)	Toggle switch for speech on and off (A)	Start VoiceOver help (A)
Triple-tap		Zooming function (G) Double-tap a selected item (A), (S)	Information centre (S) Item chooser (A)	Spell the last utterance (S)	Toggle screen curtain on and off (A)		
Quadru-ple-tap				Copy the last spoken text to the clipboard (A)			
Double Tap and Hold		Move or drag an icon. View more options for a selected item (A), (S) Label control (O)	Selection mode (S)		Label control (S)		