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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS
IPTV multimedia services and applications for IPTV –
General aspects

Enhanced user interface framework for IPTV terminal devices

Recommendation ITU-T H.703

ITU-T

ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Telepresence	H.420–H.429
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND, TRIPLE-PLAY AND ADVANCED MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619
Advanced multimedia services and applications	H.620–H.629
Ubiquitous sensor network applications and Internet of Things	H.640–H.649
IPTV MULTIMEDIA SERVICES AND APPLICATIONS FOR IPTV	
General aspects	H.700–H.719
IPTV terminal devices	H.720–H.729
IPTV middleware	H.730–H.739
IPTV application event handling	H.740–H.749
IPTV metadata	H.750–H.759
IPTV multimedia application frameworks	H.760–H.769
IPTV service discovery up to consumption	H.770–H.779
Digital Signage	H.780–H.789
E-HEALTH MULTIMEDIA SERVICES AND APPLICATIONS	
Personal health systems	H.810–H.819
Interoperability compliance testing of personal health systems (HRN, PAN, LAN, TAN and WAN)	H.820–H.859
Multimedia e-health data exchange services	H.860–H.869

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T H.703

Enhanced user interface framework for IPTV terminal devices

Summary

The enhanced user interface (UI) framework defines the functional elements supporting enhanced capability of user interaction over an IPTV terminal device. The enhanced UI functions are located in the end user functions of terminal device and coordinate together with IPTV terminal functions. The enhanced UI functions include user interface of touchscreen and speech.

This Recommendation also describes the event features, general requirements and functionalities of the framework to support enhanced user interface for IPTV terminal device, which are recommended on the basis of IPTV architecture ITU-T Y.1910.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Table of Contents

		Page
1	Scope.....	1
2	References.....	1
3	Definitions	1
	3.1 Terms defined elsewhere	1
	3.2 Terms defined in this Recommendation.....	2
4	Abbreviations and acronyms	2
5	Conventions	2
6	Introduction.....	3
7	Requirements	4
	7.1 Touchscreen requirement	5
	7.2 Speech requirement	5
8	UI functionality and interfaces	6
	8.1 Touchscreen.....	7
	8.2 Speech.....	13
	Appendix I – Examples of functional flow for mirroring remote controller	19
	Appendix II – Examples for generating touch/key input event data.....	22
	II.1 Case I: Multi-touch tracking not supported.....	22
	II.2 Case II: Multi-touch tracking supported.....	23
	II.3 Case III: Example of key button "A" input	24
	Appendix III – Summary of relevant standardization activity.....	26
	I.1 W3C.....	26
	I.2 ISO/IEC JTC1 SC35.....	26
	I.3 ITU-T.....	27
	Bibliography.....	28

Recommendation ITU-T H.703

Enhanced user interface framework for IPTV terminal devices

1 Scope

This Recommendation describes the event features, general requirements and functionalities of the framework to support enhanced user interface for IPTV terminal device. This Recommendation focuses on touchscreen and speech at a high-level.

The purpose of enhanced UI framework is to define the functional element supporting enhanced capability of user interaction over an IPTV terminal device regarding touchscreen and speech interface.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T H.760] Recommendation ITU-T H.760 (2009), *Overview of multimedia application frameworks for IPTV services*.
- [ITU-T Y.1901] Recommendation ITU-T Y.1901 (2009), *Requirements for the support of IPTV services*.
- [ITU-T Y.1910] Recommendation ITU-T Y.1910 (2008), *IPTV functional architecture*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application [b-ITU-T Y.101]: A structured set of capabilities, which provide value-added functionality supported by one or more services.

3.1.2 application programming interface (API) [b-ITU-T Y.110]: This is an implementation interface between equipment and a software module and does not have any physical realization as it is internal to the equipment.

3.1.3 content [b-ITU-T H.780]: A combination of audio, still image, graphic, video, or data.

NOTE – Variety of formats is classified as the "data" (e.g., text, encoded values, multimedia description language introduced by [ITU-T H.760]).

3.1.4 terminal device (TD) [ITU-T Y.1901]: An end-user device which typically presents and/or processes the content, such as a personal computer, a computer peripheral, a mobile device, a TV set, a monitor, a VoIP terminal or an audio-visual media player.

3.1.5 user agent [b-W3C WebArch]: One type of web agent; a piece of software acting on behalf of a person.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

- 3.2.1 approaching tool:** A tool to contact or to point touchscreen, e.g., a finger or a stylus pen.
- 3.2.2 event packet:** A packetized stream of touch input event.
- 3.2.3 speech:** Speech is the vocalized form of human communication.
- 3.2.4 speech recognition:** A kind of user interface for translation of spoken words into text.
- 3.2.5 touchscreen:** A touchscreen is an electronic visual display that the user can control through simple or multi-touch gestures by touching the screen.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

API	Application Programming Interface
DB	Database
DNN	Deep Neural Network
DOM	Document Object Model
EPG	Electronic Programme Guide
ICT	Information and Communication Technology
JPEG	Joint Photographic Experts Group
NLP	Natural Language Processing
PNG	Portable Network Graphics
QA	Question Answering
TD	Terminal Device
TV	Television
UI	User Interface
VOD	Video on Demand

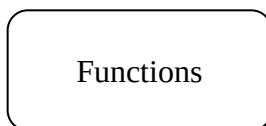
5 Conventions

The following conventions are used in this Recommendation:

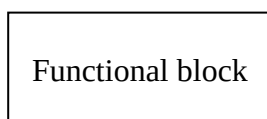
- The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.
- The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.
- The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.
- The keywords "is not recommended" indicate a requirement which is not recommended but which is not specifically prohibited. Thus, conformance with this Recommendation can still be claimed even if this requirement is present.
- The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that

the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.

- The keyword "functions" is defined as a collection of functionalities. It is represented by the following symbol in the context of IPTV architecture:



- The keyword "functional block" is defined as a group of functionalities that have not been further subdivided at the level of detail described in this Recommendation. It is represented by the following symbol in the context of IPTV architecture:



6 Introduction

The enhanced UI is considered as a functional element supporting enhanced capability of user interaction in an IPTV terminal device. Figure 1 shows the recommended conceptual diagram for presenting relation of enhanced UI functions in the case of IPTV terminal device, which is based on the IPTV architecture in [ITU-T Y.1910]. The enhanced UI functions element is located in the end user functions of terminal device, and coordinates together with IPTV terminal functions. The enhanced UI functions include user interface of touchscreen and speech.

A touchscreen is an input device that allows users to operate a device simply by touching the display screen. Touchscreen technology is one of the ways for IPTV users to interact with IPTV services. However, most IPTV sets still do not have touchscreen capabilities for direct touching on an IPTV screen. However, there are alternative ways for IPTV viewers to interact with IPTV services, such as using handheld devices with touch screens (e.g., smartphones and tablet computers).

Handheld devices can be used as "screen-mirroring remote controllers". These handheld devices have touchscreen capabilities that, coupled with screen-mirroring remote control service capabilities, can be used to control IPTV functions and applications of the set-top box as if the user directly touched the IPTV screen.

With screen-mirroring remote control service, users can watch IPTV content with an intuitive and convenient way to manipulate IPTV functions and applications.

Speech interface is used in IPTV services to control and interact with the IPTV terminal device. Users can, for example, change channels or control volumes with their own voice. Users can also ask questions in natural language on the IPTV programmes such as the title of a specific TV drama using advanced speech interface functions. Speech interface is much used in the current diverse information and communication technology (ICT) systems including mobile environment that provides convenient user experiences to control various devices and tools due to the advancement of speech recognition and speech synthesis technology. Some examples would include car navigation systems with speech, voice search system, interactive intelligent assistant service, English educational services, and intelligent chatting robots. It also provides the core function for providing accessibility to ICT systems including IPTV for users with disabilities.

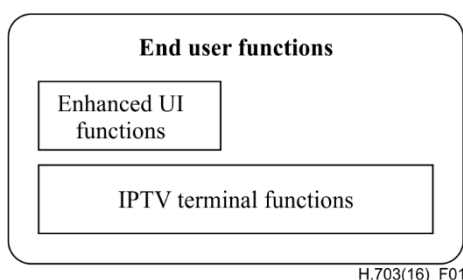


Figure 1 – Enhanced UI functions in case of IPTV terminal device

7 Requirements

General UI requirements for IPTV service are as follows:

- The UI is recommended to support events from input devices like keyboard, mouse, etc. in IPTV terminal device.
- The UI is recommended to support events from input interfaces for joysticks, microphone, etc. in IPTV terminal device.
- The UI is recommended to provide multiple modes of input and output in IPTV terminal device, e.g., touch and speech.
- The UI is required to support an application interacting with a user in IPTV terminal device.
- The UI is required to support MAFR [ITU-T H.760] application, especially web-based application, and hybrid web application interacting with a user in IPTV terminal device, in which a hybrid web application is written by a MAFR standard language together with a system application programming interface (API) call.
- The UI is required to be comprised of three distinct layers for MAFR-based interface between user and IPTV terminal device: MAFR user interface layer, hybrid application interface layer and system service interface layer.
- The UI is recommended to have the MAFR user interface layer that requests a process according to the system API call from a hybrid application interface layer, which performs a process according to the MAFR standard language.
- The UI is recommended to have a hybrid application interface layer that requests the process corresponding to the system API call from system service interface layer, which includes a system API processing unit that processes the system API in response to the request of the MAFR user interface layer.
- The UI is recommended to have a system service interface layer that performs a system-dependent operation corresponding to the system API that is based on the request of the hybrid application interface layer. The UI is recommended to notify a user about what kinds of UI modes are supported in IPTV terminal device.
- The UI is recommended to support user experience of interaction in different mode of IPTV terminal devices, including mobile and pad type device.
- The UI is recommended to support events from a remote controller in IPTV terminal device.
- The UI is recommended to provide an interface for end-user's preference setting in IPTV terminal device.
- The UI is recommended to provide an interface for switching between different display modes in IPTV terminal device.

7.1 Touchscreen requirement

The following are requirements regarding touchscreen in IPTV terminal device:

- The touchscreen component is required to support touch capability to a user.
- The touchscreen component is required to support the touch-based interaction between the user and touchscreen.
- The touchscreen component is required to support touch-sensitive screen to capture interactions between the user and touchscreen.
- The touchscreen component is recommended to support touchscreen remote control functions such as screen-mirroring remote control functions.
- The touchscreen component is recommended to support instantaneous response to user by reaction.
- The touchscreen component, including touch controller, is recommended to consume as little power as possible.
- The touchscreen component is recommended to support other types of touch methods, e.g., pen or mouse.
- The touchscreen component is recommended to support multi-touch input methods.

The requirements for the screen-mirroring remote control service are as follows:

- IPTV terminal device is required to support frame buffer access interface for capturing IPTV screen.
- IPTV terminal device is required to support event adaptation capabilities for adapting events such as touch input event and key input event.
- IPTV terminal device is recommended to support event drivers for analysing events such as touch input event and key input event.
- IPTV terminal device is recommended to support image compression function e.g., joint photographic experts group (JPEG), portable network graphics (PNG), etc.
- IPTV terminal device is recommended to support moving picture encoding function, e.g., ITU-T H.264, etc.
- Remote controller is required to support display capability.
- Remote controller is required to support touchscreen capability.
- Remote controller is required to support event processing capabilities for aggregating events such as touch input event and key input event.
- IPTV terminal device and remote controller is recommended to support a communication protocol and message format for a data communication.

7.2 Speech requirement

The following are the requirements regarding speech interface in IPTV terminal device:

- The speech component is required to support speech capability to a user.
- The speech component is required to support voice commands to control IPTV services.
- The speech component is recommended to be adaptable to the different user devices for speech interface.
- The speech component is recommended to support instantaneous response to user by reaction.
- The speech component is recommended to support the user's preferences.