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INTERNATIONAL ELECTROTECHNICAL COMMISSION

THE UNIVERSAAL FRAMEWORK FOR USER INTERACTION IN MULTIMEDIA AAL SPACES

FOREWORD

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The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
100/2189/PAS	100/2228/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

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INTRODUCTION

Ambient Assisted Living (AAL) strives to ensure the independence, safety, wellbeing and autonomy of users by using ICT, including multimedia systems and equipment and audio / video communication, for creating intelligent living environments that react to the needs of users by providing relevant assistance. Such intelligent environments can be labelled as AAL Spaces, which are characterized by a number of devices that can be stationary, mobile or embedded within other objects. Multiple users can find themselves in an AAL space simultaneously, possibly moving around within the AAL space, and entering and leaving it dynamically. These characteristics introduce new challenges when it comes to handling interaction with users in AAL spaces.

With the assumption that people are surrounded by highly distributed systems of networked interactive devices, AAL intensifies the paradigm shift from Human-Computer Interaction (HCI) to Human-Environment Interaction (HEI). One of the main challenges of HEI is to keep the multiplicity of functional units hidden to humans while making the functionality provided by them easily available based on natural ways of interaction. Instead of controlling each device separately, users should be able to interact with a whole device ensemble as one single unit and articulate goals instead of looking for functionality at the level of each single device separately (Figure 1).

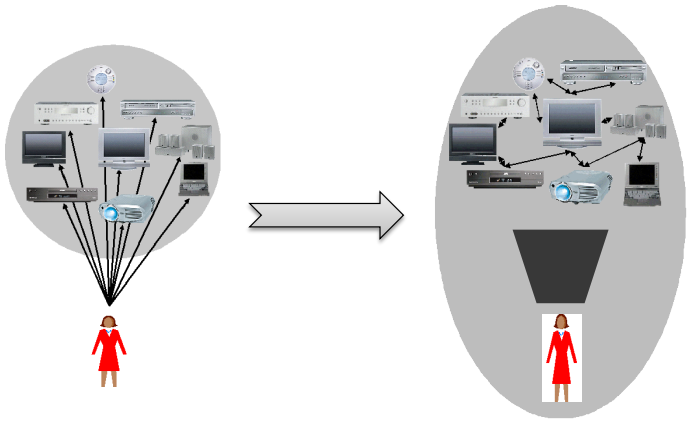


Figure 1 – Paradigm shift from HCI to HEI

Another important challenge for designers and developers of systems in AAL spaces is that interaction with applications can take place through a variety of devices at different locations with different capabilities in terms of serving a single user privately or not, supported modalities, modality-specific parameters such as screen size and resolution, power consumption, etc., which implies the need in AAL spaces to logically separate the application layer from the presentation layer (Figure 2).

Consequently, applications have to use abstract user interfaces that are device-, modality-, and layout-neutral and allow to postpone the rendering of the user interface to the execution-time, which makes it possible to interact with users in a personalized and situation-aware way. The separation of concerns also facilitates the creation of clean programming interfaces based on an open and flexible architecture that have to enable the plug-and-play of both applications and user interaction handlers (UI handlers), and allows UI handlers to serve arbitrary applications.

The resulted openness complements the openness supported by IEC 62481-2 that enables the sharing of multimedia content and streams within an ensemble of devices. It adds the

perspective of *sharing the input and output channels provided by those devices*[1] to the DLNA perspective of content sharing.

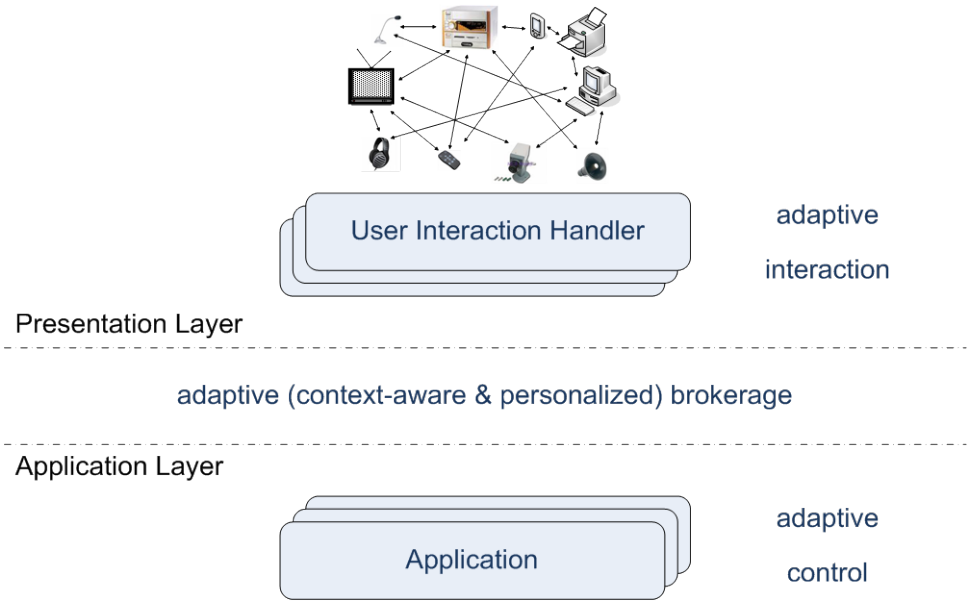


Figure 2 – logical separation of application and presentation layers

[1] This understanding of the term I/O channel is based on the actual roles of devices that enable interaction with human users: a display provides a visual output channel, a loudspeaker, an audio output channel, and a microphone, an audio input channel.

THE UNIVERSAAL FRAMEWORK FOR USER INTERACTION IN MULTIMEDIA AAL SPACES

1 Scope

This Publicly Available Specification (PAS) specifies a framework for adaptive handling of explicit interaction among humans and AAL spaces. This is based on a differentiation between explicit and implicit interaction as a consequence of the paradigm shift from Human-Computer Interaction to Human-Environment Interaction, further explained in the definition of the latter term.

As a framework, a main subject matter of the specification is the identification of relevant areas for further standardization, thereby also looking at the interrelationships among the identified areas. The PAS also provides a first extensible specification in some of those areas.

The proposed UI framework has been derived from the logical separation of application and presentation layers as depicted by Figure 2, and encompasses the following elements (Figure 3):

- Analysis of the relationships between UI handlers and I/O devices without specifying possible languages, models, or abstract APIs for interaction with these devices, as there are certain international standardization activities that go in this direction[2];
- the language and model for describing application-specific dialogs / user interfaces as part of UI requests made by applications to the UI framework;
- the adaptation concept and parameters needed to achieve adaptive UI and the way they affect UI requests; and
- Protocols used by the UI framework to broker between UI handlers and applications as pluggable components.

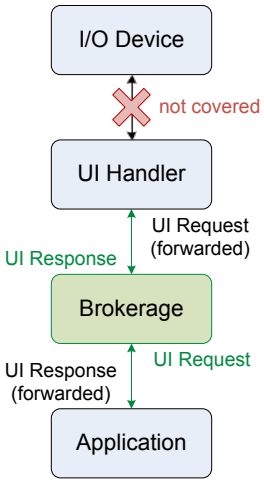


Figure 3 – The scope of the specified UI framework marked by the green colour

2 For example [3] on representing user input coming from input devices.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62481-2, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 2: DLNA media formats*

ISO/IEC Guide 71:2001, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

ISO 9241-11:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 11: Guidance on usability*

ISO 9241-110:2006, *Ergonomics of human-system interaction - Part 110: Dialogue principles*