

URC Based Accessible user interfaces for future TV applications

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1 SUMMARY

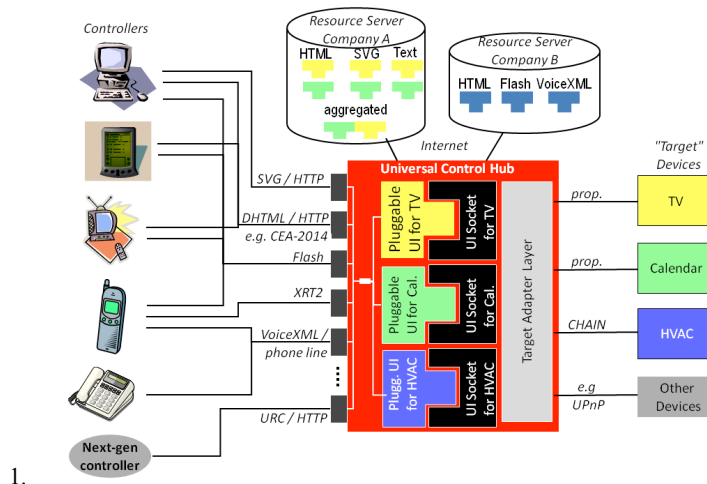
This paper presents a new architecture to make today's and next generation's Television accessible for all. Our proposal is based on the ISO/IEC 24752 "Universal Remote Console Framework" standard [1]. This standard defines an abstract user interface layer called the "user interface socket" and allows the development of pluggable user interfaces for any type of user. Since this architecture is standard based, the development of compatible pluggable interfaces is open to any third party.

Besides, the Universal Control Hub (UCH) is a gateway oriented architecture for implementing the Universal Remote Console (URC) framework in the digital home [2].

The main features of the UCH are:

- It acts as a bridge between targets and controllers: each with its own communication and control protocol, that otherwise would be unable to talk to one another.
- Standard-based user interface socket: The UCH is based on the URC framework previously introduced.
- A variety of user interface protocols: The UCH allows different user interface protocols (DHTML over HTTP, Flash, etc.) to be implemented and used by controllers.
- Globally available resource servers: The UCH can get distributed resources, such as target adaptors, target discovery modules and user interfaces from resource servers.

Figure 1 shows the UCH architecture for the URC standard.



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Fig 1. UCH architecture

For more implementation details, have a look to the short paper titled “URC Based Accessible TV” which was presented at the EuroITV 09 [3]. This paper explains in detail the application of the approach to make the remote control of TV sets universally accessible.

In two European projects, we have developed and tested this approach to ensure the accessibility of the TV and the digital home. The scope of the first project, i2home [4] is the Intuitive Interaction for Everyone with Home Appliances based on Industry Standards. In this way i2home is making devices and appliances at home more accessible to persons with mild cognitive disabilities and older persons.

The second project, Vital [5] proposes a combination of advanced information and communication technologies that uses a familiar device like the TV as the main vehicle for the delivery of services to elderly users in home environments. The new services offer will depart from traditional assistance schemes, but it considers other important demands, such as: the need for information, the need for inter-personal communication, the need for personal advice, the need for edutainment, the need to be able to move safely in the physical environment and the need to integrate into the mainstream society.

In the i2home project we have made accessible the control of different devices: TV, Calendar system, Siemens home appliances, etc. In the case of TV, two different implementations have been done. On the first iteration of the project, the Dreambox 7025 [6] was integrated to the UCH architecture, while in the second iteration Microsoft Vista Media Center [7] was integrated to the UCH.

In this project, several advanced user interfaces have been developed to control the TV and the other devices and services. For example, for the control of the TV, a multimodal user interface running in a PDA adapted to people with cognitive impairments and an accessible DHTML page for the people with sight impairments have been developed.

One of the advanced interfaces deployed on the TV has been the virtual character or the avatar, which has shown good results on tests conducted with persons with Alzheimer's Disease ranging from mild to moderate [8, 9]. An example of this advanced user interface is shown in Figure 2.

In contrast to i2home, the Vital project is centred in providing accessibility to a concrete user group, which is the elderly people without any special impairment, just the ones associated to the aging. In the Vital project, the client devices have been restricted to the TV at home and the mobile phone outdoors. The Vital project concentrates its effort in providing more services to a concrete user group, in contrast to i2home, which follows an "interfaces for everyone" approach.



Fig 2. Virtual character's user interface displayed on TV.

Following the previously stated objectives, the Vital project provides the following services interacted through the TV:

- Videoconference service.
- Edutainment & Entertainment services (e.g. Chess game and quiz game).
- Personalised information services (e.g. personalised news and navigation).

Other pluggable user interfaces for different client devices and users could easily be developed for the services integrated in the Vital project.

From our point of view, there is no user interface that fits all user groups' needs or preferences. User interaction modalities that are useful for some users could be disturbing or unnecessary for others. So, we believe that the solution consists in providing a standardised and open architecture that allows third parties to rapidly develop pluggable user interfaces adapted to the needs or preferences of each user group. In this way, an open market for these pluggable user interfaces could be established and people would be able to share or buy different user interfaces.

Regarding the provision of accessible UIs for future TV applications, we propose to make use of the UCH architecture. This way, the different services and devices can be accessed through the different TV platforms. The UCH can be implemented in the home gateway, specific PC or even in the TV set itself. Figure 3 depicts our approach.

This figure shows different target services integrated using their own protocols and that are accessed from different TV sets. The resource server object reflects the option of using the UIs and integration modules downloaded directly from the Internet.

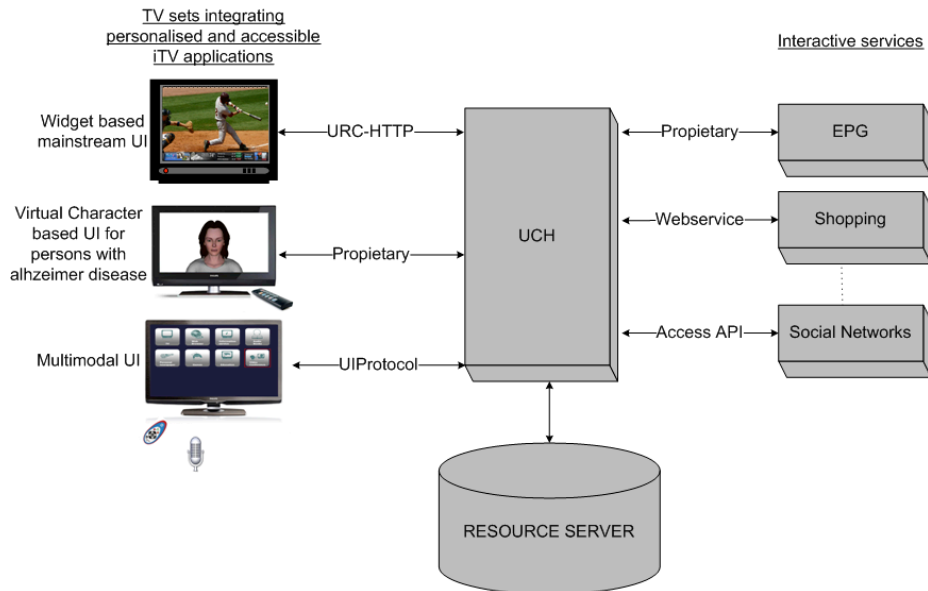


Fig 3. Proposed approach for the provision of accessible user interfaces for future TV applications.

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