

EASY ALLIANCE: A new standard to enable access to consumer electronics and home appliances (CEHA) by seniors and the disabled

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Abstract – The population of the United States is aging rapidly, and many persons in the older population have disabilities that lower their quality of life. It is important to enable seniors, persons with various disabilities, and other classes of consumers to access the ever-more-complex user interfaces in everyday consumer electronics and home appliances with ease. We have established EASY Alliance (<http://easyalliance.org/>) in order to tackle this issue. By implementing technologies and methodologies suggested by EASY Alliance, manufacturers will be able to provide completely accessible devices without compromising device appearance. The EASY Alliance will also provide testing and rating services. The EASY Alliance, in partnership with consumer groups, is lobbying the U.S. Congress to establish legal standards for the next generation of consumer electronics and home appliances.

I. INTRODUCTION

A set of new standards will be developed by EASY Alliance to enable seniors, persons with various disabilities, and other classes of consumers to access the ever more complex user interfaces in everyday consumer electronics and home appliances with ease. Traditionally, attempts that have been made to make these devices accessible have been unsuccessful. With the advent of flat-panel displays and menu-driven functions, even simple tasks are inefficient and sometimes impossible. To solve this issue at present, the manufacturers have to compromise the aesthetics of the device to create simpler usable interfaces. On the other end, the users have to give up certain valuable features of the device to make a custom user interface. In this paper, the authors outline a new set of guidelines and methodologies which will eliminate both the compromises. The manufacturer will still be able to offer an appealing design, and all classes of consumers, including the disabled, will be able to access device functionality. By implementing the technologies and methodologies suggested by EASY Alliance, manufacturers will be able to provide completely usable devices without compromising device appearance. All users will continue to enjoy their device and will be able to use the device fully.

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II. METHODOLOGY

Every CEHA device manufactured today has a common underlying architecture and platform upon which different models and features are offered. All the controls are controlled using a microcontroller or a microprocessor. To be a part of the 'EASY Alliance', the manufacturer will offer control of the device by an alternate method: for example, a blind user could control the CEHA device using a TTS-enabled cell phone equipped with Bluetooth and paired with the device. Although the concept seems simple, there are important underlying assumptions regarding the implementation. In order for the standard to be successfully adopted, it will be necessary for the manufacturer to make modifications to the internal design. The benefits of such a standard can be realized only if the standard is widely adopted both by the manufacturers and the user community. The cost of implementation will be a fraction of today's custom solutions.

A. Previous Efforts at Device Control Standardization

Past work in this field suggests that many possibilities for customized and user-oriented design of interfaces for consumer electronics (CEHA) devices. Some work has been characterized by adaptation of existing relatively inaccessible interfaces, such as audio-free touchscreens, for usage by e.g. blind populations through an audio "overlay" that includes all aspects of and thereby repackages the interface in an audio-only format. [1] Similarly, these types of difficult-to-access functionalities can be enabled through use of dynamically-changing tactile buttons adaptive to the visual touchscreen underneath. [2] Intermediate measures such as these can be used to conceptualize the needs of some users in terms of accessing current consumer technology; in particular, there will be large variation on interfaces needed by different segments of the target population, so designing an output leading to a highly customizable output will greatly expand the user base for a given product. Further work in this area so far allows for customization of interface based on a one-time assessment of a user's needs in terms of e.g. motor adaptations. [3] The approach we strive for in this work resembles these two in eventual output, in that the end product will contain a range of accessible components customizable for each user and for some user groups; furthermore, it will rely on previously iterated design principles highlighting the importance of specifying *tasks* as opposed to *device components*, allowing for intuitive use of the target device. [4]

The authors will identify CEHA firms who could be interested in utilizing this past work to begin catering to such

groups. International setting organization (ISO) and various national organizations around the world are involved in standards settings in each of the above categories.

B. Universal Accessible Control of CEHA devices

In order to realize a system that functions as a true Universal Remote Console (URC) which can access and control smart CEHA devices, manufacturers need to interpret and combine multiple standards from different categories, including remote controls, hardware, software, keyboards, display, computers, and user interfaces. Existing universal remote controls by Accenda, Cobolt Systems, Dr. Hein GmbH, Hy-Tek Manufacturing, Philips, Sky, Sony and many others allow control of only few CEHA items such as TV, VCR, DVD player, cable box, satellite dish, and stereo systems. These URC cannot control various features of variety of CEHA devices from different manufacturers.

A group that promotes URC standards, the Universal Remote Console Consortium, supports services for and facilitates development of user interfaces that are simple and intuitive to use, including future interface technologies such as natural language interaction. The next level of URC that could benefit varied user groups will be based on standards from various categories, including but not limited to user interface. The authors believe that key CEHA players need to be actively involved in R&D around standards and standards setting, as they have the responsibility to roll out smart devices compatible with set standards, and think that development of embedded systems to simulate smart CEHA devices can be a good starting point. Also, R&D activities in parallel with standards development will help create an understanding of how to map needed standards into a layer model, allowing quick interpretation of various standards needed to realize a true URC device. The EASY alliance in partnership with consumer groups is lobbying with U.S. Congress to make laws to enable adoption and diffusion of such standards.

The need for adoption of this type of accessible interface standard increases as the population of the United States grows older and requires more adaptive devices in order to maintain quality of life. The population of the United States is aging rapidly, and many persons in the older population have disabilities that lower their quality of life which would be well-addressed by more accessible consumer devices: 14.2% of persons over 65 reported long-lasting blindness, deafness, or hearing impairment in 2000, and 42% reported some type of long-lasting disabilities. Furthermore, a broad cross-section of users with disabilities of various types would be well-served by a device interface that could be easily customized by developers with a specific interest in that area, rather than by reliance on a manufacturing company to produce highly customized products for small user groups: 3.6% of persons over the age of 5 in the United States reported long-lasting blindness, deafness, or hearing impairment in 2000, forming a potential consumer base of over 10 million. [5]

III. RESULTS AND CONCLUSION

The EASY Alliance will provide testing and rating services to both the manufacturers and disabled and senior user groups. EASY Alliance will enable the manufacturers to get technical feedback for improving their modular design. In business, the upside potential of extra sales generated by these 'new markets' for the seniors and disabled users is huge. The manufacturers do not have to invest new capital for these improvements; they simply have to make sure that the APIs are provided as per the EASY Alliance guidelines, with minor modification to their internal hardware. The EASY Alliance will collect and analyze feedback of various user groups and accordingly improve the user-interfaces with each upgrade. A rating standard and scale will be developed to measure customer satisfaction for users, allowing EASY Alliance standards to provide economies of scale and cost savings to the manufacturers, added value to all consumers, and compliance with proposed accessibility regulations.

Making custom user interfaces for today's CEHA devices is very expensive and sometimes impossible to implement. Neither the manufacturer nor the user can afford such customizations. With minimal cost to the user and with minor internal modifications to the device, a comprehensive strategy seems to be the best compromise. Clearly, it is a win-win situation: both manufacturers and users will benefit. The EASY Alliance design standard will be more cost-effective when many manufacturers and all types of disability groups commit to adopt the standard and the true economies of scale can be realized.

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