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Focus Group on Audiovisual
Media Accessibility

Technical Report

Part 8: Final report of activities of Working Group F "Participation and digital media"

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FOREWORD

The procedures for establishment of focus groups are defined in Recommendation ITU-T A.7. The ITU-T Focus Group on Audiovisual Media Accessibility (FG AVA) was proposed by ITU-T Study Group 16 for creation in-between TSAG meetings and it was established on 22 May 2011. The Focus Group was successfully concluded in October 2013.

Even though focus groups have a parent organization, they are organized independently from the usual operating procedures of ITU, and are financially independent. Texts approved by focus groups (including Technical Reports) do not have the same status as ITU-T Recommendations.

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Summary

This Technical Report of FG AVA was prepared by Working Group F "*Participation and digital media*" and outlines the conclusions of the work of Working Group F.

This Technical Report identifies existing problems in developing and providing accessibility devices and services and proposes a vocabulary and a set of recommendations through an end-to-end analysis of the domain of accessibility in electronic media.

Keywords

Accessibility, adaptable interface, inclusive design, multimodal interface, participation taxonomy, personalization, usability, user model.

1   Introduction

Older adults are the fastest growing demographic group while currently around 15% of the total world's population, or roughly 900 million people, live with a disability. Modern research in intelligent interactive systems can offer valuable assistance to the elderly and to people with disabilities by helping them to engage more fully in the world. However, many users find it difficult to use existing interaction devices because of physical or aging-related impairments.

As an example of digital exclusion, statistics shows about 70 % users between 65 and 74 years old had never used Internet and 39% cannot use mobile phones in European countries. Existing research on intelligent voice recognition, adaptable pointing, browsing and navigation, affection and gesture recognition can hugely benefit them.

Additionally, systems and services developed for the elderly or for people with disabilities often find useful applications for their able bodied counterparts – a few examples are mobile amplification control, which was originally developed for users with hearing problems, but helpful in noisy environments, audio cassette version of books originally developed for blind users, and standards of subtitling in television for deaf users and so on. Furthermore, many important technical achievements could not yet be implemented at the industrial level, mostly due to lack of awareness among industrial developers, and missing software and guidelines support during design and development. Existing research on intelligent systems often works for 'average' users and excludes a certain portion of the population who finds it difficult to use the existing systems and may benefit from intelligent adaptation of the interface.

However, accessibility practitioners and other computing professionals often fail to understand each other and come up with the wrong solution. Lack of knowledge about the problems of users with disabilities and elderly users has often led designers to develop non-inclusive systems. On the other hand, accessibility research often focuses on developing tailor-made products for certain types of disability and lacks portability across different platforms and users.

2   Scope

This Technical Report summarizes a set of recommendations for all stakeholders of audiovisual media to make it more usable and accessible.

3   Existing problems

3.1   Mainstream products and services often ignore accessibility issues

3.2   Accessibility of smartphones[1]

There exists a gap between accessibility practitioners and other computing professionals, they often fail to understand each other and come up with the wrong solution. Lack of knowledge about the problems of users with disabilities and elderly users has often led designers to develop non-inclusive systems. On the other hand, accessibility research often focuses on developing tailor-made products often using proprietary solutions rather than open standards for certain types of disability and lacks portability across different platforms and users. Additionally, low commercial priority and lack of legislation and regulation fail to enforce mainstream products to enforce accessibility.

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[1] http://www.crtc.gc.ca/eng/publications/reports/rp110327.htm.

3.3 Difficulty to map accessibility features to users' range of capabilities

Two examples:

– Microsoft Windows 7 offers lot of accessibility features but, it is difficult to understand if a user knows that increasing button spacing or changing mouse settings will reduce the number of wrong selection.

– Samsung launched a new multimodal TV set, but no way for users to select the best combination of modalities based on the users' range of abilities.

In providing accessibility for digital media, it often turns out to be problematic to select the appropriate way to provide accessibility. Accessible systems such as subtitling or audio caption often require significant time and effort to prepare, and it may not be possible to provide it indiscriminately. The issue becomes more pertinent for selecting an appropriate selection of accessibility devices. At present, there is no way of choosing the appropriate accessibility options for different users and media except on a case-by-case analysis, which is not a scalable approach. Researchers often tried to solve this issue by devising user models that map users' range of capability to accessibility features, but it is not widely adopted in the industry due to lack of portability and standardization.

3.4 Quality of service and participation experience

3.4.1 Quality of captioning is poor in many countries

Industries often offer accessibility as a top up to existing products, and the accessibility features do not go through a regular quality assurance procedure. There also exist technical limitations to provide certain accessibility features such as synchronous subtitling or audio captioning in different languages. Considering all these factors, many accessibility features exist though, but they are often unusable by intended users. Additionally, it is often difficult to quantify what can offer a better quality of experience. Quality of experience is often based on a longer timescale and cannot be evaluated in a short period. Though the existing evaluation techniques mainly emphasize end users, they are not however adequate to evaluate the efficacy of a system with respect to the end users. Most of the existing techniques tried to a make a bivariate or multivariate comparison of performance metrics (such as task completion time, number of errors made, speed of execution and so on), but they failed to capture the holistic view of participation. Quality of participation also depends on other socio-economic factors apart from the technology itself complicating the measurement of the effect of an accessible product or service using standard statistical techniques.

3.5 Lack of assistive products, services and scope of education in developing countries

3.5.1 Assistive products and services are too costly in developing countries

Assistive products are often custom built for certain types of disability, which limits their market penetration and in turn increases cost. For example, an augmentative or alternative communication aid application often costs around GBP 100 or USD 150, which is not affordable by middle class families in developing countries. Mainstream software or hardware industries often do not produce and market assistive devices, though a huge market exists for those devices. Many young users with disabilities in developing countries are deprived of proper education due to lack of accessibility teaching tools affecting their overall quality of life.

4   Vision for 2015 -2020 and barriers to the vision

–   All audiovisual media can be accessed by multiple modalities.

–   The media will be intelligent enough to choose the appropriate modality of interaction and accessibility service based on physical, mental and situational impairment of users.

–   Both the content and presentation of media can adapt itself based on context of use and change of range of abilities of users with progression of age or disease.

–   Audiovisual content developers can:

  o   understand;

  o   visualize;

  o   measure effects of impairment on their design.

–   Each product will either serve s different impairment or have a specification about the assumed range of capabilities of users.

–   Audiovisual media will be seamlessly portable to different platforms and transmission media.

A few barriers in 2011 that currently prevent these visions from becoming a reality are as follows:

–   Scalability: Different media are not portable to different platforms and media.

–   Availability: Accessible media and technology is not available in the developing world. Certain key technologies are either missing or underdeveloped.

–   Training: Users need training to use accessible devices and technology, which is not always available.

–   Cost: People in developing countries cannot support state-of-the art assistive devices and technology.

–   Socio-economic status of users with disabilities/elderly users: Many users with disabilities do not get a good education and users with disabilities find it difficult to learn new technologies.

5   Recommendations

Following this analysis, the following set of recommendations is proposed:

5.1   Requirements for design of audiovisual (AV) media

1.   During the design of mainstream products or services, include the specification of the assumed range of abilities of users in the products and services rather than separate accessible products/services from mainstream ones.

2.   Adapt or personalize electronic interfaces based on the range of abilities of users and context of use.

5.2   Recommendations for design of AV media

1.   Consider the diversity of users including young users, speakers of different languages, elderly users rather than addressing a specific segment of the whole spectrum of disability. It does not mean a 'one size fits all' approach, but personalizing products and services based on multiple physical and situational impairments.
For example, a deaf user may have visual impairment as well, so captions should follow a minimum font size recommendation.

2.   Promote content development and editing tools which check the accessibility of contents and prompt for solutions. This can be done either through guidelines (such as the Web Content Accessibility Guidelines (WCAG) or software based on specific application.

3.   Promote development of text-to-speech and voice command recognition technology in minority languages where they do not exist.

5.3   Recommendation for analysing accessibility of AV media

1.   Standardizing a description of participation for different audiovisual media. The description should be used to both classify and describe any instance of participation. Accessibility services will be categorized and mapped, perhaps with the help of a user model, to the taxonomy and vocabulary.

2.   Developing legislations and metrics to ensure quality of accessibility services such as providing predictable delay, correct spelling and synchronized time stamp with captioning.

3.   Considering a set of metrics in quality assessment during system validation. A tentative set of metrics is as follows:

a.   increased enjoyment of using technology;

b.   feeling immersed in experiences;

c.   feeling closer to/more socially connected with collaborators;

d.   feeling less overwhelmed by information overload -- feel that they are getting the info they need, and that they are not being distracted by the irrelevant;

e.   increased connection with others;

f.   enhanced productivity;

g.   enabling new experiences;

h.   enabling participation by the users with disabilities in aspects of life that were formerly inaccessible to them;

i.   less air travel (due to increasing effectiveness of remote collaboration);

j.   fewer car accidents (due to using correct modalities which are less distracting to interact);

k.   increased use of public transit (due to the ability to be productive using devices while on the go).

5.4   Requirements for promoting accessibility in developing countries

1.   Include courses on accessibility in the curriculum of AV professionals at universities.

2.   Provide fund to users with disabilities/elderly users through public funds to buy assistive devices and educating young users with disabilities to avoid localization of accessible services.

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Annex A:
Abbreviations and acronyms

This Technical Report uses the following abbreviations and acronyms:

FG   Focus Group

ICT   Information and Communication Technology

ITU-T   The ITU Telecommunication Standardization Sector

TSAG   Telecommunication Standardization Advisory Group

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