



ACCESSIBILITECH

Advanced methodologies to identify, assess and transfer innovative solutions for the accessibility of people with disabilities

Deliverable 3.2.e

Evaluation report of the beta transfer of the Telecare solution



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1. Summary

The following deliverable offers the evaluation of the solution selected in the beta testing for the telecare area within the Accessibilitech project, this solution has been extracted from the mapping tool created within the framework of the project, thus ensuring that the solutions that reached the beta testing phase were accessible to various disability profiles, as well as scalable, replicable, or transferable. This report is part of Accessibilitech Work Package 3.

2. Introduction

Beta testing is the best chance to find bugs and usability issues before a product is fully released. While internal testing can uncover many problems, nothing can truly simulate real users trying to complete real tasks.

Additionally, beta testing is the first opportunity to test software in an actual production environment versus a lab or stage setting. This ensures the software can perform under real workloads and that speed, storage, and scalability all work as expected.

In the context of the Accessibilitech project, this is of additional importance, as it has been observed that many products are currently not accessible, usable, or designed from a user experience (UX) perspective.

Therefore, finding solutions to improve the lives of people with disabilities in e-learning, telework and telecare was indispensable. But this implies accessibility, which is why this beta testing procedure has been created to test whether the projects collected by the mapping tool are good examples for people with disabilities in these areas.

If you want to know more about the procedure carried out in the beta testing, see deliverable 3.2.a Beta testing project plan.

3. Telecare solution selection

Telecare is technology-based healthcare such as the monitoring of patient vital organs so that they may remain safe and independent in their own homes. Devices may include health and fitness apps, such as exercise tracking tools and digital medication reminder apps, or technologies that issue early warning and detection. The use of sensors may be part of a package which can provide support for people with illnesses such as dementia, or people at risk of falling.

Most telecare mitigates harm by reacting to untoward events and raising a help response quickly. Some telecare, such as safety confirmation and lifestyle monitoring have a preventive function in that a deterioration in the telecare user's wellbeing can be spotted at an early stage.

Telecare is specifically different from telemedicine and telehealth. Telecare refers to the idea of enabling people to remain independent in their own homes by providing person-centred technologies to support the individual or their careers.

Mobile telecare is an emerging service where state of the art mobile devices with roaming SIMs are utilised to allow a client to go outside their home but still have a 24/7 telecare service available to support them.

The 10 solutions chosen for partner voting in the telecare category were:

- Talkitt from different countries of Europe
- SBIR Phase I from different countries of Europe
- Pauto from Spain
- I4case from Spain
- Good Support from Poland
- Brainbeat from Rusia
- Care Hub Package from UK
- Maximiliana from Spain
- Visualfy Places from Spain
- Smart Assist Project from Spain

Finally, the solution selected by the partners of the project in the final vote was Visualfy Places, now we include the evaluation report of this solution.

4. Visualfy Places

They create innovative technology for people with hearing loss, and for companies and organisations committed to accessibility. Their products empower deaf people, and the society they live in, helping through technology to a real integration.

They have developed a unique algorithm, based on artificial intelligence, that recognises sounds and translates them into visual alerts on any connected device. They work every day to improve the algorithm and develop applications that add even more value. They design and manufacture in Spain.

They are part of the international B Corp movement. They believe in a better way of doing business that generates a positive impact on the environment and measures success with social and economic variables. They have been recognised as one of the best companies in the world for our social impact. They donate 0,7% of our profits on training young deaf people in new technologies. They believe that education and labour integration is vital.

There are different products within Visualfy for people such as:

- Visualfy Home
- Visualfy App

- Visualfy Places

and other more focused products for different entities, such as:

- Visualfy workspaces
- Visualfy hospitality
- Visualfy public admins

In this case, Visualfy Places has been used for the betatesting of the telecare area as part of the Accessibilitech project.

According to the World Health Organization there are 466 million deaf people in the world, and they also warn that more than 1.1 billion young people are at risk of acquiring hearing loss at earlier ages due to misuse of headphones, sporting events, nightclubs...

Added to the fact that a third of the population over 65 years of age suffers from disabling hearing loss, gives us a scenario in which it is estimated that in 2050 there will be more than 900 million people with hearing loss in the world.

Through artificial intelligence they provide the means to make inclusion a force for economic and human growth, and to comply with current legislation.

Visualfy Places is a system that, through some devices that they install in the building, is capable of recognizing relevant sounds from the environment -such as a fire alarm, a whistle from the health shift or a citizen attention office, door closing notifies or personalized notifications- and translate them into visual and sensory alerts on any device, both common to the space -intelligent lighting that they install in the building- and personal -mobile, smartwatch or smartband-

To the staff they recommend smartband so that the notification reaches them directly regardless of where they are in the building.

It is worth emphasizing the importance of privacy in AI. The system works locally, in this way they guarantee 100% that no audio can leave the building, nor be heard by anyone. Voices are not recognized but sounds, and it is the system itself responsible for once it has recognized the sound, eliminating it so that no one has access to it. They have obtained the approval of the AEGPD and being chosen in the Success Case Guide of Ethical use of GVA AI.

On the other hand, by installing magnetic loops they improve communication with users of hearing aids and cochlear implants, and through a new voice recognition functionality, they eliminate communication barriers created by the use of masks that make reading lip impossible. Any user will be able to read in real time the information that the building staff wants to transmit. The microphone of the smartphone captures the voice of the staff and transcribes it on the user's screen,

in order to respect the RGPD and protect all workers in the building, users do not have the possibility of saving these conversations. It is available in more than 100 languages.

All the system is centralized in an app available for iOS and Android and totally free for the user that today has more than 100,000 downloads.

This technology can be installed in any building open to the public, although after the pandemic, social and health services are one of the ones that are receiving the most complaints in this regard. Obviously, in buildings such as Assessment Centers for People with Disabilities, Care Centers for the Elderly or those attended by people with disabilities, the installation of this technology is very convenient.

In addition, they also work in cultural buildings such as museums, theaters or libraries, because many of the users are either older people who already have hearing loss or very young users who theyar headphones all day. In sports centers or humid environments, the use of technical aids is also not possible, so it is also recommended to improve acoustic accessibility.

In short, any building open to the public that has access ramps, accessible toilets or Braille in elevators should also consider people who are deaf or hard of hearing.

For this analysis, an in-depth interview was conducted with the team in charge of the product and a version of the product was tested at Ilunion Accessibility in Madrid.

4.1. Analysis

To evaluate Visualfy Places, we met with Manel Alcaide, CEO of Visualfy, who told us about some aspects of the product. The slogan of the product is: Accessible spaces for deaf and hard of hearing people. They allow to enjoy an optimal user experience in environments adapted by Visualfy's technology.

Hotels, offices, public buildings such as libraries, museums or town halls are incorporating sound recognition technology, translating sound notifications into visual alerts for your comfort and safety.

Visualfy offer different kind of accessibility services in spaces, these services are:

- Security alerts and accessible warnings: Visualfy warns you if the fire or evacuation alarm sounds, but also of other eventualities such as the closing time of a library, the sound of a telephone or of the door if you are in a hotel. Always safe and enjoying the experience whether at work, on the road or making use of a public service.
 - Fire alarm
 - Telephone
 - Intercom

- Gas alarm
- Acoustic pollution
- Other accessible notifications
- User experience: Information subtitled and adapted in Sign Language, in particular:
 - Welcome materials
 - Communications materials
- Simultaneous communication: Spaces with magnetic loop and video-interpretation in real time, so that communication is not a problem.
 - Call center in Sign Language (LSE)
 - Magnetic loop

In addition, the users can receive the different alerts from different ways, the spaces adapted by Visualfy have a V-shaped signage system, so that they can always receive alerts, even if their mobile phone is not nearby or there is a power cut. If they prefer, they can receive them on their mobile or on any wearable from the Visualfy app.

- Devices: Receive alerts on any personal connected device (mobile, smartwatch, smartbands). Visualfy adapts to any case of use and need.
- Visualfy signalling system: Light alert points along the adapted space, to ensure their safety, even if they do not use mobile phones or personal connected devices to receive alerts.

In this case, the relationship between the product and the different types of disability was discussed, this product was born from the need of the deaf community to understand the different types of signs, this arises because in an informal meeting, a deaf person tells a hearing person that they are calling, it is at this moment when the deaf person discovers thanks to the explanation of the CEO of Visualfy that there are different types of signs for different types of messages.

The first phase of the product was to have an application where, depending on the notification, a colour and the logo of the application were displayed, this made it very well known in the deaf community, not only in Spain but in more than 122 countries. But the community had other kinds of needs such as:

- The baby cries
- The doorbell rings
- Safety related sounds
- Sounds related to autonomy

All these were needs identified in a process of more than 100 interviews with the deaf community. All this led to think that not only a mobile application was needed, as it was done previously, but that in this project artificial intelligence would have to play a role and be able to have objects that could detect if a sound is produced or not.

It was very important for the project to look for deaf investors, who were really interested in the development of this project. **"Nothing for us without us"** is why, under the perspective of user experience, we have included the person with a disability, in this case hearing, who has had relevance in the whole process.

They have even had meetings with entities specialized in other types of disabilities, but it is true that they have not yet addressed these issues, since their focus has always been deaf people and people with hearing problems. Although they are already organizing to see how to improve the technology so that it is useful for all disabilities and discover with all these entities if their technology has any drawbacks for a disability, for example, autism.

Now the time has come to address the rest of the disabilities.

Regarding the types of alarms that we were able to verify, it is for example the shifts in the hospital or medical centres, something that had not been addressed until now and that is requested by the European Accessibility Act. The technology has three devices. The first of these is a system that is constantly listening, but how does this affect ethics and artificial intelligence? Visualfy technology has three agents:

- Detector
- processing hub
- Devices showing notifications

The first of these is a system that is constantly listening, but how does this affect ethics and artificial intelligence?

Since the product puts microphones in private places (houses) such as public or private buildings. Audio is guaranteed to never leave the building, so instead of uploading audio to the cloud, it works exclusively locally within the device. This device removes sound after you have processed it or performed some action on it.

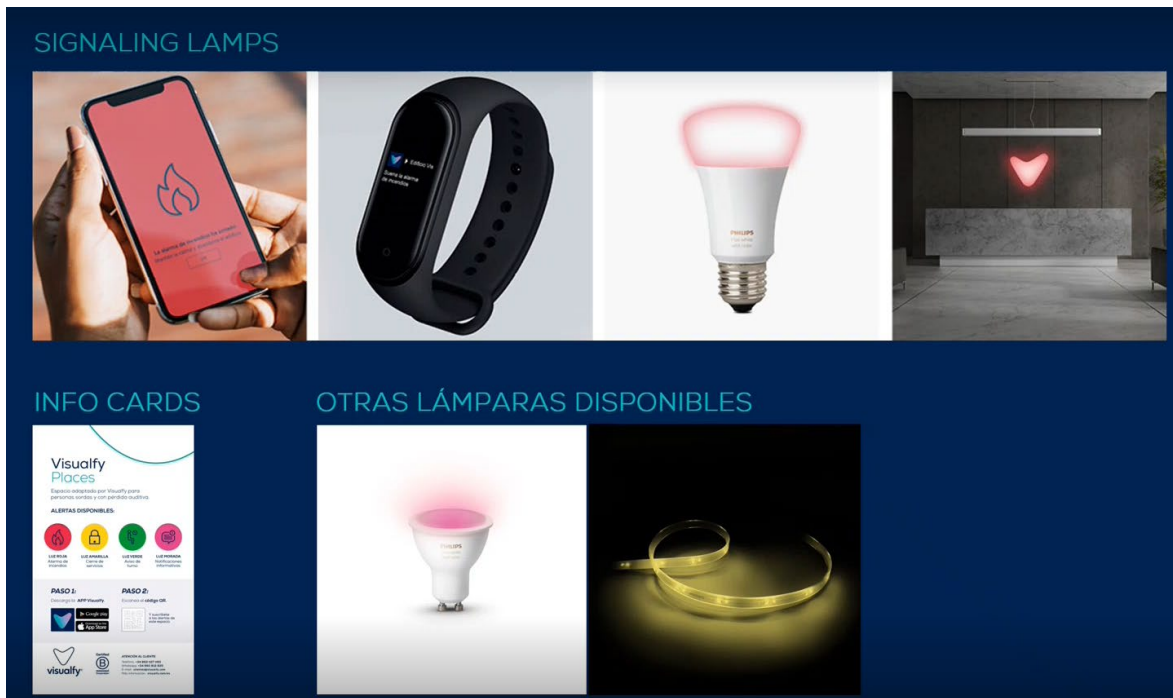
This has served for the approval of the Spanish data protection agency or for the project to appear in the guide to cases of ethical uses of artificial intelligence. Privacy is important, and it was requested by all deaf people.

In addition to the detectors, the processing Hub had to be included, which included a light, a physical signal apart from the connection with the technology. These signs are indicated on the receiver that, apart from the lights, can be mobile phones or smart bands, as already mentioned, this includes iconography and easy-to-read texts for each message. It is important to use the entire region of mobile devices and not a small message. You can also create other routines linked to certain home automation elements. About the colour pattern, and the difficulty with colour blindness, this is solved on the mobile screen with the iconography, but the team is also investigating how to carry it out in buildings, although the solutions are still not cheap enough for the buildings are encouraged to install it.

Currently they combine the physical light with the notification that reaches the personal device.

The pattern types are as follows:

- Acknowledgment: The alert is acknowledged by the sound that is produced.
- Integration: The alert reaches us via integration with the client's computer systems.
- Cloud: The alert is launched with a configurable schedule from the Visualfy cloud control panel or by launching it manually from the same panel.



As regards the mobile application, an application has not been created with public or private entities so as not to force the user to download an application for each building. Nor has any kind of integration been done with them.

Regarding the mobile application, it complies with the WCAG 2.1 standard at level AA, including sign language throughout the application and it is also free.

Understanding WCAG 2.1 is an essential guide to understanding and using "Web Content Accessibility Guidelines 2.1" [3]. Although the normative definition and requirements for WCAG 2.1 can all be found in the WCAG 2.1 document itself, the concepts and provisions may be new to some people. Understanding WCAG 2.1 provides a non-normative extended commentary on each guideline and each Success Criterion to help readers better understand the intent and how the guidelines and Success Criteria work together. It also provides examples of techniques or combinations of techniques that the Working Group has identified as

being sufficient to meet each Success Criterion. Links are then provided to write-ups for each of the techniques.

WCAG 2.1 has several levels of conformance: [3]

- For **Level A** conformance (the minimum level of conformance), the Web page satisfies all the Level A Success Criteria, or a conforming alternate version is provided.
- For **Level AA** conformance, the Web page satisfies all the Level A and Level AA Success Criteria, or a Level AA conforming alternate version is provided.
- For **Level AAA** conformance, the Web page satisfies all the Level A, Level AA and Level AAA Success Criteria, or a Level AAA conforming alternate version is provided.

Finally, the analysis demonstrated how this technology eliminates acoustic barriers, which can limit our safety or personal autonomy, and on the other hand communication barriers are eliminated with magnetic loops, sign language and voice-to-text transcription. Some of these measures are already included in train stations in Spain. For all people, also without disabilities, there are signs with the information from Visualfy. Signs in braille and without braille.

5. Conclusions

The reality of Visualfy is that the design has focused on a type of disability, in this case deafness or hearing impairment, although it did not cover the rest of the disabilities in its entirety if we could detect that they have been considered in one way or another. That is why Visualfy Places was chosen for this beta testing, due to its innovation, being a final product implemented and also having masterfully taken into account accessibility for a part of the disability group.

6. References

[1] «Telecare Wikipedia» [En línea]. Available: <https://en.wikipedia.org/wiki/Telecare>

[2] «Visualfy Places» [En línea]. Available: <https://www.visualfy.com/visualfy-places/>

[3] «W3C Introduction to Understanding WCAG 2.1, » [En línea]. Available: <https://www.w3.org/WAI/WCAG21/Understanding/intro>.



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The information contained in this publication does not necessarily reflect the official position of the European Commission.