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This article describes the challenges faced by a team of audio describers to take existing access services at Liceu Opera House in Barcelona to a new level by offering more access services, more features to personalise, and in various languages. The first part of the article will describe Liceu existing access services. The second part will analyse, on the basis of tests with end users performed in 2014 and 2015 by UAB and RNIB, the possibilities offered by wireless connections and the many challenges of the new mobile opportunities.

KEY WORDS: media accessibility, audiovisual translation, audio description, audio subtitling, opera.

Opera accessibility in the 21st century: new services, new possibilities*

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La ópera accesible del siglo XXI: nuevos servicios, nuevas posibilidades

El presente artículo describe los retos a los que se ha enfrentado un equipo de audiodescriptores al recibir el encargo de incrementar y mejorar los servicios de accesibilidad en el Gran Teatre del Liceu, añadiendo nuevos mecanismos que personalicen cada servicio y ofreciéndolos en varios idiomas. La primera parte del artículo describe los servicios preexistentes en dicho teatro. La segunda parte analiza las posibilidades que ofrecen las conexiones inalámbricas y los móviles de última generación tomando como referentes estudios llevados a cabo con usuarios finales en 2014-2015 por parte de la UAB y RNIB.

PALABRAS CLAVE: accesibilidad a los medios audiovisuales, traducción audiovisual, audiodescripción, audiosubtitulado, opera.

INTRODUCTION

In the last century technology was enjoyed in a fixed location. You had to be in a place near a socket to speak over the phone, you had to watch TV next to the electric plug and the aerial, you had to listen to an audio description (AD) next to a jack and at a certain range from the audio describer. In this century, wireless connection has freed us from the fixed location. Technology is no longer determining where, when and how we access the services and their content. Accessibility functionalities are no longer included in specific devices for persons with disabilities but are integrated in standard devices. Humans now decide, and it is up to all stakeholders in opera production to ensure accessibility and to optimise resources.

The Gran Teatre del Liceu is the great Catalan opera house. It opened on 4th April 1847. It is important to understand the background history of one of the largest European opera houses. In its most popular times, it reached the number of 3000 seats and was the biggest in Europe. The Liceu was funded by private shareholders of what would become the Societat del Gran Teatre del Liceu (Great Liceu Theatre Society), organised in a way similar to that of a trading company. The Liceu building has been under constant renovation. The latest took place between 1994-1999 due to a fire caused by a spark that accidentally fell on the curtain during a routine repair. In 1999 the Liceu opened with the same traditional horseshoe-shaped auditorium as before but with greatly improved technical facilities. The new Liceu had also a new participation. Fundació del Gran Teatre del Liceu (Liceu Great Theater Foundation) was created, and the Societat del Gran Teatre del Liceu handed over the ownership of the building to the Foundation. This allowed for a new mixed public/private funding with new social responsibilities.

The technology in the new Liceu included the subtitling system *Figaro* that allows every seat in the theatre to follow the libretto in Catalan, English or Spanish. Surtitles and subtitles catering for linguistic accessibility opened the door to new accessibility services, which have been implemented progressively. The Barcelona Liceu has at its core a public wishing to understand the content of the opera, according to Mateo, 2007: 137):

> «If, not many years ago, opera goers assumed non-comprehension as part of this experience (unless they knew the pieces by heart — which was not uncommon — or studied the libretto before the performance), today's audiences show a desire to understand the verbal text at the same time as they receive the music[.]»

Although linguistic accessibility is now an established service, more services are required to make opera an inclusive cultural performance. This article aims to present how opera accessibility has been approached at Liceu, the role of research in providing these new services, and the challenges and opportunities of new mobile technologies.

OPERA ACCESSIBILITY IN 20TH CENTURY

The Barcelona opera house has followed an active policy on accessibility by increasing its services. Opera multilingual subtitling has been present in most opera houses in Europe (Griesel, 2005; Mateo, 2007a, 2007b; Oncins, 2015) and still is. Some opera houses have also increased the accessibility offer to AD (Matamala & Orero, 2007; Miquel-Iriarte *et al.*, 2012; Oncins *et al.*, 2012). Liceu has had an active social policy, and even before the adoption of

FIGURE 1. *Subtitling booth*

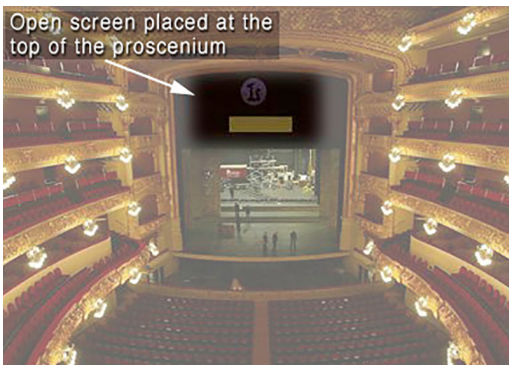

FIGURE 2. *Surtitles in Catalan*

the Convention on the Rights of Persons with Disabilities (CRPD) by UN where accessibility to cultural events is considered a human right (United Nations, n.d.). Liceu's approach is also in line with later legislation such as the Audiovisual Services Media Directive (European Commission, in press), which could be regarded as the EU response to the CRDP, and the local Catalan Accessibility Act (Llei 13/2014, del 30 d'octubre, 2014) (Catalan Government, 2014).

At Liceu, subtitles and surtitles are created and delivered from a purpose built booth as can be seen in Figure 1 below. Subtitles are projected by a person every night following the music score, not a given time code. This is due to the fact that every night the performance can vary, and synchronised subtitles are a must.

At present, Liceu offers subtitles in English, Catalan, and Spanish, with surtitles in Catalan, placed at the top of the proscenium, as can be seen in Figure 2.

Multilingual subtitling is possible thanks to the screens included in the rebuilding after the 1994 fire. Two different types of screens, TFT and TXT, were built in the seats as can be seen in Figure 3: TFT as a TV (image and subtitle) and TXT (only with text).

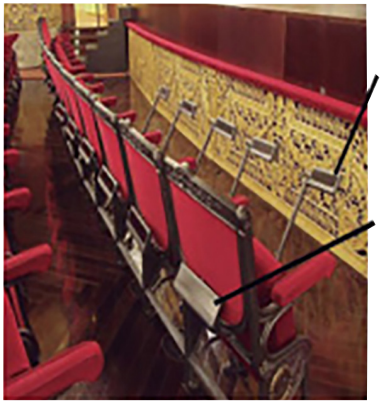

FIGURE 3. *Different TFT screens: the first for text only*

In the 2005-06 season, the Liceu started the new AD service. First, the two largest blind associations in Catalonia produced the services: ONCE and Associació Catalana de Discapacitats Visuals (ACDV). This arrangement meant that one opera was audio described twice, by two different describers, and delivered live twice. Members of each association attended separate performances to listen to the AD. This duplication was terminated by Liceu in the 2006-07 season, where a team from the Faculty of Translation at Universitat Autònoma de Barcelona (TransMedia Catalonia research group) signed a memorandum of understanding to provide this service, and to take the opportunity to do research (Matamala, 2005, 2007; Matamala & Orero, 2007; Orero, 2007; Orero & Matamala, 2007; Cabeza-Cáceres & Matamala, 2008; Puigdomènech *et al.*, 2008; Puigdomènech *et al.*, 2010; Cabeza-Cáceres, 2010; Corral & Lladó, 2011; Miquel-Iriarte *et al.*, 2010; Oncins *et al.*, 2012).

This research approach allowed TransMedia Catalonia and Liceu to start testing new services and strategies linked to AD. A remarkable example is opera audio subtitling.

First tests on opera audio subtitling

In 2005 the Liceu offered the first opera with AD and audio subtitling in Catalan (Orero, 2007). Audio subtitles are defined by ISO/IEC 20071-25 (ISO & IEC, 2017) as "captions/subtitles that are read aloud over the audio in a video." This is a common access service in some European subtitling countries such as the Netherlands, Norway or Sweden, where regulation establishes that all television programmes need to be audio subtitled. The first audio subtitling test in Liceu was an orchestra version of Donizetti's *Roberto Devereux*. The reasons for developing tests on audio subtitling were that with only an audio description of the visuals, blind and visually impaired audiences missed an important part of any opera: the written surtitles were provided as a translation of the sung part. Previous to testing audio subtitles, this written content was either ignored or only briefly summarised by the audio describer, thus relying on the linguistic knowledge of the blind and visually impaired audience.

In the test with Donizetti's *Roberto Devereux*, audio subtitles were read by a human describer in addition to AD and, despite many suggesting that the effect of hearing the voice of the describer on top of the opera singing would not be welcome, the results of the satisfaction questionnaires showed that end users were very happy with this new service. Most blind and partially sighted end users were not aware of the subtitling service at Liceu, so they missed the text of the lyrics. They did not know they could enjoy the translation of what was being sung into their language. After this opera, a new AD style (Puigdomènech *et al.*, 2010) was taken into consideration for Liceu, including audio subtitles next to AD. It must be highlighted that, apart from giving access to the subtitles to blind and partially sighted audiences, audio subtitling has many other advantages for opera. It mitigates the split attention effect of looking at one screen for the subtitles while the action takes place in a different view range. It also offers voiced subtitles for those with reading issues. A final advantage is that it may be delivered by a synthetic voice, because a written input can be easily converted into speech by a text-to-speech system. While this was opposed by end users a few years ago due to the quality of the speech, these days is fully acceptable (Fernández-Torné & Matamala, 2016), although it is yet to be implemented at Liceu.

New access services for diverse audiences

More access services have been implemented recently since Liceu looked at ways to improve sound reception. An induction loop which reduces background sound and augments intelligibility was installed in July 2014. This new service has been installed to all areas of Liceu except for the gods (5th floor). The reason for this is the lack of physical space on the floor to wire the area and the narrow disposition of the seating area.

The last access service implemented at Liceu was in the 2015-16 season: easy reading was adopted. All signals were changed and nowadays the programme and other information such as the opera synopsis are always offered in easy reading, both in Catalan and Spanish, on the opera website.

On 18th July 2015, the first attempt to offer opera subtitles with mobile technology started in one opera: Verdi's *La Traviata*. This opera started the "Liceu a la Fresca" campaign (Gran Teatre del Liceu, n.d.), where opera is projected in open air at night in the summer in different locations so as to reach a wider audience all over the country. This is the departure point for the new challenge of the current century: providing all access services in all productions in three different languages.

21ST REQUIREMENTS AND EXPECTATIONS

The progressive accessibility policy at Liceu has built up end users' expectations, who now expect to have a normalised access to the many performances. Up to now, audio descriptions with audio subtitles were offered only in six operas and only for one performance. The relationship between cost and exploitation is imbalanced because at present one AD script is drafted and delivered only one night, a very ephemeral event that does not allow end users to attend the performance of their choice.

Another problem is that only seats in the gods have a jack to be connected to the TFT screen with image (see Figure 3). This means that end users have to be seated in some pre-established seats with hardly any vision. While one may wonder why a vision seat is needed for blind audiences, the fact is that within the blind audience there is a wide spectrum of conditions. Some persons with low vision can access features such as colour, which may help them follow the performance. Additionally, blind and partially sighted persons may be going to the opera with sighted friends and relatives and, needless to say, they may want to seat in another part of the theatre, according to preference and financial possibilities to purchase seats. Therefore, daily access to content and freedom for seat location are two expectations the Liceu wanted to meet.

With the new financial situation, the possibility of opening a dedicated AD service to offer AD in the same conditions as subtitles was out of the question. An architecture action would have to take place to accommodate the AD booth, and new personnel would have to be employed. The focus was, then, moved from making the environment accessible with the aid of the services of AD and audio subtitling mentioned in previous paragraphs, to the hands of the users. In such context, technology came to the rescue, and mobile technology was seen as the solution, providing autonomy and more choice to the end user.

MOBILE TECHNICAL SOLUTIONS AND SHORTCOMINGS

The technological advance was sought in the use of smartphones. This device has shown to

fulfil the needs of very diverse people. In this case, people with specific needs, being linguistic, sensory or both, may find in smartphones the solution required to solve all the different needs and provide an inclusive access to the operatic event. The implementation of a mobile app was based on previous experiences in the field of accessibility to live cultural events. The following subsections offer an overview of different tests related to mobile technical solutions.

Live accessibility production and distribution

Although not related to opera, at Universitat Autònoma de Barcelona (UAB) a live accessibility production and distribution system was developed: UAS (Oncins *et al*., 2012). This system allowed UAB to implement an active and integrated accessibility policy, whereby live subtitles, AD and sign language were offered in the main academic events: opening of the academic year and Honoris Causa ceremonies. While the system was rudimentary, it offered the possibility of starting an accessible cinema season (UAB, n.d.), but more importantly, it gave a large experience in the main issue present when offering live services through mobile technology: synchronisation.

Focusing on opera, Oncins (2012) studied the different subtitle possibilities according to subtitle editors. There are many editors, and while Microsoft Power Point is not one, it is often chosen since it is seen as the cheapest solution (Vervecken, 2012: 248) and also allows 'flexibility in the amount of text and number of lines and characters' (Mateo, 2007a: 142). After her thorough research, Oncins (2012: 56) concludes:

> For opera, the most popular surtitling software titles are Figaro and Vicom. Figaro is currently being used at the Royal Opera House in London and Vicom at the Gran Teatre Liceu in Barcelona and La Monnaie in Brussels. Another interesting piece of surtitling software is Opera Voice, which has been developed to make use of new smartphone platforms and is currently being tested at the Maggio Musicale Theatre in Florence[.]

This study was published in 2012, and by 2016 no further academic literature, with the exception of Walczak (2017), can be found regarding application of mobile technology in opera houses, and the previous tests in Florence. Be as it may, it seems subtitling and its technology is now mature and can be sent over wireless technology with no technological issues. Regarding subtitle and AD mobile distribution, tests with end users on recorded productions were performed in 2014 by Universitat Autònoma de Barcelona (UAB, n.d.) and in 2015 by RNIB, providing relevant insights to be taken into account when implementing mobile access services in opera.

In Barcelona, Quality of Service tests were performed with 19 blind or low sighted and 15 deaf and hard of hearing users during the Sitges Film Festival 2014 (Europa Press Catalunya, n.d.) the first week of October 2014. In the UK, RNIB launched a three-month user trial in February 2015 with television content in video on demand services (Rai, 2015). The aim of these tests and user trials was to gather views and feedback on the use of app-based AD delivery system.

Tests were performed in two different apps: Moviereading (http://moviereading.com) in the UK and ArtAccéss (http://sdos.es) in Catalonia. Nowadays most European countries have developed their own app such as Watson in The Netherlands (http://watsonapp.nl), Greta und Starks in Germany (Gretaundstarks.de) or Cybercom in Sweden (http://cybercom.com). Though each app is different, they broadly have the following features:

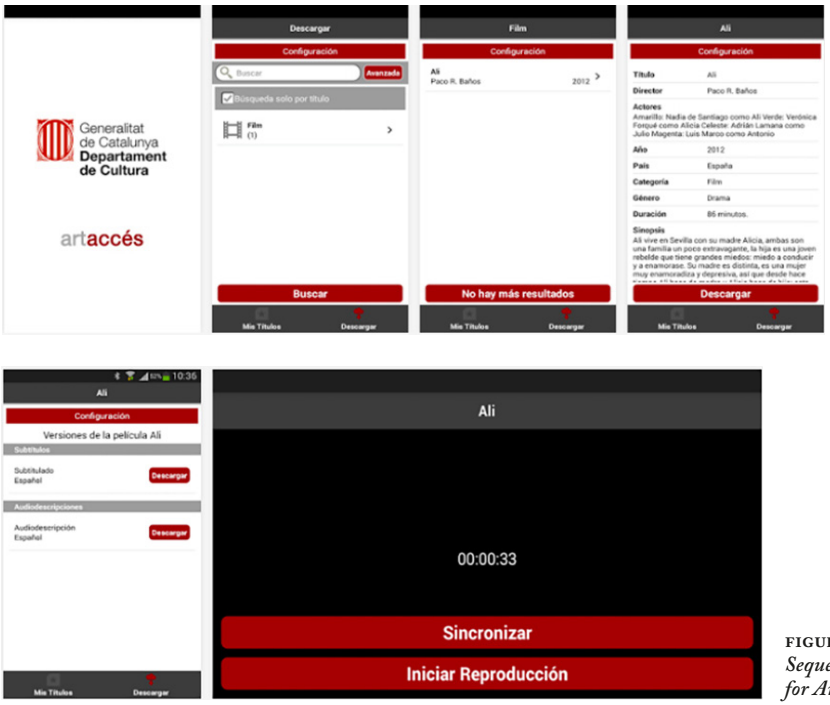

FIGURE 4.
Sequential screens for ArtAccéss Application

- Download, store, and play AD.
- Synchronise at any time during the play, through different technologies such as fingerprinting or sound stamp.

The apps pick up the movie soundtrack using the smartphone's microphone and then synchronise it with the AD at the required moment. The AD soundtrack is downloaded from a dedicated server. Navigation screens also change but they have similar features, as can be seen in Figure 4, which reproduces snapshots of the application ArtAccés.

End user requirements

While feedback in both tests was positive, mostly for AD users, the following conclusions were reached. For the tests in the UK, it was observed that the app could be improved as follows (Rai, 2015: 13):

- The app functionality could be improved if, once the film/TV content was selected and started, the app pulled the related AD track from the library within the app, downloaded it to the phone/tablet or streamed the AD track after identifying the exact point in the playout.
- For the navigation it was considered that adding a search field within the app would simplify the process of looking for a title.
- One of the recommendations was to automatically turn on the airplane mode when the app was opened on the device to avoid receiving calls and disrupting the viewing experience.

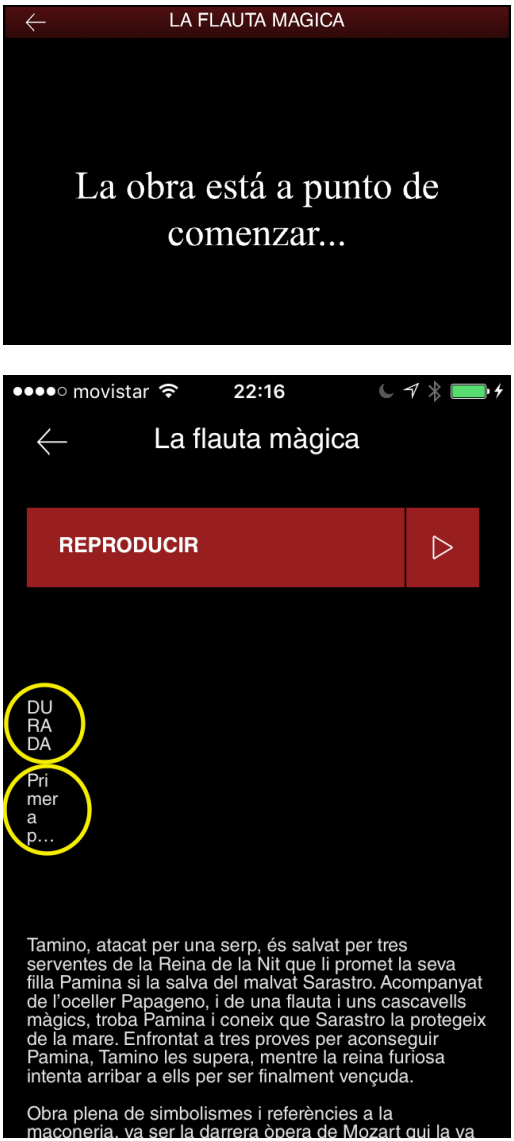

FIGURE 5. *Two examples of typography issues solved*

- Specific training sessions to use the app should be provided on an individual basis and an in-depth user manual should also be made available to users.
- Reporting of bugs should be made easier.

For the tests in Barcelona (Walczak, 2017), where usability was tested through the System Usability Scale, and utility and quality of service through Likert-scale questionnaires, the overall results also showed great potential. End users were quite enthusiastic about the app, but they also offered the following suggestions to improve it:

- The participants unanimously agreed that the quality of the sound was very good, but the volume of AD was definitely too low. Most of them had difficulties with hearing the AD track, so further improvements in sound mix and volume were suggested.
- The AD track should not be put in stereo mode as the blind and partially sighted viewers use only one earplug for listening to it because they have to follow the original soundtrack of the film played in the movie theatre.
- Regarding synchronisation, participants said that once synchronised, the AD track went faultless. However, some participants claimed it was difficult for them to synchronise the file at the very beginning. As they stated, it lacked a signal or instruction to start the AD track.
- Although participants downloaded and used the application on their own and did not request any technical support, they claimed that the interface was a bit too complex for them. For some, it was uneasy to navigate the application as the commands were quite confusing and they did not know what to

press, whereas others complained about the buttons arrangements, claiming they were too close to each other.

The last recommendations by end users highlight a critical feature: how to access the access services and how to interact with the interface. Indeed, both the graphic design and user-app interaction are crucial, and end users claim simplified applications that can be operated more quickly and efficiently.

End user feed-back was transmitted in the form of user requirements to the app developers. Appropriate changes were made to the app, and no second round of testing took place. The reply from developers was to call for a joint meeting to explain what had been implemented and what they considered that was beyond the scope of their contract. As can be seen in Figure 5, the word *DURADA PRIMERA P…* are split and aligned to the left. Also, the font used is a serif. These small changes were implemented regarding typography and navigation. All other issues were left pending for future developments.

THE LICEU APPROACH: HOW TO OVERCOME SYNCHRONISATION CHALLENGES

While mobile access service delivery is a reality for recorded media as the ones described before, such as television or cinema, solutions have to be found for live synchronisation. A first difficulty is to set up the wireless connection for the mobile distribution of access services. To install Wi-Fi connection in a closed area, from where over 2000 end terminals (mobile phones) may connect concurrently is in itself a challenge. Another issue to consider is the fact that some opera houses may have copyright restrictions, or Internet inhibitors may be installed for piracy protection. One way or another, to availability of a robust Wi-Fi signal is the basic step from where to start the service.

Taking into account the lessons learnt from previous research, Liceu has decided to adopt the possibility of offering semi-automated access services in all performances in three languages. The system is being developed within the new Liceu scheme Barcelona Opera Access funded by Vodafone. Through a mobile app subtitles, AD, and audio subtitles in three languages are on offer.

A key challenge has been the AD synchronisation, and the solution has been found linking it to another access service: subtitling. As previously said, live performances of the same opera may vary one from the other. Singers may forget lines and the audience may react differently: whilst on one performance the audience may clap enthusiastically and request an encore with no programmed interruptions, the following night the audience may whistle to show rejection. Regarding subtitling, these and other live unpredicted situations can only be dealt with a professional being present, navigating through the list of subtitles and choosing the right text and the right time.

As far as AD is concerned, it is generally delivered when there is no singing, that is no subtitles, hence the synchronisation of AD with subtitles was seen as a logical development. Therefore, the Liceu workflow works with two different teams. The subtitling team produces their subtitles as they always do, but the files are uploaded to a platform for its distribution. A dedicated subtitler through keyboard pulses projects each subtitle during the performance. These subtitles are sent to the screen above the proscenium, to the TFT screens on the seats and also to the end user mobile terminal. In the same platform, the AD team has uploaded the sound files, with the

audio descriptions in three languages. These sound files have been previously created by an audio describer using an AD editor that allows also for AD recording. The sound files are synchronised at the end of certain subtitles: in this way, one single operator offers both AD and subtitles in three languages.

Using this system, end users can access: (a) the sound files with the AD, and (b) the subtitle files that can be either read or reproduced through mobile phone voice-over capability. In other words, they can be accessed as textual elements or as audio elements, catering for the needs of a wide array of end users. Still, what seems a neat, easy and inclusive solution has many hitches and merits further research. Just to provide one example, in some operas the singer may repeat a chorus or a line several times. This repetition is sometimes used for the audio describer to offer visual information. This is often the case in contemporary opera adaptations, when the libretto is adapted with no recitatives, and the performance is almost 100% singing. In these instances the neat solution of a subtitle being used to cue the AD may lead to a synchronisation mistake. Additionally, including AD units over repetitive segments may also clash with access services other than automated audio subtitling. Attention should also be paid when a much-loved musical piece is sung or played in order to avoid AD. If end users activate the voice-over capabilities of their mobile phones so that subtitles are read aloud, AD cannot be understood simultaneously. A solution will have to be researched in this regard, and it may be found in an already existing service such as audio introductions. This is just an example of the many research possibilities that emerge from implementing mobile technology in providing access to live events.

CONCLUSIONS

It is a truth that with the development of new technologies in recent decades, new devices and systems have profoundly helped increasing the presence of media accessibility services. The presence of subtitles for the deaf and the hard of hearing or regular audio described audiovisual contents for the blind and visually impaired on TV and cinema is now a reality in many countries. Nevertheless, there is still a very long way to go when it comes to live stage performances.

The difficulty here is the use of new devices that are meant to automatise a service that is, in fact, live performed, namely it is always subject to changes and variations. In opera houses the application of subtitles is performed with the aid of subtitling programs but instructions and monitoring have to be managed by a person. AD is still fully performed by a live audio describer, a fact that limits the autonomy of the visually impaired, constrained to attend the opera on a particular session and be seated in specific areas of the theatre.

Current systems and devices must overcome existing obstacles and reach a new phase aimed at the entire autonomy of people with sensory impairments in general. Smartphones, whose presence and use has become almost obligatory, could become the devices that will render accessible any kind of standard audiovisual content. The most remarkable advantage is that the adaptation happens in the end users' hands, this means that any person, regardless of their sensory limitations, will be able to enjoy and participate in all live performances/events.

Finally, the semi-automatisation of the AD service will open a brand new world of possibilities, both with research and commercial purposes. A product that was conceived and

prepared for a specific occasion is now recorded and preserved, thus, reducing its useless reproduction and allowing for deeper analysis. Moreover, both the creation of audio introductions and the production of both audio introductions and AD in three different languages can be exported and used in more than one theatre or country, increasing the effectiveness and application of this service.

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ACEPTADO EN MAYO DE 2019
VERSIÓN FINAL DE JUNIO DE 2019

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