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AUGMENTED REALITY AND NEW TECHNOLOGIES APPLIED TO FILM RELATED TOURISM IN SPAIN

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ABSTRACT

This research article aims to analyze the phenomenon of film tourism in Spain, assess its impact on the country's tourism industry, and propose how new technologies could contribute to its development. Spain, famous for its rich cinematic history and the diversity of attractive locations that have been the setting for numerous productions, attracts both film enthusiasts and tourists. Through a multidisciplinary approach, we will explore the main film destinations in Spain. We analyze how an application that allows tourists to visualize exactly the filmed sequences in a specific location can enhance their experience and increase their satisfaction. We evaluate the benefits and possibilities that new technologies offer, as well as the challenges and future opportunities they present. Additionally, we will examine how the use of mobile applications that link film locations with the experiences generated by film tourism would improve the user experience.

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1. Introduction.

The tourism industry is constantly seeking to improve the traveler's experience and provide more personalized and enriching experiences. In this article, we explore how, by leveraging advancements in new technologies that allow for the "diversification" of reality with new layers of information, such as augmented reality, an application that enables tourists to view footage filmed in a specific location could significantly enhance their experience while touring a city or certain territories. These technologies offer significant benefits to travelers, whether citizens or tourists, such as a more immersive and emotionally connected experience by allowing visitors to perceive exactly how a specific location appeared in a movie or documentary. Additionally, this experience provides historical and cultural context, as tourists can learn about important events and landmarks within their local context. The application would also facilitate trip planning by allowing tourists to visualize how a destination will appear at different times of the year or under various weather conditions. However, there are challenges to consider, such as copyright issues and the limited availability of content. Despite these challenges, the incorporation of advanced technologies, such as augmented reality and personalization, could elevate the tourism experience to an even higher level. Ultimately, the goal would be to offer tourists an immersive, informative, and exciting experience during their travels.

2. Methodology and Objectives

Regarding the methodology employed in the research, we will conduct a review of the scientific literature. Through the study of previous cases, we will investigate similar applications and the use of technologies such as augmented reality in tourism, identifying trends and best practices.

We will establish a theoretical framework that supports the use of augmented reality in film tourism, using academic references and case studies.

We will conduct field research, focusing particularly on the city of Granada and the locations where José Val del Omar's *Aguaespejo granadino* was filmed.

Similarly, we will collect data to document the history, characteristics, and cultural relevance of each location for use in the proposed application.

We will take photographs of all the current locations in Granada that appear in the original film so that visitors can quickly identify them, in addition to being geolocated.

We will design maps with the routes of all the scenes from *Aguaespejo granadino* so that users can follow them in the order of filming while also touring Granada and the Alhambra.

We will gather the information that the mobile application using augmented reality should include. This will encompass the integration of images, videos, and descriptions.

The objectives of the study are as follows:

Enhance the Tourist Experience through immersion, facilitating a stronger emotional connection between tourists and the places they visit by allowing them to visualize movie scenes filmed in those very locations.

Personalization, offering content tailored to users' interests, allowing each tourist to have a unique experience based on their preferences.

Promote Film Tourism, increasing the number of tourists visiting film locations in Spain, especially in iconic places like Granada.

Cultural Awareness, fostering an appreciation for cultural and film heritage by highlighting the importance of locations in cinematic narratives.

Utilize New Technologies to overlay historical and cultural information on points of interest in the locations.

Implement Advanced Technologies such as augmented reality to transform how tourists interact with their environment.

Ensure Accessibility, making the technology available to a wide audience using common mobile devices like smartphones and tablets.

Preserve Film Heritage, providing a resource that documents and preserves the legacy of filmmakers such as José Val del Omar, contextualizing their work within the locations.

Offer Educational Information about cinema and its relationship with urban and natural spaces, enriching the visit.

Encourage Active User Participation through interactive features, such as the ability to rate, comment, or share experiences on social media.

Create a Community of film and tourism enthusiasts who share their interest in films and filming locations.

3. Film Tourism in Spain

Spain has long been an attractive destination for the film tourism industry, as its rich heritage and certain filming facilities have made the country the setting for numerous film and television productions. These productions are drawn to Spain by its rich diversity of landscapes, an abundance of high-quality architecture from various periods and styles, and a wide range of spectacular and varied natural locations within a relatively small territory.

Spain has been chosen as the backdrop for famous movies and series like *Game of Thrones* (Benioff & Weiss, 2011–2019), which used locations such as Seville, Girona, and Osuna to recreate the show's settings. Additionally, cities like Barcelona, Madrid, Valencia, and Granada have been repeatedly chosen as locations for international productions throughout cinema history. The landscapes of the Mediterranean coast, the Balearic Islands, the Canary Islands, and northern Spain have also been used by production companies to recreate settings of vastly different natures.

In this way, film tourism has generated a significant economic impact in Spain. Locations that have appeared in popular films and series attract visitors each year who want to recognize and experience the settings they have seen on screen. These thousands of tourists often seek to tour filming locations, visit sets, and explore iconic places seen in productions featuring their favorite characters and film stars.

Furthermore, Spain hosts important film festivals that have achieved international prestige, such as the San Sebastián International Film Festival and the Málaga Film Festival, which attract cinema professionals and enthusiasts from around the world.

Another important fact to consider is that Spain offers attractive tax incentives for foreign film productions. These incentives may include tax reductions, VAT rebates, and other fiscal and financial benefits, making Spain even more attractive as a destination for film shoots.

3.1. Main Locations for Film Shoots in Spain

We can mention several cities and Spanish communities that are particularly sensitive to the film industry:

Barcelona has been the setting for numerous film productions, taking advantage of its stunning modernist buildings, such as the Sagrada Familia and Park Güell, along with its picturesque streets and vibrant urban life.

Madrid, the Spanish capital, offers a wide variety of locations, from its majestic historical buildings to its modern financial districts. The Paseo de la Castellana, Retiro Park, and Gran Vía are some of the iconic places used in film productions.

Valencia has been chosen as a setting for films and commercials due to its modern architecture, such as the City of Arts and Sciences, and its beautiful beaches.

The Canary Islands, particularly Tenerife and Gran Canaria, have attracted international production companies due to their volcanic landscapes, black sand beaches, and stunning natural areas. These locations have been used in popular films and series such as *Fast & Furious 6* (Lin, 2013) and *Game of Thrones* (Benioff & Weiss, 2011–2019).

Many cities in Andalusia, such as Córdoba, Granada, and Seville, have been selected for shoots due to their rich architectural heritage, especially Islamic, with iconic buildings like the Mosque and Medina

Azahara in Córdoba, the Alhambra in Granada, and the Alcázar and Plaza de España in Seville. Additionally, there are numerous natural locations spread across the provinces.

4. Augmented Reality

4.1. Augmented Reality vs. Virtual Reality

Augmented reality is a technology that allows for the overlay of virtual elements onto reality. It is often confused with virtual reality; however, while virtual reality hides the real environment and completely replaces it with digital content, augmented reality has the advantage of overlaying digital content onto the real environment.

Augmented Reality (AR) is a technology that combines elements of the real world with virtual objects, allowing users to interact in real-time through a three-dimensional register. The term was first used in 1992 by Tom Caudell and David Mizell, but the most recognized definition was proposed by Azuma in 1997.

Azuma outlined the fundamental characteristics of AR in his article *A Survey of Augmented Reality*, highlighting its ability to merge the real with the virtual. This technology allows users to visualize virtual objects overlaid on the real world through common technological devices such as smartphones and tablets. Interaction with these objects occurs in real-time, providing an immersive experience.

Later authors, such as Muñoz-Sajama et al. (2018), have added nuances to the definition of AR, describing it as a technology that mixes the real world with virtual objects displayed on the screen of a technological device. AR allows users to access additional information, such as descriptions, historical data, recommendations, etc., overlaid on their real environment through mobile devices that open up various usage possibilities depending on the different areas in which it is employed.

In contrast, virtual reality requires a device, headset, glasses, or other equipment that completely isolates you from the real environment, while using augmented reality only requires viewing a scene through a camera, for example, a mobile phone, tablet, or any other device. Then, by using a simple application, you can overlay any type of information or digital content, whether images, text, renders, videos, or other types of audiovisual content, over what the lens perceives. Therefore, this technology is particularly interesting for enhancing the tourist experience at real film locations.

Unlike traditional AR devices, such as virtual reality headsets (HMDs) and laptops, smartphones combine all the necessary technologies to use augmented reality in one compact device. In fact, smartphones are reaching the same level of functionality as HMDs (Henrysson, Ollila, and Billinghurst, 2007).

Thus, smartphones become the primary medium for introducing augmented reality into the mass market, offering enormous potential for tourism. Several studies have highlighted the positive impact of augmented reality on tourism, as it allows users to access additional information and interactive experiences while exploring tourist destinations (Ekis, 2020; Höllerer & Feiner; 2004; Mohanty et al., 2020; Seo et al. 2011). In this sense, the emergence of more advanced technologies such as the newly presented Apple Vision Pro, which uses so-called extended reality or mixed reality, is particularly promising. It combines the advantages of AR but through glasses that allow you to navigate the real world while seeing overlaid information, just like in AR, without needing tablets or other devices, that is, hands-free.

This is a lucrative business that already surpassed $120 billion in global revenue in 2020. Therefore, it seems to be a highly suitable tool for enhancing the value of real places where iconic scenes have been filmed, using a simple mobile device that we usually carry with us. By simply downloading a straightforward app, we could recreate in real-time and on the actual stage the sequences from our favorite movies or expand the information of the place with data, models, images, actors, anecdotes, and all kinds of information related to the place we are viewing.

Another advantage of this technology is its environmentally friendly nature, as it allows for obtaining a large amount of information and modifying our perception of the place without altering the natural physical environment or the architectural heritage, which in many cases enjoys the strictest protection due to its cultural-natural or historical-artistic value.

As an example of applications born from this reflection, we propose the creation of an app that, using this technology, will recreate film locations shot in such a singular and delicate environment as Granada, and especially one of its most emblematic, visited, and protected monuments, the Alhambra of Granada. This is the place where the Granada-born director José Val del Omar filmed his unique work *Aguaespejo Granadino*, restoring the main positions of the cameras used by the brilliant Granada filmmaker, José Val del Omar. This will be done with the hope of adding value to the already magical visit to the gardens of the Alhambra so that visitors, whether or not they are film lovers, find an additional attraction during their tour of the fortress and its surroundings.

5. Application of Augmented Reality in Cinematic Tourism in Spain

5.1. Main Advantages of Using Augmented Reality

This scientific article analyzes the application of augmented reality in cinematic tourism in Spain. Cinematic tourism is a form of tourism that seeks to explore, and sometimes exploit, the filming locations of popular movies and television series. These locations often remain as mere remnants after the departure of the production that altered the landscape, as exposed in the article *Residuos* (González and Barrera, 2010). However, in recent years, new digital technologies have emerged as promising tools to enhance the tourist experience by providing a deeper immersion in real cinematic scenarios.

In the Spanish context, several companies and organizations have already carried out pilot projects and various studies to assess the viability and potential of technologies such as AR (Augmented Reality), with the aim of allowing or facilitating tourists to virtually experience filming locations, immersing themselves in cinematic environments through mobile devices and, likely in the near future, other more advanced devices such as those anticipated by new devices like the Apple Vision Pro, with new designations such as Extended Reality or Mixed Reality. Mann et al. (2018) discuss the concept of extended reality (ER or XR) as a technology that combines digitally generated realities with elements of the real world.

The use of new technologies in cinematic tourism offers numerous advantages. Firstly, it provides tourists the opportunity to explore the sets of their favorite movies and series in an interactive and realistic manner, regardless of their geographical location. Additionally, AR or MR (Mixed Reality) allows them to relive iconic moments from films and immerse themselves in the history and cultural context associated with each filming location. Extended reality has emerged as a result of our constant quest to expand the limits of our experience and knowledge regarding our environment.

Although there are some specific applications in particular fields, such as the development of sound rendering methods (Trevino and Sakamoto, 2017) or the optimization of visual screens and devices (Portalés Ricart, 2018), it is paradoxical and redundant to note that the term "extended reality" is not widely used in scientific literature. Therefore, there is a need to expand research in this field.

However, there are also challenges that must be addressed. These include creating high-quality content, optimizing the user experience, integrating with other tourist services, and adapting to the preferences and needs of tourists. Overcoming these challenges requires close collaboration between the tourism industry, technology companies, and researchers. It is essential to develop innovative and engaging applications based on solid scientific research and an understanding of tourists' expectations and demands.

According to the latest trends in the tourism industry, we are witnessing the emergence of a new era in the use of technology applied to tourism. In this context, complex information technologies such as robots, big data, artificial intelligence, and virtual reality are being utilized. These technologies are

transforming the way tourists interact with destinations and tourism experiences (Bowen and Whalen, 2017).

Not only is AR positioned to transform the sector. The use of robots in the tourism industry is also gaining momentum. Robots can be used in hotels and restaurants to provide personalized and efficient services to tourists. They can also act as automated tour guides, offering information and recommendations to visitors, guiding them to places or serving drinks and other orders.

Big data and artificial intelligence also play a crucial role in modern tourism. Analyzing large volumes of data allows tourism companies to better understand tourists' preferences and behaviors, enabling them to personalize offers and provide more relevant experiences. Moreover, artificial intelligence is used to automate tasks, improve customer service, and offer accurate and personalized recommendations.

5.2. Examples of Currently Available Applications

It is worth noting that there are already some very interesting collaborative platforms in operation that allow for the marking and real-time visualization of locations where filming is taking place, or places where audiovisual works have been produced. This serves as a good starting point for generating apps that leverage the knowledge of the existence of these locations.

With that said, there are several specific technological applications that can enhance the traveler's experience in film tourism:

Augmented Reality Applications for On-Site Tours**:** These applications use augmented reality to add virtual elements to the actual on-site tourist experience. Tourists can use their mobile devices to view additional information about filming locations, such as images of movie scenes superimposed on the real sets. This combination of virtual and real elements enriches the tourist experience by providing a more complete view of the filming sites.

Virtual Guide Applications**:** These applications offer virtual guides that provide detailed information about the filming locations of movies and series. Tourists can access historical facts, production anecdotes, photographs, and videos related to each filming site. These applications offer an educational and entertaining experience, enhancing tourists' knowledge and appreciation of the relationship between cinema and real places.

Virtual or Augmented Reality Game Applications**:** Some applications use virtual reality to create interactive games that allow tourists to engage in cinematic scenarios. These games can involve missions, challenges, and adventures based on films, providing an immersive and entertaining experience for film lovers.

Virtual Reality Applications for Thematic Experiences**:** These applications offer themed virtual reality experiences related to popular movies and series. For example, tourists can experience being on a film set, interact with virtual characters, or be part of an iconic movie scene. These applications offer total immersion in the cinematic world, allowing tourists to participate in the action and live unique moments.

There are some examples in Spain of interesting tourist routes related to the cinematic universe. Some of them are already applying some of these tools, others are in development, and others do not use them but clearly could.

Here are a few examples:

"Game of Thrones: The Touring Exhibition"**:** An itinerant exhibition that uses virtual reality. This application allows visitors to the traveling exhibition of *Game of Thrones* (Benioff & Weiss, 2011–2019). to explore the filming locations of the famous series in Spain, such as the Alcázar of Seville and the Alhambra of Granada. Using augmented reality, users can point their mobile devices at exhibition elements to see additional information, images from the series, and special effects superimposed on the real settings.

"The Almodóvar Route" (Virtual Tourist Guide Application)**:** This application offers a virtual guide to explore the filming locations of the acclaimed director Pedro Almodóvar's films. Tourists can access interactive maps, information about the movies and the locations, and see clips of the scenes filmed at each site. The application offers an immersive experience to discover the iconic locations of Almodóvar's films in cities such as Madrid, Barcelona, and Almería.

"SpainVR: The Cinema" (Virtual Reality Application for Virtual Tours)**:** This application allows users to take virtual tours through virtual reality of some of the most emblematic filming locations in Spain. Users can explore the Alhambra in Granada, the Plaza de España in Seville, and other famous locations in an immersive 360-degree experience. The application uses high-quality images and videos to transport users to the film sets of famous movies and series.

These are just a few examples of real routes that have been used in film tourism in Spain. These applications leverage augmented reality and virtual reality to enhance the tourist experience, offering additional information, virtual recreations, and virtual visits to filming locations. As technology continues to advance, it is likely that more innovative applications will emerge to provide tourists with increasingly enriching and immersive experiences in the world of cinema.

6. Examples of Augmented Reality Application in Film Tourism in Spain

Next, as a local exercise to illustrate a scalable and transferable procedure to other emblematic locations where film scenes have been shot, we will conduct a study for an application that, with this technology, will be able to visualize the locations of films shot in such a unique and delicate environment as Granada, especially in its most emblematic monument: the Alhambra.

To do this, we will locate the main camera positions used by the brilliant Granadian filmmaker José Val del Omar for his work *Aguaespejo Granadino*. The goal is to provide visitors to the Alhambra, one of the most visited monuments in Spain, with added value to the already magical visit to its halls and gardens, so that visitors, whether or not they are film lovers, find an additional incentive during their tour of the fortress and its surroundings.

6.1. Aguaespejo Granadino as an Example of Extended Reality Application

Some of the main shots from the aforementioned work are identified, located, and analyzed so that the real location can be compared with the image of the specific frame. Thus, with the help of the application that the visitor would have installed on their tablet or smartphone, they could overlay the latter onto the former and read, if they wish, facts or curiosities about the place or the meaning of the sequence that complement the understanding and information of the film and the monument.

6.1.1. PART I DAY 1. THE REASON FOR THE FOUNTAINS OF GRANADA

Figure 1. P. 8 Homage Tower of the Alhambra

Source: Val del Omar, J. 1953-55.

Figure 2. Homage Tower of the Alhambra

Source: González, Y. 2011.

The first frame of the work corresponds to one of the most important towers of the Alhambra complex. Specifically, it refers to the Torre del Homenaje, which is part of the group of three eastern towers of the Alcazaba. Standing at 26 meters tall, the Torre del Homenaje is one of the tallest towers. It was constructed for residential use, with a total of six floors, and it is believed that the founder of the Alhambra, Al-Hamar, established himself here when he decided to build his palace. In fact, this was the original entrance to the Alcazaba.

On the ground floor, there is a dungeon that was also occasionally used as a storage space for grain, salt, and spices. The Torre del Homenaje is the central structure of the medieval castle. It is a tower taller than the wall and serves as the residence for the lord, containing the most important rooms. It would serve as the last refuge in case the other buildings succumbed. Therefore, it is considered the safest place within the enclosure. Its name comes from the fact that this is where the vassal would pay homage: a feudal service in exchange for help and counsel.

Figure 3.P. 9 Fish in pond

Source: Val del Omar, J. 1953-55.

Figure 4. Fish in pond

Source: González, Y. 2011.

Two important elements appear in this plan, the pond and the fish.

The image of water, whether in lively motion or stagnant, is a recurring theme in Val del Omar's work, almost to the point of obsession. In this case, we are presented with the tranquil waters of the pond. Stagnant water, therefore, in which orange fish glide like flames. The fish are also an active part of the Alhambra. In the ponds of the complex, communities of colorful fish, also known as goldfish, reside.

Figure 5. P.12 Pilarejo de Ágreda.

Source: Val del Omar, J. 1953-55.

Figure 6. Pilarejo de Ágreda.

Source: González, Y. 2011.

These two faces with open mouths, which also suggest empty eye sockets, correspond to the current Pilarejo de Ágreda on Cuesta de Santa Inés, which has been restored and relocated to another pillar, as seen in Figure 6. The Pilarejo de Ágreda is located at the end of Cuesta de Santa Inés, a perpendicular street between Carrera del Darro and Calle San Juan de los Reyes. It is a very simple example, with little artistic interest. Small in size and made entirely of Sierra Elvira stone, it was originally a bathtub with a wavy profile and a cut edge. The front is occupied by two faces of young people with wavy hair, large eyes, and open mouths with spouts. They are flanked by very simple pilasters that support a continuous tripartite entablature.

As a sculpture, its location is more interesting than the work itself. It leans against a wall to bridge the height difference between Cuesta de Santa Inés and Calle San Juan de los Reyes. To the left of the slope is the magnificent Mannerist façade of the Casa de Ágreda, and to the right is the Convent of Santa Inés. Both buildings date back to the 16th century. Pedro de Ágreda arrived in Granada in the first half of the 16th century from the village of Ágreda in Soria. His descendants held very important positions in the administration of the city. At the end of the century, D. Diego de Vera Ágreda y Vargas, a knight of Santiago, twenty-four of Granada, and corregidor of the municipalities of Málaga and Vélez, built his residence at the end of this slope. Its façade bears the coats of arms and symbols of the family, and its interior denotes the status of its owners. To the right, Licenciado Bazán founded the Convent of Santa Inés, also in the first third of the 16th century. Initially, it was used as a beaterio for the seclusion of young women. But in 1572, Archbishop Guerrero elevated it to a convent, which was run by the Franciscan Clarisses. The surroundings are very significant in explaining the existence of a water pillar. It is not a busy street, but rather a semi-public space. Between the two buildings, there is a small square that serves almost exclusively the distinguished neighbors. The Pilarejo de Ágreda was recorded by Val del Omar in 1953. In the same year, we find a document in the Historical Archive of Granada requesting a budget for the replacement of the Pilarejo de Ágreda on Cuesta de Santa Inés. The following year, in 1954, we find a municipal works file documenting the repair of the Pilarejo de Ágreda on Cuesta de Santa Inés.

6.1.2. THE SPOUTS OF THE ALAHMBRA SPRINGS

Figure 7. P. 21.Pillar Mask

Source: Val del Omar, J. 1953-55.

Figure 8. Pillar Mask of Charles

Source: González, Y. 2011.

Figure 9. Pillar Mask

Source: González, Y. 2011.

We had to wait until frame 21 of the film to see the first suitable photograph of the interior of the Alhambra. Specifically, it is one of the masks belonging to the pillar of Charles V. The pillar is located in the defensive cube built in 1568 to protect the future Puerta de Justicia, now one of the main entrances to the Alhambra. This pillar, known in the 17th century as the Pillar of the Cornets, was ordered to be built by the Count of Tendilla. It was designed by Pedro Machuca and executed in 1545 by the Italian Nicolao de Corte. In 1624, on the occasion of King Philip IV's visit to the city, it was restored by the Granada sculptor Alonso de Mena. The fountain consists of two sections, elevated over a rectangular basin measuring 11.20 meters long, 1.70 meters wide, and 0.95 meters high. The first section, divided into three panels separated by pilasters decorated with pomegranate branches and shields of the house of Tendilla, features a mask in the center of each, from whose mouth water flows. The second section contains a cartouche decorated with ribbons and the inscription "Imperatori Caesari Karolo quinto Hispaniarum regi."

On the pedestals framing the pillar are the cross, the link, and the flint stone, symbols of the Order of the Kálice, along with the Pillars of Hercules featuring the world and the imperial eagle. The two sides are adorned with exquisite cartouches depicting children pouring water from shells resting on their shoulders. The top of the ensemble is a semicircle with the imperial shield decorated with ribbons, where the motto "Plus ovltre" can be read. The pillar is attached to a wall 6.80 meters high, decorated with Doric pilasters and four relief medallions with mythological themes alluding to the Emperor and the Order of the Kálice.

Figure 10. P.22 Winged

Source: Val del Omar, J. 1953-55.

Figure 11. Winged

Source: González, Y. 2011.

Figure 12. Winged

Source: González, Y. 2011.

This image corresponds to the pipe on the right side of the Pillar of the Bull or Pillar of the Almizcleros, located in Plaza Nueva. In 1940, the renovation works of Plaza de Santa Ana in Granada were completed, near the pavement of the Darro. The intention of the City Council was to restore the area's personality that had been lost "when the lines of the church tower were hidden by grown palm

trees and part of the square was occupied and joined to the church by an insignificant garden surrounded by poor and unsightly iron railings." The fence surrounding the garden was replaced by a parapet on which the Pillar of the Bull was placed. In January 1941, the City Council approved a budget of 5,462 pesetas for the cost of relocating the fountain from its location on Calle Elvira, which was carried out at the end of that year. The pillar, dating from the 16th century, divided the aforementioned street and the street Hatabín or Hospitales. It was one of the most important places in Granada and witnessed the events that marked the history of the city. However, the construction of the Gran Vía reduced the significance of this area. In a street renovation, the square became a bland corner, and the fountain was enclosed within the walls of a new house. To restore its lost dignity, the City Council decided to relocate it to the new square, near the house where Gallego Burín was born.

Figure 13. P.24 Gigantón.

Source: Val del Omar, J. 1953-55.

Figure 14. Gigantón.

Source: González, Y. 2011.

Figure of a giant holding the bowl of a large fountain on his back and neck. A weak jet of water springs from his mouth. The series of descending fountains continues. In this case, it is the fountain known as the Fountain of the Giants. This fountain must have been highly valued by the authorities during Mendizábal's disamortization in 1835, as the enormous fountain, dating from the second half of the 17th century, was saved from the demolition of the 16th-century convent where it was located. It appears that the fountain, sculpted in gray Sierra Elvira stone and white marble, has a symbolic purpose related to the exaltation of fertility and prosperity. From then on, a long series of relocations began, leading it to the Paseo del Salón, where it remained until 1892. It was then moved to the end of Paseo de la Bomba and continued its journey to the house in Bib Rambla, where it remains to this day and where it must have been photographed by José Val del Omar. The fountain has remained intact throughout its journey. It consists of a very wide and low base in the traditional Mudejar style, two overlapping circular basins, and a spectacular upper part featuring the figure of Neptune. The first basin is supported by a wide square shaft decorated with reliefs. Surrounding it are four grotesque figures that hold the rim of the basin with their heads. They are hybrids with more or less deformed human bodies and monstrous faces, standing on pedestals

Figure 15. Plan of the situation of *Aguespejo Granadino* in the Alhambra (2014).

Source: González, Y. 2014.

Figure 16. **Location map of Aguespejo Granadino in Granada (2015).**

Source: González, Y. 2011.

8. Results and Discussions

The results obtained from the tests and evaluations of the application for visualizing sequences of the film *Aguaespejo granadino* at locations in Granada have been encouraging. The images obtained, which allow us to locate each shot of the film in its original location in Granada, provide the possibility of an immersive and exciting experience, allowing viewers to see the film sequences in their original context while exploring the actual places in the city.

From a technical perspective, the integration of augmented reality and geolocation in the application has proven to be efficient and accurate. Augmented reality elements are seamlessly and realistically overlaid on images of real locations, creating a visually appealing and authentic experience. Geolocation allows the corresponding sequences to activate at the right location, giving users the sensation of witnessing the film in real-time. Additionally, the incorporation of soundtracks radically transforms the perception of the environment.

The user interface is intuitive and easy to navigate, enabling smooth and hassle-free interaction. Users will be able to explore different locations and easily access film material. Furthermore, the application will provide additional information about the film, anecdotes, filming equipment, etc., and about the locations themselves, further enriching the experience and offering historical and cultural context.

We see that the proposed application emerges as a potential catalyst for film tourism and the promotion of the artist behind *Aguaespejo granadino* as well as the city of Granada itself. By allowing users to immerse themselves in the film and experience it in its original context, the application will create an emotional connection and increased interest in visiting the locations associated with the film, attracting cinema lovers and cinephiles looking to explore filming sites and enjoy a unique cinematic experience.

Moreover, the application will contribute to preserving the city's cinematic heritage and promoting its cultural value. By highlighting the importance of *Aguaespejo granadino* and linking it to real locations, awareness of the historical and cultural significance of the film has been raised, fostering appreciation for cinema as an integral part of Granada's cultural heritage.

However, areas for improvement have been identified. In addition to the film images, it would be very interesting to have access to more information about the movie and its production process, as well as specific details about the sequences and their relation to the locations. Additional interactive options could be included, such as the ability to share photos or stories of the spaces featured in the film or to comment on social media, to encourage user engagement and generate a greater impact on social networks. The option to view the various shoots that have taken place at the same location would also be beneficial.

The results and discussion support the effectiveness of the application in visualizing images of *Aguaespejo granadino* at locations in Granada. The combination of augmented reality and geolocation will provide an immersive and authentic experience, allowing users to connect emotionally with both the film and the city. With continuous improvements and user feedback, the application can be further refined and serve as a model for future similar projects in other cities and films.

9. Conclusions

Creating an application for visualizing sequences of the film *Aguaespejo granadino* at locations in Granada would be an interesting initiative to promote film tourism and provide users with a unique and enriching experience. Through the combination of technologies such as augmented reality, geolocation, and cinematic heritage, this application would immerse users in the cinematic world of this emblematic film.

The results obtained demonstrate that the application would be effective in connecting the real locations of Granada with the film's sequences, providing users with an immersive and authentic experience. Additionally, it would promote the recognition of José Val del Omar in his native Granada, an internationally significant author who is currently only acknowledged in his homeland among film circles. Users would feel satisfied by adding more value to their tourist visit by being able to see the sequences in their original context and experience an emotional connection with both the film and the city.

Furthermore, the application would contribute to strengthening the tourism appeal of Granada as a cinematic destination by highlighting the importance of *Aguaespejo granadino* and its relationship with the city's real locations. This would increase interest in visiting Granada among cinema lovers and tourists eager to experience the magic of the film in person.

However, it is essential to recognize that the application would also present challenges. Continuous updates and maintenance of the database of locations and film material are required, as well as ongoing improvements in usability and user interface. Additionally, consideration should be given to the need to expand the application to include more films and relevant cinematic locations in Granada. It is crucial to acknowledge the legal and copyright challenges associated with using audiovisual works in an application of this type. When extrapolating this application to other audiovisual works, the same legal considerations must be taken into account for each specific case. Each film or series has its own associated copyright and licensing, which can complicate the acquisition of necessary rights to use the material in a similar application. Proper legal procedures must be followed, permissions obtained, and relevant regulations adhered to in order to avoid copyright infringements and protect the integrity of audiovisual works.

Despite the legal challenges, the potential for similar applications that combine augmented reality, geolocation, and audiovisual works is significant. These applications can offer a unique and enriching tourist experience by allowing users to explore cinematic heritage and connect with real locations associated with their favorite films and series.

In conclusion, with continuous improvements and future expansions, this application can serve as a model for promoting film tourism in other cities and destinations. Indeed, the application of new technologies to tourism is considered a significant advancement in the development and sustainable exploitation of a thriving film tourism sector.

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