

# MEMORIES BETWEEN ARCHITECTURE AND CINEMA: A GLIMPSE INTO THE WEBAPP CINEMAPP.NET

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## MEMORIAS ENTRE ARQUITECTURA Y CINE: UNA MIRADA A LA WEBAPP CINEMAPP.NET

**RESUMEN:** Cinemapp es una aplicación web (webapp) que permite el descubrimiento, individual o en grupo, del *Ecosistema Cinematográfico de la ciudad de Valladolid*. Esta ciudad destaca por su patrimonio arquitectónico y su historia cinematográfica, con numerosos cines que han desaparecido y películas que se han rodado allí, es decir, una combinación de patrimonios arquitectónico y cinematográfico únicos. La aplicación propicia una experiencia interactiva que permita descubrir y disfrutar de la historia cinematográfica de la ciudad, así como reflexionar sobre el cine, los medios de comunicación y las nuevas tecnologías. El proyecto recopila tanto información histórica como memorias ciudadanas en multitud de formatos digitales la cual nutre la base de datos gráfica denominada *FilmcityDB*. Mediante la combinación de ambos y utilizando el contexto de Valladolid como prototipo extrapolable, los usuarios pueden explorar diferentes rutas y sumergirse en la historia del cine acumulada en la ciudad desde el siglo pasado.

**PALABRAS CLAVE:** educación y comunicación digital, arquitectura y cine, memorias, formatos, estructura de datos, webapp

**ABSTRACT:** Cinemapp is a web application (webapp) that enables the individual or group discovery of the Cinematic Ecosystem of the city of Valladolid. This city is distinguished for its architectural heritage and cinematic history, with numerous cinemas that have vanished and films that have been shot there, thus comprising a unique combination of architectural and cinematic heritage. The application fosters an interactive experience that facilitates the exploration and enjoyment of the city's cinematic history, as well as contemplation of film, media, and new technologies. The project compiles a wide range of historical information and citizen memories in various digital formats, which nourish the graphical database named *FilmcityDB*. By combining both resources and employing the Valladolid context as an extrapolatable prototype, users can explore different routes and immerse themselves in the accumulated cinematic history of the city since the past century.

**KEYWORDS:** education and digital communication, architecture and cinema, memories, formats, data structure, webapp



## 1. Introduction

Who hasn't embarked on a treasure map adventure at least once? Many have even drawn their own maps, incorporating topographical information or references, ultimately providing clues to follow a path. Every treasure map arises from the need to encode a journey towards a goal using a geolocation-based procedure. In the present era of Information and Communication Technologies (ICT), this game has evolved into geocaching, a contemporary version created by Dave Ulmer, taking advantage of the enhanced precision margin of GPS satellites implemented by the United States government on May 1, 2000<sup>1</sup>. Since then, geolocation has permeated our daily lives, transforming our experience of the world, particularly in complex environments saturated with underlying information, such as a city. Undoubtedly, the success of geocaching lies in the final discovery of the treasure, typically a physical object, but it can also involve uncovering information related to a point of interest (POI). Building on this concept, the web app *cinemapp.net*, or simply Cinemapp, emerges.

Cinemapp unveils an entire Cinematic Ecosystem, that of the city of Valladolid. This ecosystem is characterized by the presence of cinemas, many of which have vanished, as well as the movies that have been filmed within the city. It represents a combination of architectural and cinematic heritage that weaves together the powerful history of both the tangible and intangible cultural assets of this city intertwined with the world of cinema. Cinemapp recovers memories. The objective of this application is to provide users with an interactive experience that allows them to discover and enjoy the cinematic history of the city while reflecting on cinema, media, and new technologies. To achieve this goal, the project supporting Cinemapp, known as the *Cinematografic Ecosystem of the City and Transfer with New Technologies*, gathers a wide range of information, including texts, plans, maps, renders, infographics, edits, image recovery, film excerpts, and interviews<sup>2</sup>. This information feeds into a graphical database called *FilmcityDB*, which serves as the backbone for the mobile application. By combining these resources and utilizing the context of Valladolid as an extrapolatable prototype, users can explore different routes within the cinematic ecosystem and immerse themselves in the accumulated film history of the city since last century.

84 The experience provided by Cinemapp encourages reflection on topics such as the interplay between the physical and the virtual, the comprehension of time, the dialogue between the past and the present, intangible culture, and new technologies, as well as the reactivation of the past through film and information technologies. Through the digitization of this architectural and cinematic memory, the city is transformed into a vast educational space that contributes to the development of its citizens and their literacy in new technologies. This initiative allows for the discovery of Valladolid's cinematic heritage, offering a unique way to explore it while engaging in an interactive and contemplative experience concerning cinema, media, and new technologies within the contemporary context (figure 1).

## 2. Background and State of the Art

### 2.1. New Digital Guides

The 21st century has ushered in a multitude of applications in the form of digital travel guides thanks to the proliferation of smartphones and the widespread use of the internet. While the concept of the travel guide itself is not new, the way to access it and its digital potential linked to architectural travel is shown as a clear case of success.

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<sup>1</sup> Dave Ulmer, an expert in Global Navigation Satellite Systems (GNSS), took advantage of this opening by the US government and proposed a game by hiding a "treasure chest" on May 3, 2000, in the vicinity of the city of Portland. Ulmer sent the exact coordinates of its location, giving rise to the first Geocaching. Geocaching is an outdoor treasure-hunting game in which participants use a GPS device or smartphone to hide and seek containers called "caches" or "geocaches" in specific locations marked by GPS coordinates worldwide. Geocaching has been used as an interactive tool in various educational settings. Several studies describe it as a gamification tool to make learning more engaging and to teach students the use of GPS and mapping applications.

<sup>2</sup> This work originates from the Research and Development and Innovation Project "Cinematic Ecosystem of the City and Transfer with New Technologies," funded by the Junta de Castilla y León and ERDF funds.

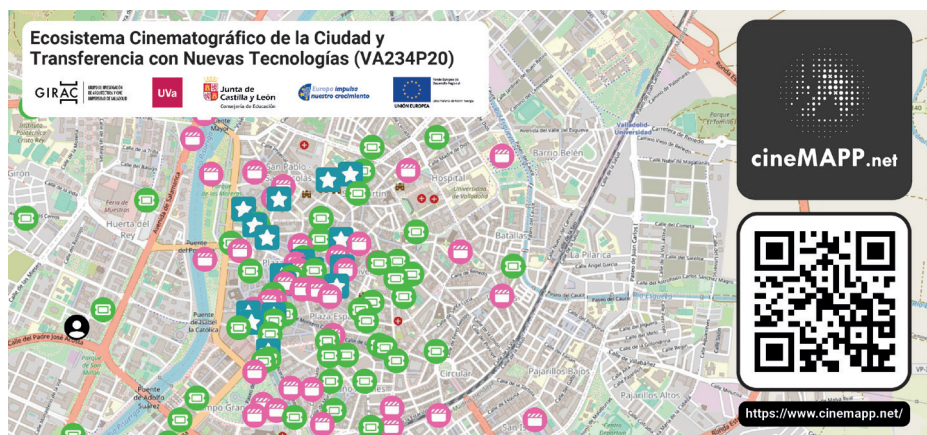


Figure 1: Cinemapp.net. Project research presentation image, logo, and QR code. Source: the authors.

Ángel Camacho Pina (2023) briefly presents an overview of some of these guides in comparison with *Archimaps*, an application launched in 2013, featuring content currently focused on various cities - Barcelona, Berlin, Chicago, London, Los Angeles and Southern California, Madrid, Mexico City, and New York - with a database of 2800 architectural works from the 20th century. *Archimaps* was preceded by applications such as the now-defunct MIMOA, an application concept originated in 2007 with webapp technology and oriented towards co-creation processes, though not reaching the idea of «citizen science»<sup>3</sup>. In MIMOA, users indiscriminately uploaded images and references of modern architecture, which sometimes resulted in a lack of rigor and criteria. Among the most recent references, all of them conceived of as installable apps for iOS or Android, it is worth mentioning ARCHITRACKER (2017), with a global scope; London Architecture Guide (2017), with a local focus and surprisingly low reputation; or AIA Guide to Boston (2021), much more successful due to the broad range of categories and filters that can be applied to descriptions, narratives, and photos of more than 1200 contemporary landmarks, historic buildings, urban features, and parks throughout the Boston metropolitan area.

Among the most recent proposals, a relatively unknown but highly potential case is *LOD-4Culture – World Cultural Heritage Just One Click Away*, developed by the GSIC/EMIC at the University of Valladolid in 2022 (Vega-Gorgojo, 2022). The potential of this system lies not so much in the interface, which continues to prioritize the use of maps and POIs to identify the works, but in its database, which operates in real-time with open linked data - Wikidata, DBpedia - impacting both the rigor of the content, its variety within the context of cultural heritage, and the almost immeasurable global growth potential.

In the examples mentioned, the combined use of maps with POIs and lists with filters is essential for the correct user experience. The vast majority of architectural guides in mobile application format start from this scheme, with few variations. In these examples, the content consists of existing architectures to facilitate their visit. In this sense, Cinemapp will clearly differentiate itself since its content will not be made up of only architectures; rather, it will also include film shootings that have taken place in the city; nor will these architectures necessarily still be standing, thereby appealing to the collective memory of the citizens who have seen them disappear. Cinemapp is not just a travel guide; it is also a guide of memories.

One of the first projects to address the idea of linking cinematic memory with the city, with which Cinemapp shares strong ties, was 'Cinematic Geographies of Battersea: Urban Interface and Site-Specific Spatial Knowledge' (Penz et al, 2013), developed by The Centre for Architecture and the Visual Arts (CAVA), a collaboration between the universities of Liver-

<sup>3</sup> The concept of "citizen science" in its current form dates back to the second half of the 19th century. One of the earliest documented examples was initiated by Wells Woodbridge Cooke, who created a network of volunteer observers at various points across the North American continent to study the phenology of birds. The volunteers compiled their observations and sent them to Cooke, who then analyzed the data and produced detailed reports on the species studied.

pool, Cambridge, and Edinburgh, and the association *The Survey of London*. Its aim was to explore how cinema and moving images contribute to the understanding of cities. It focused on the Cinematic Geographies of Battersea, analyzing the intersection between cinematic culture, geography, and architecture. The project emphasized the influence of cinema on everyday experience and the perception of the urban environment. The London district of Battersea was chosen to understand how the physical city acts as an interface that combines film and architectural heritage with public engagement. This culminated in 2013 with the Ghost Cinema App for iOS, designed with the idea of creating a perception of temporal ubiquity, using historical cinematic material related to Battersea and its rich film history, including 27 cinemas and more than 600 films shot in the area. Thanks to geolocation, users could access digital media linked to that specific place. By providing historical images of the same location where the user was and allowing the sharing of these experiences on social networks, the application sought to offer a new perspective on how Battersea has evolved over time. Unfortunately, Ghost Cinema App did not move to a phase of production open to the public, something that has, however, been a priority for Cinemapp.

## 2.2. Fundamental Aspects Among Cinema, Architecture, and Digital Content

The study of the interrelationships between architecture and film to analyse contemporary visual culture has become increasingly common. The coexistence of both disciplines can be observed in research centres that combine Architecture and Visual Arts, utilizing research tools that were previously considered independent (Pérez-Barreiro et al., 2022). Moving images and new audiovisual technologies offer new conceptions of public and private space in contemporary architectural practice and other disciplines (Cairns, 2007; Koeck, 2013), which is the research focus of the present project.

While it is not the objective of this study to present the wide spectrum of research and viewpoints that relate architecture and cinema, it is appropriate to mention some perspectives of interest that inform the concept of Cinemapp. For instance, Juhani Pallasmaa (2001) and Jorge Gorostiza (2007) have conducted studies examining in detail how classic directors such as Alfred Hitchcock, Michelangelo Antonioni, Andrei Tarkovsky, Ernst Lubitsch, or Stanley Kubrick, use architectural space and the camera to create space and narrative tension, showing how the camera traverses and expresses the virtual space of the drama. Specifically, Juhani Pallasmaa has articulated his interest in the notion of existential space; that is, how we live or understand our experience of everyday life. According to Pallasmaa, both cinema and architecture frame this human experience, with architecture being a more bodily experience. The Finnish architect believes that films can teach architects a great deal, suggesting a focus on how both fields can complement each other, one of the germinal aspirations of Cinemapp, to enhance our understanding and experience of space (Pallasmaa, 2001).

In addition to analyzing architecture reflected in films, one cannot ignore the necessary understanding of the architectures of the cinemas themselves, a typology in the process of disappearance no less representative of the Modern Movement and the early decades of the 20th century. Thus, Cinemapp has focused on the architecture of cinemas outside the realm of the screen, as an additional layer of memories superimposed on the urban fabric, an aspect extensively developed by its creators from the Recognized Research Group of Architecture and Cinema at the University of Valladolid GIRAC (Villalobos et al., 2016; González et al., 2016a; González et al., 2016b; González et al., 2016c).

A final point of view to highlight, which Cinemapp also reflects, is the urban dimension of the relationships between cinema and architecture. As recently studied by Antonio Piza (2022), cinematography and architecture stand out as disciplines that alter reality, benefiting from their multiple interactions. Both share the manipulation of elements such as space, light, and movement. Just as architecture develops and changes over time, cinematography focuses on capturing the dynamics of time and space. The influence of cinema on the city is evident through cinemas, film studios, and urban advertising, while cities often take on a central role in films, almost as a main character of the film. It can be affirmed that there is a clear connection between urban reality, manifestations of modernity, and cinematic techniques, which since their emergence in the 20th century have become an essential medium for interpreting various aspects of architectural and urban culture.

However, notwithstanding the validity of such studies, cinema and the moving image represent a spatial experience that has been expanded in the digital era. The relationship between the physical and the digital has become increasingly relevant in architectural design, public space, and everyday life in the city. The city is conceptualized as an environment of interrelations, and new media fulfil information needs that foster social interaction in the urban setting. Technological development has generated its own vocabulary. For instance, the notion of the «media city» (Mcquire, 2008, p. 203) represents a formal product and a conceptual breakthrough, referring to a specific urban form of our contemporaneity, one that differentiates and delimits itself. Thus, digital culture has permeated various human scales (Negroponte, 1995), from personal perception to private space, the collective environment of public buildings, and the urban landscape (Colomina, 2001; Townsend, 2004). In recent decades, advanced architecture has leveraged the findings of these investigations (Rincón-Borrego et al., 2022a; Rincón-Borrego et al., 2022b). However, numerous studies have cautioned about the risks of a purely spectacular use of technology and advocated for responsible usage (Debord, 1976). Moreover, the didactic and social dimensions of technology have been explored (Echeverría, 1999; García-Carrizo, 2016), as well as the social opportunities it offers (Lipovetsky & Serroy, 2009; Gorostiza, 2018).

The relationships between architecture, digitization, communication, and education have been addressed in conferences and specialized publications, highlighting the adaptation of these concepts to the implementation and development of media and digital technologies (Amps, 2020; Gutiérrez-Martín y Tyner, 2012). This process entails continuous literacy in these emerging disciplines and transforms the city into an educational environment. Digitization has intensified the transformation of the relationships between humans and images, generating new forms of socialization (Cubitt et al., 2021, p. 68). The digitized image, seen not only as photography but as data, has found a suitable and renewed place in the creation of mobile applications such as those previously mentioned. A decade ago, mobile applications for nomadic museography and heritage tourism already explored basic resources that are still relevant today, such as the localization of POIs, visualization of non-existent buildings, graphic reconstruction of the past, and interactive virtual simulations, combined with social networks and gamification (Imbert-Bouchard et al., 2013). The International Congress *Amps. Architecture, media, politics, and society*, held in Canterbury in 2020, addressed digitization in all its potential applications, recognizing the ubiquity of the digital and the interrelationships and interests it establishes in the life of cities, focusing not only on the indexing of tangible realities, architectures, art, design, but above all on the connection with the layer of memories that such landmarks construct as a palimpsest (Amps, 2020).

Interactive practices in architecture, driven by the use of new technologies, point to a further breaking down of the boundaries between the virtual and the physical, being this one of the key aspects that Cinemapp must encompass. The proposed experience, both cinematic and architectural, developed in a digital environment has the potential to offer flexibility and immersion in a new type of space, in both the public and private realms (Bullivant, 2005, p. 7). This spatial experience, based on interactivity, places the subject at the center, appealing to their memory, and relegates the object to a secondary plane. Therefore, while the introduction of digital technologies is often associated with the technological changes themselves, it is more relevant to consider how they relate to and interact with the new forms of communication they provide (Saggio, 2005). This is where the content of Cinemapp becomes of greater importance, including the type of data, information structure, formats, and memories, rather than solely focusing on the technology that enables its transfer to society.

### 3. Visualized Memories in Cinemapp

#### 3.1. The Opportunity of Cinema as Collective Memory

Cinema refers to both a historical, cultural, and social memory of material events and an intangible, human memory that gives meaning to the history of cinema itself. Maurice Halbwachs helps us understand the importance of collective memory in the reconstruction of a society; collective memory has a social character because recollection emerges in relation to people, groups, places, languages, and dates within the life of the societies to which we belong (Halbwachs, 1994, p. 38). In this sense, Cinemapp actively participates in the effort to construct such collective memory, understood as a social process of reconstructing the past lived and experienced by a particular community (Halbwachs, 1991/2002). It seeks to shed light on a

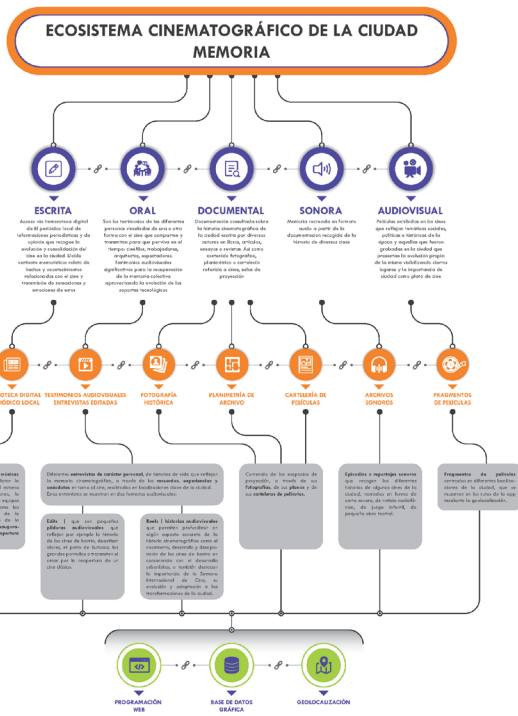


Figure 2: Structure and schema of the memories of the cinematographic ecosystem contained in Cinemapp. Source: the authors.

type of past that differs from canonical history, characterized by informative profiles of dates and facts, in favour of making visible the identity of the group that experienced those now vanished cinemas and films. Therefore, the collective memory emphasized by Cinemapp is communicative, shared, transmitted, and fundamentally constructed by the group of belonging.

While historical memory is composed of a combination of historical endeavors and current reality, collective memory forms a narrative based on lived experiences, although this does not imply that it remains static over time (Barrenetxea, 2008, p. 8). Cinema and its spectators, the film industry and professionals, the exhibition spaces, and filming locations all form part of the collective memory of a community and contribute to the reconstruction of a society. In this sense, the role of cinema in the reconstruction of a city's cultural past becomes particularly relevant for Cinemapp. Just as the cinema constructs memory, its protagonists, from the viewers to the professionals, do so to no lesser extent. In this specific case and, in order to recover part of that collective memory, the project includes two interview campaigns. One campaign is carried out through Municipal Civic Centres to collect cinematic memories from the citizens, unfortunately interrupted by the 2020 pandemic<sup>4</sup>. The other campaign targets researchers and professionals whose content was ultimately edited and contributed to Cinemapp. Both campaigns result in various memory formats: oral tradition, sound archives (with a special emphasis on some of the city's landmark cinemas), audiovisual testimonies (interviews with cinephiles, scholars, professionals, edits, reels), and journalistic documents (archive of relevant projections, programs, opening films, closing films, reopening films) (Figure 2).

<sup>4</sup> This campaign, suspended due to the pandemic and, therefore, we will have to resume, opened with the following notes addressed to the invited residents: *Is cinema part of your life? You surely have many experiences and memories to share with us: your first movies on the big screen, the inauguration of the cinema in your neighborhood, which was a significant event, film screenings at your school. Perhaps you have kept old cinema tickets, old photos related to this art, movie posters, newspaper clippings. Or maybe you have participated in some film shoots that have taken place in Valladolid. Your memories are invaluable, and your memories are important. Share them with us. We are waiting for you. Come and share your cinema memories with us.*

### 3.2. Justification and Valorization. Cinema as a Mass Phenomenon in Valladolid

Cinema transcends its nature as a spectacle, building, or industry. As a mass phenomenon, it is intimately connected to the people who enjoy it, reflecting the social reality of different eras since its invention. (Martín de Uña, 2002, p. 15). Valladolid was among the first cities to embrace the invention of the Lumière brothers (Villalobos, 2020, p. 15). As Martín Uña notes, on September 16, 1896, the first public screening in the city took place, described as «wondrous» in the local press (Martín de Uña, 2002, p. 24). The city witnessed the introduction of cinema from its beginnings, aided by the public's warm reception. Soon after, film forums and cinema clubs were founded in the city, which in some way contributed to the later creation of the university chair of History and Aesthetics of Cinematography in 1962, the first in Spain. One must also not forget the valorisation and promotion of the evolution of cinema through the Valladolid International Film Week, called Seminci. For all these reasons, as well as the urban growth of Valladolid during the 60s and 70s, a period during which cinemas and neighbourhoods even came to share names, the context of this city presents itself as a cinematographic ecosystem of great potential and richness. Cinemapp aims to make all this information and much more accessible to anyone interested in it.

The invention of cinema was born with a social character, aimed at portraying, and preserving reality as a documentary tool. In its early days, the cinematograph was temporarily installed in fair booths in large cities, initially acquiring a popular aspect. In Valladolid, it was announced on September 16, 1896, during the popular Fairs and Festivals as the attraction «The Cinematograph», which facilitated its democratization as a type of amusement open to all social classes (Martín Arias & Sáinz Guerra, 1986, p. 5; Villalobos, 2020, p. 13). In approximately a decade, by 1908, cinema in Valladolid had become a pastime frequently visited by the general public, particularly among the less privileged classes, many of whom were illiterate and lived in very precarious conditions. For them, cinema represented a unique form of amusement, not just as something exotic, but rather as an immediate form of entertainment (Martín Arias & Sáinz Guerra, 1986, p. 12).

The rapid evolution of this medium, transitioning from projections in fairground booths to the production of narrative films, led to the establishment of dedicated spaces for film exhibition<sup>5</sup>. By 1939, the urban centre of Valladolid had already enjoyed 16 projection venues, including both permanent and temporary theatres, making cinema widely accessible as a mass entertainment. Attending a screening was, and still is, an experience that encompasses the ritual of lights, colours, music, and the spectacle itself, combined within a purpose-built architectural space (Martín de Uña, 2002, pp. 20-22). All these arguments make Valladolid a case study with great potential for the prototyping and development of Cinemapp. ∞

## 4. Methodology, Objectives, Technology, Management, Transfer, and Experience

### 4.1. Methodology and Objectives

Cinemapp is developed using a project resolution methodology that involves the analysis of needs, study of responses, preparation of contents, and design of virtual and physical information support through specific technological development. This methodology is guided by a general objective (GO) stated in the project title, which is divided into three specific objectives (SO): SO1 - *Content Development*; SO2 - *Content Transfer and Technological Development*; SO3 - *The City as an Extensive and Everyday Medialab*.

SO1 - *Content Development* involves the study of films and their screening and shooting locations within the context of Cinemapp. This work allows for the analysis of architectural themes, urban spaces, and social customs represented in cinema and audiovisual production over time. Recognizing urban landscapes and the transformations that have occurred in them solidifies the identity of the place in the memory of citizens, and the contrast between images from different eras reinforces the temporal dimension of the city and its neighbourhoods, arguments that articulate the so-called memories presented in Cinemapp.


<sup>5</sup> Since 1896, George Méliès has been a pioneer in this regard, transforming cinema into a narrative spectacle, surpassing simple everyday scenes, and turning the cinematograph into a more elaborate form of entertainment.

JUEVES 7 DE FEBRERO DE 1933

## El Norte de Castilla

# EL NUEVO CINEMA LAFUENTE

### En la calle de Mariano Fernández Cubas



de contrato, catálogo, fotos, películas de propaganda... Como a tentara el cerco, han comenzado a presentar tres días de exhibición... La película que se exhibe hoy en día, y se exhiben también otras que se exhiben en otros puntos de la ciudad...

de este punto de vista, han tenido un adorno indudable destinando buena parte de una casa a la exhibición del cine...

Los propietarios lo han tenido todo en cuenta. No habrá una sala de cine, sino una sala de cine y una sala de cine...

El edificio de nueva planta, en el que se instala el Cinema Lafuente, en la calle de Mariano Fernández Cubas.

de en el bolsillo de urgencia, comodas las butacas e ideales para el espectador...

Entre las de otras salas de exhibición: «Trinidad», drama intenso, película de realismo y actualidad, película nueva, que dentro una semana en el distrito...

El edificio ha sido construido en un terreno que se encontraba en un estado de ruina...

Magacín bar, instalado en el sótano del cinema, además de otros dos, uno en el foyer de butacas y otro en el hall del edificio.

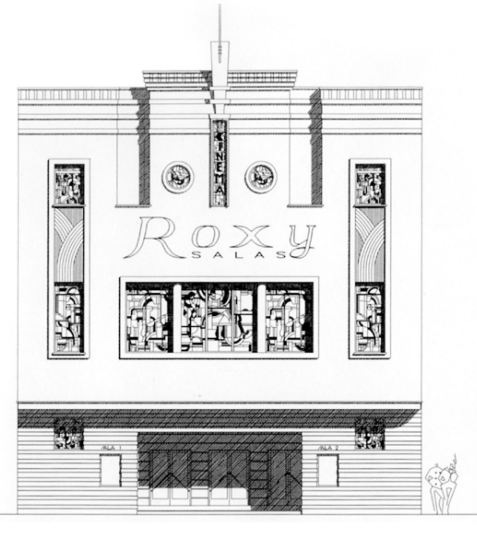


Figure 3: Content in Cinemapp. (Top) Article dedicated to the inauguration of Cine La Fuente in the newspaper El Norte de Castilla on February 2, 1933. (Bottom) Photograph and facade plan of Cine Roxy. Ramón Pérez Lozana, 1936. Source: Municipal Archive of Valladolid.

S02 - Content Transfer and Technological Development is a priority in the project. The aim is to disseminate the research results, promoting awareness of local cinematic history and culture and its impact on contemporary visual culture. Furthermore, the goal is to promote Valladolid as an attractive destination for the audiovisual industry in general, empowering neighbourhoods and the city by identifying their urban fragments in cinematic history.

Finally, S03 - The City as an Extensive and Everyday Medialab is responsible for shaping the web app as a reflection of a ubiquitous architectural and cinematic ecosystem. This requires a combination of theoretical and research support, as well as the development of advanced technologies for its dissemination and social transfer.



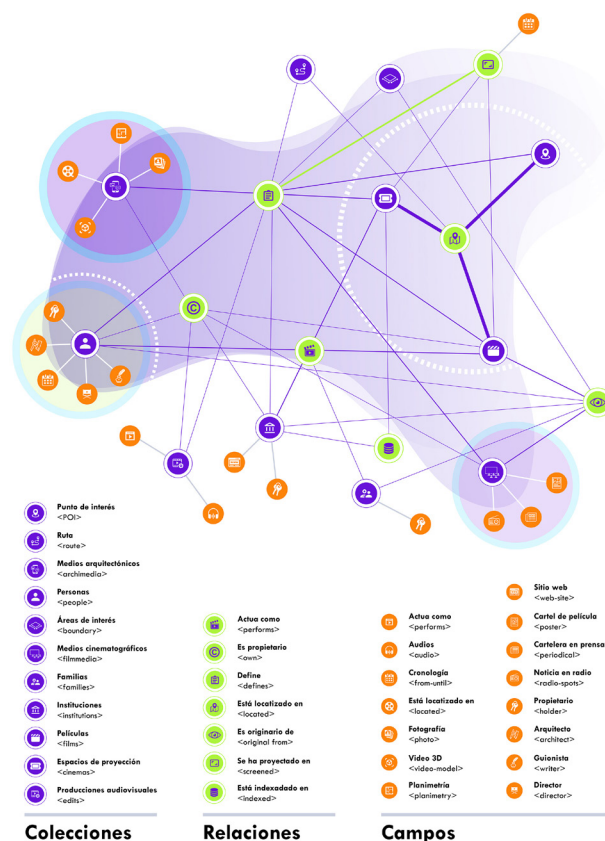


Figure 4: Data structure in FilmcityDB. Organization of collections, relationships, and fields. Source: the authors.

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## 4.2. Technology, Data Management, and Transfer

From a technological standpoint, the design of Cinemapp and its FilmcityDB database employ a combination of Node.js, ArangoDB, and its REST API, which follows a well-tested typical workflow (Rippon & Griffith, 2019)<sup>6</sup>. As an ecosystem, the web app requires the cataloguing, production and indexing of a large amount of data to generate the components and code that articulate it. This includes data about films shot in the city - directors, actors, production, etc. - data related to their urban settings - geolocation - and data about catalogued screening spaces - buildings, floor plans, photographs, architects, developers, chronology, etc. Therefore, the majority of the data that the project works with is reference data, derived and/or compiled in various formats (Graphics: jpeg, pdf, png, tiff, dwg, stl/ Texts: docx, pdf, txt/ Video: mp4, h264/ Audio: flac, mpeg-4). Many of these data are the result of research in original documentary sources, architects' archives, newspaper archives, film libraries, and municipal archives (Figure 3).

The data is organized using an open-source multimodel graph database technology called ArangoDB, which is based on the graph-oriented data model where nodes represent entities and edges represent the relationships between them (Figure 4). This approach allows for efficient access to related data and facilitates complex queries. Furthermore, ArangoDB combines features of both document databases and key-value data stores, offering great flexibility in the modeling and manipulation of data (Robinson, Webber, & Eifrem, 2013). On the other hand, the files themselves are structured in terms of project, identification, figure, and file names. The naming system used adheres to the semantic version control scheme (<ExampleURL>). The same idea is applied to the datasets.

<sup>6</sup> First, Node.js acts as the web server, handling client requests and responses. When a user interacts with the web app, Node.js processes the request and communicates with ArangoDB using its API. ArangoDB, as a NoSQL database, stores and retrieves the necessary data for the application. The ArangoDB API allows Node.js to efficiently query and perform operations on the database. The retrieved data is processed and sent back to the client through Node.js, which generates the corresponding response. In summary, Node.js acts as an intermediary between the client and ArangoDB, using its API to access and manipulate the data stored in the database and then send the appropriate response to the client.

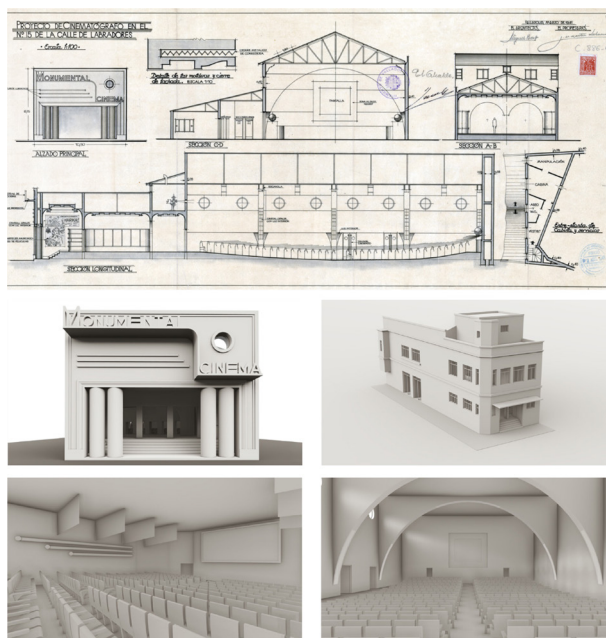


Figure 5: Information access flows in Cinemapp from the mobile front-end. Source: the authors.

### 4.3. Multimedia, Simultaneous, and Extrapolatable Experience

The experience offered by Cinemapp takes into consideration the technical paradigms that Anthony Townsend (2004, p. 102) establishes as attributes of media architecture: «visualization», based on the number and proliferation of screens in the urban environment; «communications», based on wireless networks that change the way users interact with the built environment; «positioning», referring to mobile technologies and their infinite possibilities in this regard; and «documentation», which speaks to the computerized mapping of the city through geographic information systems (GIS). To respond to these attributes, the web app is designed as a prototype tested in Valladolid but extrapolatable to any environment. It can be accessed in two modes, both through a web browser. Firstly, there is a *walk mode*, where the user follows their own path using their mobile device screen with active geolocation. As they navigate the city, the application provides inputs based on their positioning. Secondly, there is a *ubiquitous mode*, accessible from any internet-connected device.

The perception of information in Cinemapp allows for different levels of use and access flows to numerous formats (Figure 5). The most immediate access is through the initial map, where POIs are located, identifying places of interest of two types: screening spaces or filming locations. Selecting any POI unfolds an interactive scrollable tab at the bottom of the screen, containing the associated information for that point. Within this vertical dropdown, the web app provides a range of content, from interviews to newspaper clippings of historical film listings, floor plans, 3D reconstructions of cinemas, audio clips, or clips of movie scenes that can be visited on-site, among others. All of this comprises the collection of memories within



**Figure 6:** Content in Cinemapp. (Top) Section and elevation of Cine Goya. Miguel Baz García. April, 1941. Source: Municipal Archive of Valladolid. (Bottom) 3D models of modern cinemas in Valladolid. Source: the authors.

the web app, which allows, for example, the observation of Valladolid's urban development through the cinemas linked to its neighbourhoods in the 1960s, the identification of different moments and territorial boundaries, the verification of the pioneering nature of the city's first cinema, the comparison of relationships and time periods between cinemas and films, or simply following one of the nine defined routes to explore the urban settings of film shoots.

Furthermore, in the lower right corner of the map, there are buttons that allow for cross-filtering of POIs based on categories, chronologies, and stages, as well as activating the route mode that guides users to urban settings filtered by the movies that have been filmed in them. The interface is complemented by a side menu with diverse content, ranging from reels to legal information, and a share button in the upper right corner.

In the current technological era, the dissemination and preservation of memories require the involvement of technical advancements, leading to the emergence of new media and devices for storing them. At the same time, new forms of displaying and visualizing these memories also arise. It is precisely on these new audiovisual formats that Cinemapp relies for sharing and communicating collective architectural and cinematic memories through content specifically designed for web platforms. Thus, podcast formats are included, presenting new audio content capable of recreating stories related to cinemas. The edits created for the web app are presented as short audiovisual capsules that capture cinematic testimonies and memories. Finally, reels are utilized as longer audiovisual narratives aiming to delve deeper into specific topics. All of this allows Cinemapp to be used, not only as an individual or group tourism tool, but also as a foundation for research and analysis based on the wealth of its diverse contents and media (Figure 6).

## 5. Conclusions

The results obtained after the launch of Cinemapp in December 2022 have been remarkable in terms of visits, reaching nearly 10,000 unique entries, especially considering that its target audience is linked to Valladolid. Even more surprising is the analysis by countries, a total of 17, which is considered a very good result, considering that the English version has not yet been implemented and that the geolocation functionality is currently not available<sup>7</sup>.

<sup>7</sup> The tracking of these results is carried out through Google Analytics. The list of countries by number of visits is as follows: Spain, Netherlands, USA, Finland, Austria, France, Ireland, China, Canada, Sweden, Bosnia Herzegovina, Brazil, Hungary, India, Iran, Russia, and Uruguay.



Figure 7: Evolution of the projection spaces recorded in four stages in Cinemapp. Source: the authors.

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However, beyond the quantitative analysis, Cinemapp provides qualitative results. It is evident that this web app brings us closer to the city's space in a unique way, but what is perhaps more significant is that it offers us a vision of the dimension of time, either by showcasing places and buildings that no longer exist or by displaying the urban aspect portrayed in various films. To some extent, thanks to Cinemapp, we can compress time at our convenience, as stated by Yourcenar (1951, p. 248): «I am always amazed that my contemporaries, who believe they have conquered and transformed space, ignore that the distance of centuries can be reduced as we wish» (Figure 7). Precisely, the qualitative value of Cinemapp has earned it the *International Honour Mention* (Research Category) in the HERSUS Prize on Modern Built Heritage in 2023 (Alonso et al., 2023), organized by the University of Belgrade, the University of Venice, the University of Cyprus, the University of Thessaloniki, and the University of Seville and co-funded with European Funds.

In conclusion, Cinemapp was created to be a container of accessible and visible film memories, free and open. It allows access to and visualization of individual and collective memories, as well as the discovery of new memories through the application. It even offers the possibility to audibly travel back to 1910 to experience the history of the Pradera Theatre, a landmark in the development of Valladolid's history.

As explained, its purpose was also to communicate and educate others on the cinematic ecosystem of Valladolid through the digitalization of information, a goal that is considered to have been achieved. However, the project currently aims to expand to other cities, a circumstance that, combined with the continuous implementation of information and data, is recognized as an ongoing improvement process open to the interaction of each local community. A desirable future development would also be to align its database with the network of linked open data, which would result in a clear enhancement of functionalities, for example, in the multilingual aspect, as well as in terms of possible scalability.

To date, the project has successfully brought together a wide range of film memory contents and formats in a digital device, making them visible and well preserved. Cinemapp presents the city as a vast space of learning and memory, where citizens explore the inherited cinematic ecosystem, allowing visitors to enjoy sustainable screen tourism, while everyone discovers a common treasure.

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