



# заштита градитељског наслеђа у **21.** веку

ИЗАЗОВИ И МОГУЋНОСТИ

PRESERVATION OF ARCHITECTURAL  
AND URBAN HERITAGE IN THE 21<sup>ST</sup> CENTURY:  
CHALLENGES AND OPPORTUNITIES

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IN THE 21<sup>ST</sup> CENTURY: *CHALLENGES AND OPPORTUNITIES***

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## **DIGITAL LAYERING OF THE PAST: MAPPING THE SPACES OF BELGRADE'S FORGOTTEN URBAN MEMORY**

### **Abstract**

Understanding and designing cities in a contemporary world goes beyond perceiving their final form. To fully comprehend the complexity of a place's identity, it is important to go as far back into the past as possible, in order to establish the continuities and cultural practices that have impacted the development of the cities we know today. The places of these practices have mostly disappeared from the perceivable level of the city space, due to the constant process of building and rebuilding, but, thanks to digital media, it is possible not only to digitalize data about the past but also to superimpose it on the contemporary urban tissue.

This paper aims to explain the methodology of studying historical urban spaces with the help of different GIS programs or photo editing software. The paper is divided into three segments: data gathering, methodology of mapping superimposed layers, and potential uses of digitalized maps in different aspects and phases of urban planning, design, and heritage studies. The results point to a new interdisciplinary methodology that combines multiple aspects of studying and understanding cities' pasts and improving their public spaces for heritage presentation in accordance with the New Paradigm of Heritage.

**Keywords:** heritage digitalization, palimpsest, research methodology, urban studies, urban memory

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## **DIGITALNO RASLOJAVANJE PROŠLOSTI: MAPIRANJE PROSTORA ZABORAVLJENE URBANE MEMORIJE BEOGRADA**

### **Sažetak**

Razumevanje i projektovanje gradova u savremenom svetu prevazilazi posmatranje gradova kroz njihovu finalnu formu. Kako bi se shvatila kompleksnost identiteta mesta, potrebno je istraživanjem ići što dalje u prošlost, kako bi se ustanovili kontinuiteti i kulturološke prakse koje su uticale na razvoj gradova kakve poznajemo danas. Mesta ovih praksi su većinski nestala iz sagledivog spektra gradskih prostora, usled konstantnog građenja i rušenja gradskih celina, ali zahvaljujući digitalnim medijima, moguće je ne samo digitalizovati podatke o prošlosti, već ih i preklopiti i prepoznati kao deo savremenog urbanog tkiva.

Cilj rada je da objasni metodologiju istraživanja istorijskih gradskih prostora, uz pomoć različitih GIS programa i softvera za obradu slika. Rad je podeljen u tri segmenta: prikupljanje podataka, metodologiju mapiranja preklapljenih slojeva, i potencijalnu upotrebu digitalizovanih mapa u različitim aspektima urbanističkog planiranja i urbanog dizajna, urbanih studija i heritologije. Rezultati istraživanja upućuju na novu interdisciplinarnu metodologiju koja spaja više aspekata izučavanja i razumevanja mnogobrojnih prošlosti grada, i omogućava unapređenje javnih gradskih prostora, te prezentaciju nasleđa prema principima Nove paradigme.

**Ključne reči:** heritage digitalization, palimpsest, research methodology, urban studies, urban memory

## Introduction

The process of interpretation and presentation of cultural heritage according to the New Paradigm of Heritage has shifted from the presentation of selected artefacts, buildings, sites, people or places, to presenting entire processes of multicultural impact of urban development. With an equitable representation of diverse communities and different pasts of places, a new method of urban analysis of historical areas should be developed with the aim of achieving a complete understanding of urban spaces and their meanings. Going beyond the material characteristics of historic urban landscapes (HULs), this paper explores the ways of mapping and finding the hidden and forgotten urban memory, or the 'ghost matrix' of the city as perceived today. In the process of heritage interpretation, this paper will focus on the stages of the interpretation process derived from the 'expert phase' or the 'first interpretation', as described by Tim Copeland<sup>1</sup> and further developed by Katarina Živanović into the following four steps: 1) information gathering; 2) analysis; 3) selecting the right approach; 4) defining the activities.<sup>2</sup>

The paper is divided into three sections: In the first section of the paper, the process of information gathering, as a step in the interpretation process identified by Živanović, is explained, which shows different media used for identifying tangible and intangible heritage, maps that determine locations of heritage sites, and images that aid our understanding of visual characteristics and capture *genius loci* of heritage sites.

The second section of the paper is closely connected to the second step of the interpretation process; i.e. the analysis phase. This phase and its description help connect tangible and intangible heritage elements to coordinates of contemporary public spaces, elevating their value and significance. This section outlines the methods of finding the invisible and visible pasts within the city tissue, adjusting cartographic data to contemporary maps and coordinates, and using imagery to determine the positions of certain heritage sites, as well as their potential for *in-situ* heritage presentation through digital reconstruction.

The third section discusses possible uses of the results of the superimposed maps, which reveal both the density of the cultural heritage of certain places and the continuities and multiculturalism of the city's development. The potential uses of digitally superimposed mapped heritage data range from their significance for locating spaces of urban memory and archaeological heritage sites within the contemporary city matrix, through gathering data for different methods of heritage presentation, to finding grounds for strengthening the local community and multicultural groups.

The significance of understanding the entire process of urban development of contemporary cities in heritage interpretation and presentation requires viewing the cities not only through their final form, but also through superimposed layers of pasts, identified as urban palimpsests. Through his research, Ali Cheshmehzangi suggests understanding the pattern of urban development through different periods, and the recognition of multiple realities that have shaped the cities in which we live today.<sup>3</sup> The formation of a database for exploring urban memory relies on the thesis by Gustavo Araoz that the layered functions

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and development of space help identify the matrix and patterns of continuous habitation and diverse use of urban spaces, of which material evidence may exist (or not exist) in the urban fabric today.<sup>4</sup> While Cheshmehzangi's research, specifically focused on newer cities, explores urban memory by superimposing satellite imagery from different periods, the European context of historical cities requires the use of cartography and historical sources to trace the past and stages of urban development through history.

The purpose of addressing the layered past of the city is not only to explain the linear or parallel occurrence of historical events but also to help detect and (re)discover multiculturalism and diversity of meanings within contemporary spatial contexts.<sup>5</sup> In urban studies, the palimpsest method of site analysis offers a new approach to the embodying of the passing of time, and the *time-space* relationship. The effect of the 'density of time'<sup>6</sup> helps identify the specific spaces of historical cities, which require special attention and careful planning of heritage interpretation and presentation within the public space. Building on works by Andreas Huyssen<sup>7</sup> and Christine Boyer<sup>8</sup> in recognizing the significance of superimposed heritage and urban palimpsests, this paper aims to explain the steps for their revelation.

### **Gathering Documents for Digitalization**

The quest of searching for forgotten and invisible heritage starts with data gathering. This step includes collecting maps, photographs, and other documents and artefacts that can be precisely linked to a geographic space.

The gathering process is a part of Tim Copeland's 'expert interpretation' and the first part of Živanović's interpretation process, and entails identifying pasts through multimedia material, but mostly relies on cartography. The significance of cartographic material, mostly maps depicting different epochs, lies in its potential to connect the collective memory of the depicted sites, to geographic spaces, and – consequentially – to the contemporary urban matrix.

The tracing of the past(s) within Belgrade's historical core is primarily based on the cartographic works by Željko Škalamera, plans by Emilijan Josimović, Stevan Zarić and Jovan Bešlić, and other maps published in Vasa Čubrilović's *Istorija Beograda 1-3* (1974), Angelina Banković and Zlata Vuksanović-Macura's, *Stvaranje modernog Beograda* (2019) and *Belgrade: Maps and Plans from the 18th-20th Century* (2008),<sup>9</sup> edited by Marta Vukotić Lazar, as well as archaeological findings mapped by archaeologist Marko Popović. In addition to these maps, strategic and military maps of Belgrade contribute to the understanding of different views of the city, some being more descriptive and narrative in their visualization, with others being precise in landmark recognition, but geometrically distorted compared to the actual urban matrix. In addition to the characteristics of the cartographic principles used in their creation, all the named maps have slight geometric distortions, skewed blocks and differing sizes, which is understandable from the historical context of their creation, but also in need of correction for the precise tracing of the (in) visible heritage sites.

To correct these map distortions and pinpoint heritage precisely, other media (drawings, photographs and textual descriptions) can assist in tracing the past to its exact location. For example, a heritage site, which can be mapped with an offset rate of up to 10-20 metres, can be pinpointed more precisely by using other media to find the spatial *anchors* that have remained in place up to the present day (streets, buildings or other markers). The relevant images contain visual information about sites, but also expand our understanding of them as parts of local culture or the spirit of the space, significant for the potential digital reconstruction of a site. These images can be found in published works, catalogues or digital collections of museums, as well as on postcards and photographs from private collections. In addition to visual and cartographic data, written sources, such as newspapers, can provide more specific information about the characteristics of certain sites; for the example of Belgrade, special editions of Belgrade's Municipal Paper (Beogradske opštinske novine ) contain articles about the city's past, directed specifically toward its popularization among its inhabitants, which often contain detailed information on the location of the described sites in relation to the contemporary urban tissue of the early 20<sup>th</sup> century. For the process of mapping the past and its digital layering, this means that it is possible to use data to answer the following questions:

- a) Where is/was the site?
- b) What does/did it look like?
- c) What kind of public life revolved around it?

Answering these questions explains sites as singular layers of the past, and while such information can be used as a final stage of interpretation, it solely anchors the visual material to a heritage site. The more significant part of this research combines many layers, places and sites, to create a database of Belgrade's overall urban development, and identify the sites with the highest density of heritage, which points to a more complex – and likely digital – approach to heritage presentation.

Anchoring pasts to the contemporary tissue and identifying their locations through maps and images enables an understanding and rediscovery of Belgrade's forgotten memory, which has been erased from the contemporary city tissue through the process of urban development.

### **Digital Superimposing Methodology – Finding Belgrade's Urban Palimpsest**

Digital superimposition of the gathered data follows the method of urban palimpsest for identifying pasts within the urban fabric. According to Nadia Bartolini, "The palimpsest enables something that has disappeared from sight to resurrect; a trace to linger."<sup>10</sup> It is in this explanation that the importance of the 'invisible' spectrum in understanding and interpreting the heritage of places appears. Although in the processes of development new objects, matrices and structures have replaced the old ones, Bartolini emphasizes



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*the appearance of the shifts of layers, and raises the question: Are the physical traces of the past really extinguished?*<sup>11</sup>

This phenomenon of the seeming erasure of the past is explained by the selectivity of values that are retained in cities<sup>12</sup> and as such transferred to the next level of urban development. Urban palimpsests observed by Cheshmehzangi are precisely based on the characteristics of the 'erased' (i.e. forgotten) memory that did not survive such selection, and which today, in accordance with the New Paradigm of Heritage, especially the UNESCO *Recommendation on Historical Urban Landscapes*, and the analysis of the New Paradigm by Neil Silberman,<sup>13</sup> establishes the value of 'process not product'; the actions of communities impacting the space's development beyond its final physical form. In his categorization of urban palimpsest, Cheshmehzangi separates urban landscapes, urban form, purpose of surfaces, urban identities, urban textures (i.e. urban matrices) and city image as significant components that belong to the processes of development of the morphology of cities and can participate in the creation of narratives about the past of space.<sup>14</sup>

Urban palimpsest analyses based on layering can be carried out and used in two ways. One process is the *layering* process, which is used to specifically analyze each stage of development, through a retrospective cartographic reading of space;<sup>15</sup> each stage of development is mapped separately, as a separate sequence. So, for example, to examine the urban memory of locations such as the PuDong district centre in Shanghai and Lagos in Nigeria, Cheshmehzangi uses sequences of satellite images of the site from several periods to explain the different phases and changes in the city's tissue.<sup>16</sup>

Another process – arguably more relevant to the topic of this paper – which contributes to explaining the density of heritage and urban memory of the city, and is suggested by Stefano Bianca as a process of *historical macroanalysis*,<sup>17</sup> is the process of *overlapping* cartographic data about the past, (based on historical maps, photographs, strategic and military maps, urban plans and satellite images), which – once overlapped – offer a refinement of the multilayered and dense heritage within cities (Figure 1). With this approach to urban palimpsests, points of continuity and elements of *complexity* of the past are obtained for use as data in the phase of 'expert interpretation'.

To overcome the issue of the geographic precision of historic maps in the geospatial positioning of Belgrade's pasts, here digitalization has been approached by redrawing maps over a georeferenced map of Belgrade. This allowed corrections of the distortions of the original maps to be made by using reference points to conclude more precisely where the heritage sites were located, and where the 'ghost matrix' of the city's palimpsest lies. Use of streets that have remained unchanged throughout Belgrade's urban development as the first corrective reference helps adjust the mapped information concerning the specific streets and areas. The second set of reference points can be found in older historical buildings, such as Dositej's Lyceum and Sheikh Mustafa's mausoleum, which date to the 18<sup>th</sup> century, or pinpointed to the sites of the Roman legionary castrum and artefacts precisely mapped by Marko Popović. Some of the described traces of the city's many pasts can also be identified through satellite imagery, as is done in Cheshmehzangi's research, especially within the enclosed blocks of the Upper Dorćol area.



Figure 1. Superimposed maps, adjusted to the contemporary urban fabric (Author: Milja Mladenović, 2023).

Using reference points as anchors for mapping, it is possible to rescale and adjust the maps according to them. For more distorted maps, several reference anchors are required to adjust the views according to the narrower observation areas. The specific character of drawings, especially as seen on the 18<sup>th</sup>-century military map of Belgrade by Fr. W. Bruschi,<sup>18</sup> points to a specific cartographic methodology of presenting the city in a radial matrix, which, while it did not exist in Belgrade, was a familiar morphology for the Austrian military, which led to a radial distortion of the representation of Belgrade within the plan. The use of this map in digitalization and mapping of the (in)visible urban memory is unreliable from a geometric perspective, but the toponyms and the selection of the representative buildings depicted on the map are relevant sources for tracking significant landmarks throughout different periods of Belgrade's development.

The advantages of using CAD software (Autodesk's AutoCAD) and georeferenced maps are valuable in acquiring specific coordinates of certain invisible and forgotten heritage sites. Repeated mentions and depictions of certain buildings, monuments, streets or areas in memories, multimedia sources, and across various maps allow for a certain degree of their physical pinpointing in contemporary tissue and reveal a number of traces of the past embedded within the contemporary urban fabric (Figure 2). The characteristics of software that allows the drawing and sorting of data in different layers and arrangement of them by periods and colour is beneficial to further research. The maps were further edited in Photoshop editing software to enhance the visibility of the conclusive results of mapping.

For the research, layers containing the data were arranged chronologically and by land use type, resulting in the creation of sets of both themed and chronological maps explaining the characteristics of Belgrade's layered pasts. These are further temporally categorized into seven chronological layers: 2<sup>nd</sup> Century, 3<sup>rd</sup>–4<sup>th</sup> Century, 17<sup>th</sup> Century, 18<sup>th</sup> Century, early 19<sup>th</sup> Century, late 19<sup>th</sup> Century, and 20<sup>th</sup> Century, and by land use into three categories: religious buildings and graveyards, sites of everyday life, and inherited street network (Figure 3).

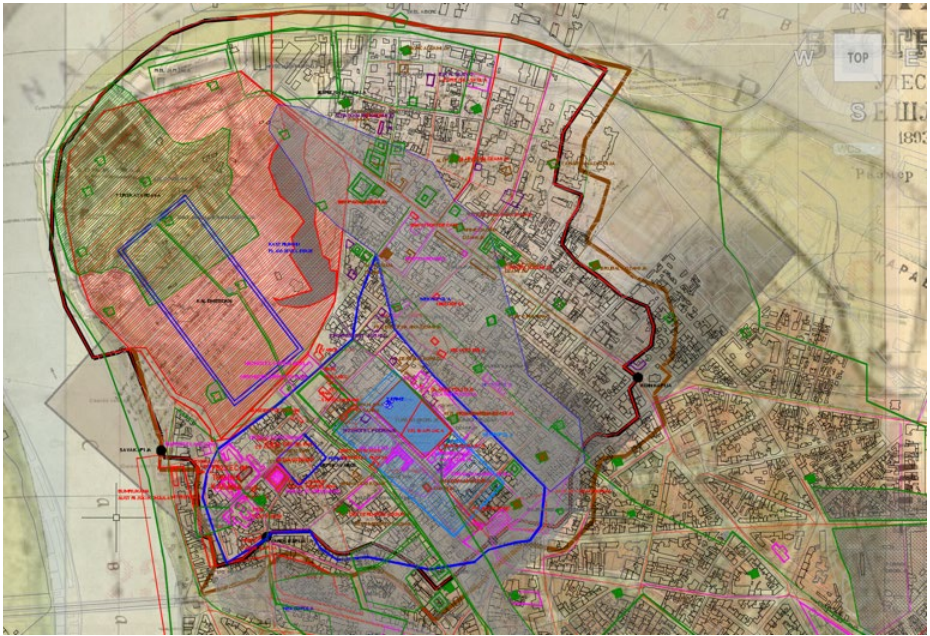


Figure 2. Redrawn and superimposed heritage elements according to mapped data (Author: Milja Mladenović, 2023).



Figure 3. Chronological and themed digital maps of Belgrade's historical core (Author: Milja Mladenović, 2022).



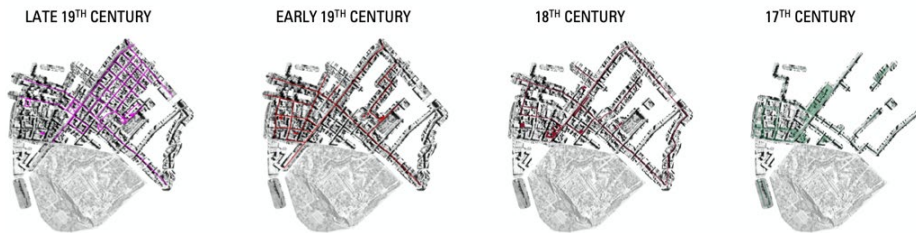


Figure 4. Photoshopped analysis of urban matrix development  
(Author: Milja Mladenović, 2022)

The CAD software also allows for the precise superimposition of heritage mapped in the gathered documents, with contemporary buildings enabling the identification of the 'living' elements of the 'ghost matrix'. Identification of the built urban blocks, streets or former boundaries within the city provides a better insight into the continuity, as well as the multiculturalism, of Belgrade's historical centre. The georeferenced maps can be used further in GIS programs, where supplementary multimedia information about the sites can be added.

The images, textual descriptions, memories and places of cultural significance for local communities are included in the mapping process according to their location, but the additional data they represent (visual and descriptive) facilitates their further presentation in spaces already mapped in the georeferenced format. In the case of GIS programmes, connecting photographs and descriptions to a geospatial system leads to the creation of an interactive map, which can subsequently be used as a means of interaction with heritage, or as an interpretation phase for connecting multimedia information in a singular platform for further research in the field of heritage.

Transferring the mapped data as a cartographic segment of the process into photo-editing software enables the construction of different interpretative materials, which, in turn, facilitates an understanding of the city's urban development and various stages of its morphologic forms, specifically related to different cultural contexts (Figure 4). The images and textual descriptions help link the intangible cultural heritage and multicultural 'individual histories' to physical spaces. The difference this brings to the current practice of heritage interpretation and research includes the 'invisible' spectre of the city in heritage presentation, reviving the forgotten urban memory. Consequentially, this process leads to a better understanding of the city and enhances its multicultural values for diverse communities.

Recognizing points of visible and invisible pasts identified as relevant by cartographers provides spatial anchors for using mapped data for different presentation techniques based on interactive maps and map-based software. These maps and digitalized heritage data can be further used for tourism, education or research. The main characteristic of mapped data for potential digital heritage interpretation is the *choice* it offers its end-users, whether visitors or experts. Through this, reading urban heritage becomes a potential interactive

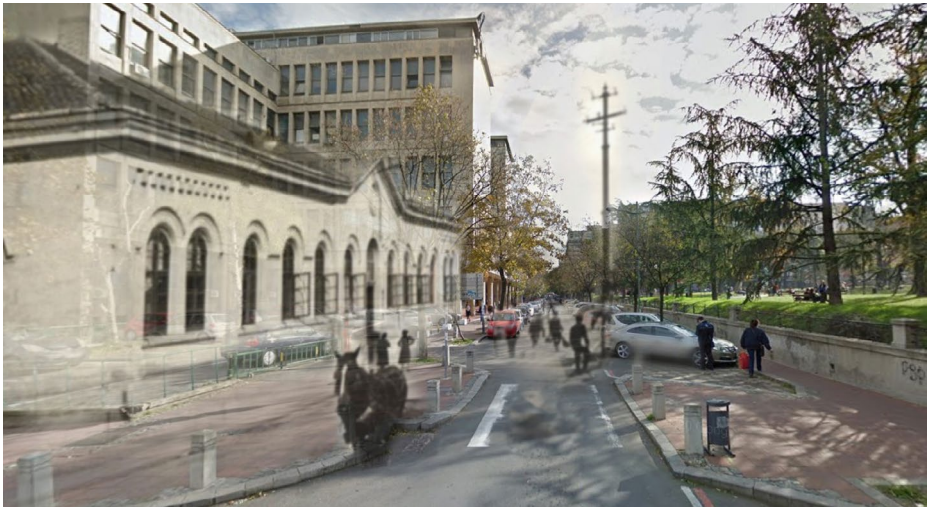


Figure 5. Overlapped past-and-present view of a site in Braće Jugovića street.  
(Author: Milja Mladenović, 2022)

platform, offering users a selection of data according to chronology or topic of the gathered and mapped multimedia. Specifically in the context of understanding urban memory as an attraction, these superimposed maps contribute to the further urban and touristic development potential of Belgrade's historical core.

### **Possible Uses of Digitally Layered Maps**

Considering a significant gap between the officially recognized and institutionally protected heritage sites and the forgotten diverse urban memory that can greatly contribute to the better urban development of Belgrade's historical core and likewise its development as a touristic attraction, the digitalized palimpsest of all of Belgrade's pasts offers a starting point for urban planners, architects, and heritage specialists and interpreters to overcome the gap, and consider broadening the concept of heritage protection beyond that of the conservation and restoration of material heritage.

The potential use of digitalized palimpsests of urban memory and forgotten heritage sites is acknowledgeable in the field of urban studies, where different hidden identities and sites – as well as certain components of forgotten morphology, long merged with contemporary architecture – can be designed and accented to create a new identity of space. Such new identities are based on the assemblage of those from the past and can bestow an interesting component of development in tourism and the local economy, by providing distinct experiences within urban spaces of the historical city centre (Figure 5). In the field of heritology, such approaches help with the implementation of the New Paradigm of Heritage, through a new interpretation of HULs and urban spaces, enabling the popularization of heritage as an aspect of common everyday life.

Within the field of urban studies, the use of digitally layered maps provides further understanding of different aspects of the city's character, leading to better urban planning. Acknowledgement of the complexity of urban pasts and their specific locations provides significant data for the protection of historic urban areas or their urban revival as contemporary spaces of continuity. Furthermore, the use of this kind of data provides insight into *genius loci* beyond the final stage of urban development, inviting different users and inputs for identity-based and holistic urban planning. Through this, new zones within the historical centre, recognized by the superimposition of the past, appear, pointing to a more comprehensive approach to the detailed planning of areas with high heritage densities.

In the fields of heritology and humanities, the superimposed data offers insight into places of continuity or discontinuity, and specifically accentuates the multiculturalism of the city's past, as well as the precise impact of different communities on areas of the historical core. Understanding these characteristics, especially through their categorization by type (places of worship, streets and places of everyday life) enables a link between the intangible and tangible heritage and the urban form of the contemporary city. As a result, the complex digitalized map of an urban palimpsest invites many new readings of the city's pasts, both themed and chronological.

This type of approach in the fields of urban studies, urban planning, heritology and humanities can result in the multidisciplinary design of interaction with heritage sites and historical areas. Similar to the *Beotura* smartphone app,<sup>19</sup> the integral and holistic approach to urban pasts proposed in this paper can result in a digital guide based on an interactive map, which combines map-based information about heritage with textual and image data. Within the *Beotura* application, which includes 107 sites of institutionalized and non-institutionalized, visible and invisible, heritage, thematic tours were created that guide the user through one of ten tours on an interactive map, which, among others, include the topics of multicultural heritage through thematization related to the Jewish or Ottoman heritage of the city, or those that include storytelling about different pasts (i.e. of the city's 'dark past(s)') through multimedia presentation (Figure 6). According to the basic purposes of the presentation arising from the New Paradigm of Heritage, this application conforms to the addition of information about the physical space, using as anchors the existing objects of heritage, or the coordinates to which the sites of invisible heritage are attached.

## Conclusion

Building on the New Paradigm of Heritage principles and recent research by Cheshmehzangi, Bianca, Silberman and Bartolini, this paper establishes a methodology for tracing and exploring urban memory as a hidden part of the contemporary urban fabric. Through the use of CAD and image editing software, the precise locations of forgotten heritage can be revealed in today's urban fabric, accenting the spaces within the historical centre, which can then be further developed for storytelling purposes, whether in the field of heritage interpretation and urban design, in the tourism sector, or as a multicultural generator of the empowerment of local communities.

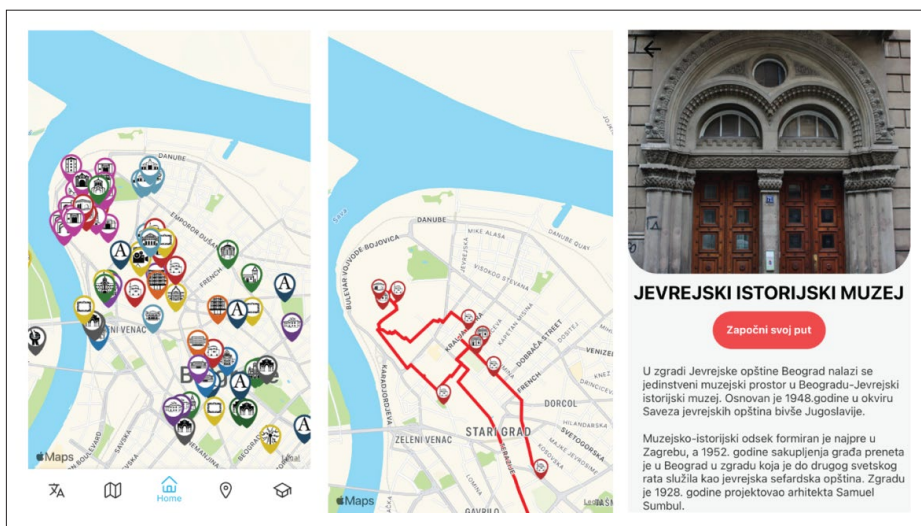


Figure 6. *Beotura* app  
 (source: <https://apps.apple.com/us/app/beotura/id64444841651>)

Traced across chronological periods, the digitalized maps contribute to understanding a city as a palimpsest, and through layered and mapped sites provide new insight into the centuries-long urban development of Belgrade's historical core, as well as specific locations for the resurrection of the memory of the city's past, as suggested by Araoz.

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