

Application of GIS Technology for Cultural Mapping: The Case of Havelis in Shahjahanabad

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## Culture For All Conference on Cultural Mapping 2021

In early 2021, Sahapedia issued an open call inviting researchers, academicians, and practitioners to share their work on cultural mapping with the hope of creating a knowledge repository on the subject in India and regions with similar cultural history like Asia and Africa. Papers were submitted under the following themes - (a) Cultural mapping—theory & practice, (b) Technology for cultural mapping, and (c) Mapping Matters.

Over 60 papers were submitted of which 15 papers were featured in the #CultureForAll Conference. The conference was held digitally on 28 and 29 September 2021, in collaboration with the Centre for Social Studies (CES) at the University of Coimbra, Azim Premji University, the Centre for Internet and Society, and the Re-Centring AfroAsia project at the University of Cape Town.

The papers published on this site are predominantly from South Asia and their research interrogates, discusses, and reflects upon the complex questions of who, what, how, and for whom to map culture. The papers explore a diverse range of subjects and approaches that range from literature in Nagaland and food in Goa to music in South Africa and architecture in Delhi. The authors for the papers include researchers in history, literature, and music, as well as architects and educators.

This paper was presented in the #CultureForAll Conference on Cultural Mapping for the session 'Mapping Technologies, Tools and Approaches'.

### Application of GIS Technology for Cultural Mapping: The Case of Havelis in Shahjahanabad

#### Author Bio

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**Shubham Mishra** ([shubhammishr@gmail.com](mailto:shubhammishr@gmail.com)) was trained as an urban planner at the International Institute of Geo-information Science and Earth Observation (ITC), the Netherlands, and School of Planning and Architecture (SPA), Delhi. He also holds a Master's degree in Geography from the University of Delhi. He uses his training of an urban planner to explore landscapes—both built and natural—to link the present to the past.

#### Abstract

Despite the widespread prevalence of Geographical Information Systems (GISs) in areas such as urban and regional planning, transportation, environment and several allied

fields, their use in heritage conservation remains limited in India. The recently initiated collaborative research between the School of Planning and Architecture (SPA), Delhi, and Politecnico di Torino, Italy, envisages to address this gap by using GIS in not only documenting the havelis of the historic area of Shahjahanabad but also using this as a tool to arrive at planning and design decisions that can help in both preserving the structures as well as improving the quality of life of residents. Still in its preliminary phase, the research aims to create an open-source web-based platform which would enable anyone to get a variety of spatial data and information about havelis.

**Keywords:** Historic Areas, Mapping, Havelis, Geographic Information Systems, Shahjahanabad

## Introduction

The collaborative research project “Havelis of Shahjahanabad: Knowledge, Awareness, Enhancement” aims to develop innovative ideas, methodologies and strategies to raise awareness about these historical buildings, enhance their heritage value and improve the quality of life of residents of the old city of Shahjahanabad in Delhi. In doing so, it would map this information on an open web-GIS platform. The project seeks to involve international scholars and heritage experts as well as local agencies, residents and students to achieve its aim. Although Shahjahanabad has been the subject of numerous research initiatives that range from architectural and historical to cultural and socioeconomic, academic or professional work that brings together all these elements in an open-source, web-based spatial platform is not yet available.

This research collaboration between School of Planning and Architecture (SPA), Delhi, and Politecnico di Torino, Italy, started in late 2020 as part of a Memorandum of Understanding (MoU) between these two institutions. This paper aims to present the preliminary phases of this research.

Geographical Information Systems (GISs), with their ability to store, analyse and visualise vast amounts of spatial and non-spatial data, are ideal to document heritage and disseminate information about it. Although GIS is widely being used as a decision support tool in fields such as urban and regional planning, traffic and transportation, landscape ecology, geography, geology and many others, its use in heritage conservation, at least in India, is quite limited at the moment. This research project envisages to address this gap by making use of GIS in not only documenting the havelis of a historic area such as Shahjahanabad but also using this “Heritage GIS” as a tool to arrive at planning and design decisions. These decisions, it is envisaged, would help in both preserving the structures as well as improving the quality of life of the residents.

## Shahjahanabad

In 1638 CE, a little more than a decade into his rule, Mughal Emperor Shahjahan decided to shift the capital of the Mughal Empire to Delhi and create a magnificent new city intended as a model in terms of planning, spatial organisation and landmark

structures. The new city that he founded on the banks of river Yamuna lay north of all the previous cities of Delhi. It was named Shahjahanabad.

Shahjahan, the ever-keen builder, had personally overseen the planning of the city, directing the construction of a primary mosque—the Jama Masjid—laying down of gardens and canals, and giving away plots of lands at prominent locations to his noblemen for building their own mansions. Outside these mansions, along the main thoroughfares, bazaars developed where merchants traded in imported goods and merchandise. Over time, some of these transformed into specialist markets and have remained so even in present times. Then there were numerous mosques, temples, inns and gardens, some of which were laid down by Shahjahan's wives, princesses and courtiers. Accounts of travellers, such as Francois Bernier, reveal how impressed European visitors were with Shahjahanabad's immense riches. Clearly, the abundant wealth and stability of the Mughal Empire during the reigns of Shahjahan and his successor, Aurangzeb (r. 1658–1707 CE), took the city to its zenith. Shahjahanabad thrived not only as the capital of the empire but as a cultural centre where arts and crafts, architecture, poetry and music flourished (*apud* Mitra Chenoy, 1998; Ehlers and Krafft, 2004; Bernier, 1916).

Once the capital of the mighty Mughal Empire—an empire that stretched as far north as present-day Afghanistan—today Shahjahanabad is generally known as the “Old City” of New Delhi. Unlike the other cities of Delhi, whose form is either untraceable or exists merely as desolate monuments scattered all over, Shahjahanabad is still a living city. Many of the architectural imprints of Shahjahan, his courtiers and later rulers—the Red Fort, the Jama Masjid and numerous other structures—have survived the Revolt of 1857 and its aftermath, Partition of the subcontinent in 1947 and the “planned” and “unplanned” onslaught that came after Independence (*apud* Peck, 2005). What has also survived is its numerous arts and crafts traditions and their practitioners, many of whom are now fourth- and fifth-generation residents. Furthermore, being one of the Central Business Districts (CBDs) of Delhi, it is home to a variety of businesses and allied activities.

The irregular urban grid framework of Shahjahanabad, mainly characterised by narrow streets, is dotted by roughly 500 havelis, the Mughal courtyard houses, where noblemen and rich merchants used to live. Unfortunately, developmental pressures, inadequate planning, standardised urban renewal projects, lack of maintenance, decay of the civic amenities and other factors have contributed to the loss of many of them.

Despite the transformations that have taken place over the centuries, these havelis are still easily recognisable, mainly because of their elaborate arched gateways. These gateways had always been an important element of design, thanks to an arched opening, usually the foliated or cusped churidar mihrab. The door panels, often decorated with carvings and floral motifs and characterised by a plinth, ensured privacy from the outside world. (Fig. 1) Inside this arched gateway, away from the street outside, the



haveli would open into the central courtyard—the core space of these mansions—where the most important activities of the household would take place. On either side, rooms surrounded the open space, a semi-public area, to receive guests and visitors. Courtyards were typically spacious, sometimes adorned with fountains and gardens, and while the main one was on the ground floor, some havelis would also have smaller ones on the upper floors, surrounded by rooms, which were part of the family's private space. On the last floor, terraces were quite common, used for outdoor sleeping and for recreational activities such as kite flying, drying food and clothes, and pigeon baiting. The complex horizontal and vertical composition of spaces—from courtyards and terraces to verandas and inner rooms—ensured that the havelis created a pleasant environment, both climatically and culturally, alleviating the worst heat peaks of summers and guaranteeing adequate privacy for the family (*apud* Tillotson, 1998).



Fig. 1. Havelis and their decorated arched entrances (Source: G. D'Agostino)

Today, many of these imposing mansions are in a state of neglect, lie vacant and risk collapse. These pressures and risks notwithstanding, the havelis provide a unique identity to Shahjahanabad, representing a distinct community-oriented way of life, thus becoming the core architectural element of the area—an invaluable heritage resource of Shahjahanabad.

Over the centuries, Shahjahanabad has witnessed several phases of transformation, both physical and social. During the eighteenth and the early nineteenth centuries, the number of havelis continued to grow, though smaller, fitting within *kuchas*, *katras* and *mohallas*. After suppressing the Revolt of 1857, the British planned important intervention in old

Delhi (*apud* INTACH, 2018). Havelis were often demolished and replaced with more modern and ordinary homes. From huge quarters in the early nineteenth century, their dimensions got drastically reduced in a matter of five decades. Many of them got further fragmented into shops and workshops. Such changes continued after Independence too. With the reduction in size, the role of the havelis changed as well. Many factors continue to affect havelis today—large-scale change of use, from residential to commercial; the partial, or even total, demolition of significant architectural elements, subdivisions and alterations; and outmigration of the inhabitants. These factors highlight the urgent need for intervention, perhaps starting with sharing knowledge about their values, raising awareness among residents and further investigation of possibilities to enhance their role and adaptive reuse.

### **The Research Methodology**

This collaborative research aims to document havelis of Shahjahanabad by collecting diverse information. An open-source web-GIS based platform that disseminates information about different facets of these havelis to people at large is envisaged as one of its outcomes. The information disseminated in this manner, it is hoped, would raise awareness about the urban heritage of the area.

The project team composed of heritage practitioners and related domain experts from the two institutions aim to locate as many havelis as possible and create a database consisting of both the architectural details of the buildings as well the socioeconomic aspects of the inhabitants. The spatial documentation and the creation of database is envisaged to be accomplished using open-source software.

The research aims to use a series of maps to trace the chronology of the city and the transformations it has undergone since coming into existence in the mid-seventeenth century. For building this chronology, a series of historic maps are envisaged to be superimposed in layers. (Fig. 2; Table 1) The havelis would then be overlaid on these base layers. The superimposition of the various base layers would help in understanding the changes that have occurred in the city at various points in time.





Fig. 2. Pre-1857 map of Shahjahanabad overlaid on Google Satellite Image (Source: Authors)

TABLE 1: List of Maps to be Used for this Research		
S. No.	Map	Action
1.	Ehlers and Krafft, Shahjahanabad pre 1857 map	Geo-referencing and digitisation of the map
2.	1865–67 Surveys of Lala Hurdeo Das and Lala Tika Ram	Geo-referencing, mosaicking and digitisation of Survey sheets
3.	1910 Wilson Surveys	Geo-referencing, mosaicking and digitisation of Survey sheets
4.	Revenue Department Map	Geo-referencing and digitisation of the map

The web platform will show the precise location of the heritage structures, and havelis will be easily recognisable through a distinct mark or colour. (Fig. 3) For each building, all attribute information will be divided into different descriptive categories. (Fig. 4) Starting with an introductory table, containing the location of the building and information about its status (ownership, use, preservation, etc.). The database would

record detailed architectural information such as the building material used in walls, floors and roofs; details of decorative elements; type of plaster and so on. In addition, socioeconomic characteristics of the inhabitants would be recorded in another table. The two tables would be related to each other using a common ID. A draft schema showing the general information about the building and the household is shown in the figure given below:

ID	MCD Revenue No	Original Name	Present Name	Latitude	Longitude	Mohalla	Kucha/Katra	Status	Present Ownership
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Construction Period	Original Function	Present Function	Signature Element	Construction Material	Remarks
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ID	Household ID	HH Members	HH Male	HH Female	Toilet Access	Water Supply
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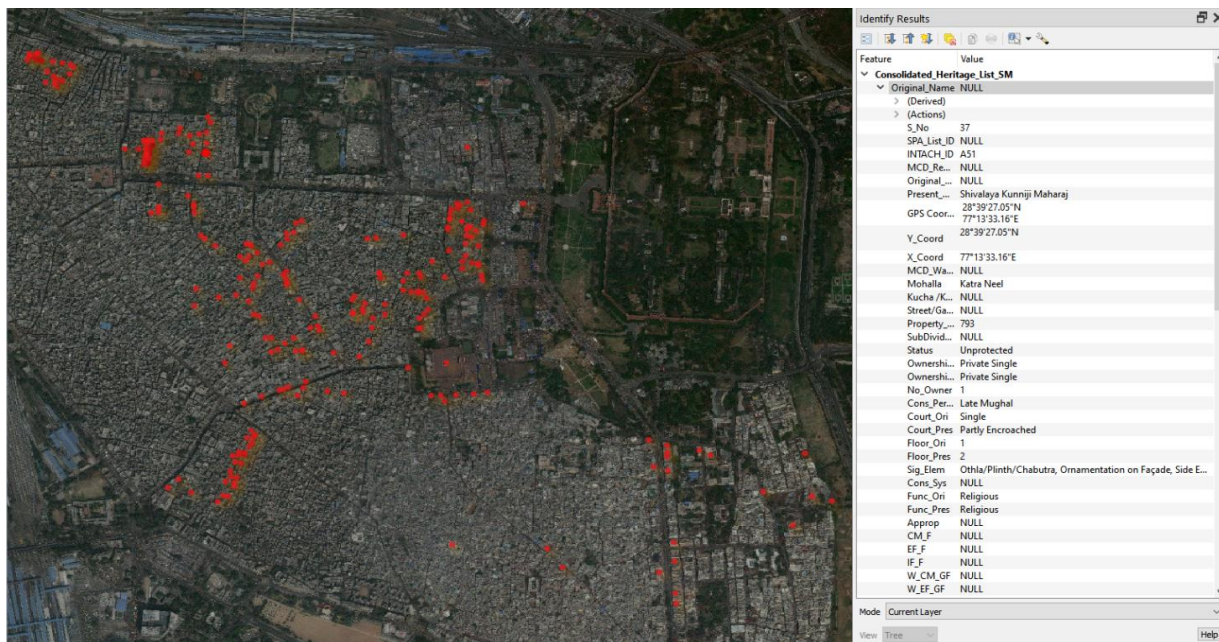


Fig. 3. Location of heritage structures (Source: Authors)



Original_Name	NULL
> (Derived)	
> (Actions)	
S_No	37
SPA_List_ID	NULL
INTACH_ID	A51
MCD_Re...	NULL
Original_...	NULL
Present_...	Shivalaya Kunniiji Maharaj
GPS Coord...	28°39'27.05"N 77°13'33.16"E
Y_Coord	28°39'27.05"N
X_Coord	77°13'33.16"E
MCD_Wa...	NULL
Mohalla	Katra Neel
Kucha /K...	NULL
Street/Ga...	NULL
Property_...	793
SubDivid...	NULL
Status	Unprotected
Ownersh...	Private Single
Ownersh...	Private Single
No_Owner	1
Cons_Per...	Late Mughal
Court_Ori	Single
Court_Pres	Partly Encroached
Floor_Ori	1
Floor_Pres	2
Sig_Elem	Othla/Plinth/Chabutra, Ornamentation on Façade, Side E...
Cons_Sys	NULL
Func_Ori	Religious
Func_Pres	Religious

Fig. 4. Attribute information available on clicking a heritage structure on the map (Source: Authors)

Using different “queries”, the users will also be able to sort and visualise information as required. (Figs 5 and 6) For instance, a user may visualise havelis built only in a certain part of Shahjahanabad or during a particular time period. Or a technical expert may filter the structures only by the material used in the construction of floors, walls or the roof. The system would also provide links to events associated with the structure as well as images/photos, wherever possible. At the same time, thousands of kilometres from Delhi, a potential tourist may simply look for routes to enjoy the lanes of Shahjahanabad. The database has been structured in a manner that is convenient to both collect and enter the data in it as well as access all the information once it is ready.

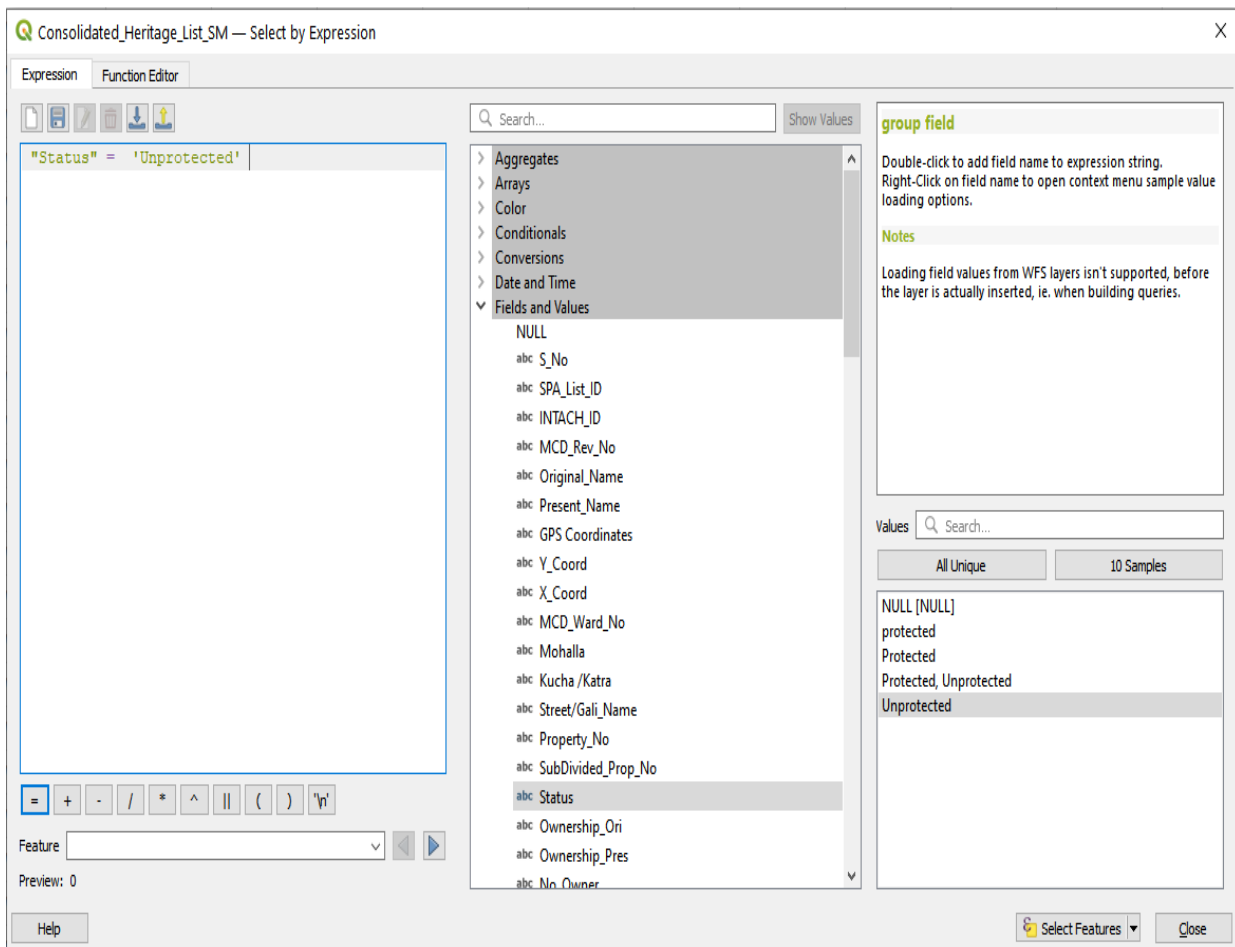


Fig. 5. Sample query to select all the “Unprotected” heritage structures in the database (Source: Authors)

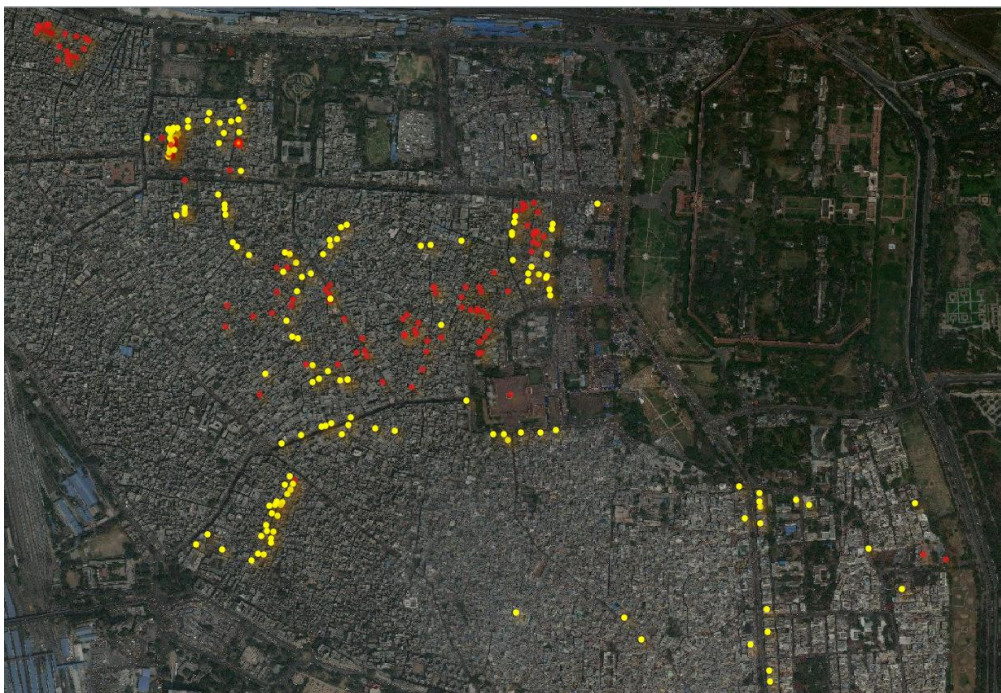


Fig. 6. All the “Unprotected” heritage structures shown on the base map (Source: Authors)

Several further actions and outcomes are envisaged using various open-source applications. For instance, the creation of digital story-maps and interactive routes that would allow anyone to explore Shahjahanabad, or other platforms, such as Wikipedia, OpenStreetMap, Mapillary, that would involve individuals to contribute and gather more information.

This cultural mapping project is thus envisaged to provide a deeper understanding of the present conditions of havelis while simultaneously collecting all the information necessary to intervene, if needed, and to promote their role for the present and future of the city, where heritage conservation and reuse should be considered key elements of the development processes. Further, the objectives just mentioned will surely benefit from the synergy of the two institutions' cultural approaches, by sharing and disseminating good practices and lessons learned in the two countries.

As mentioned in the New Urban Agenda (UN-HABITAT) the activity of cultural mapping should include both tangible and intangible elements of heritage (*apud* UN-HABITAT, 2017). So, documenting havelis as historical buildings also means collecting information on local knowledge, related, for instance, to traditional craftsmanship, performing arts, cultural practices and lifestyles. A thorough analysis of the local context, with its intangible and tangible dimensions, can help residents to know more about the urban heritage that surrounds them and boost their sense of belonging to the place. Despite outmigration during the last decades, many families still live in Shahjahanabad, and despite plenty of challenges and difficulties, they deal with regularly, they still feel attached to the old city. The research aims at following a people-centred approach. Indeed, the living (and working) communities of an historical area play a fundamental role in revitalising its legacy. If a community does not know its own heritage and/or does not recognise it as an asset, there is little chance to improve the quality of living without completely changing the urban morphology of the city. So, citizens need to be involved in the process of heritage awareness and enhancement, recognising the opportunities that cultural resources can bring to boost the life of the community and improve the living conditions of the area. For this purpose, engagement of residents, experts and the elected representatives is vital right from the start. Further, when referring to havelis, it is important to go beyond the single-building approach and see them as part of a system, with all the interconnections between the built form and the practices of local communities. So, any actions or initiative for promoting and revitalising Shahjahanabad cannot be only about the buildings but also for its people.

Documenting and mapping havelis not only mean identifying the physical traces of the city but also entail collecting the narratives—about events, people and their lives—that have shaped these buildings over the years. Indeed, despite being in ruins, the memories of these mohallas (neighbourhoods) have not faded. While trying to record intangible heritage related to havelis and its role in and for Shahjahanabad, this research would like to demonstrate how cultural resources can be a means to enrichment of society, where actions of conservation and reuse can be part of community development.



## Conclusion

For this cultural mapping project, the involvement of a cross-section of stakeholders is required, and different scales of interventions and levels of engagement need to be considered. Workshops and activities on site would involve local communities, students and heritage experts. The research would explore the possibility of mapping through crowdsourcing to enhance the bond between people and their cultural heritage. Discussions and interviews with the community elders would be useful to understand the urban narratives of the times gone by. The research would also engage with the local government representatives and the civic authorities, and showcase the role that “Heritage GIS” could play in strengthening local knowledge, enhancing research, managing heritage, policy planning and designing better solutions that could help in both preserving the heritage and improving the quality of life of the inhabitants of Shahjahanabad.

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