

SCTCMG 2021**International Scientific Conference "Social and Cultural Transformations in the Context of Modern Globalism"****GIS MAP OF HISTORICAL AND CULTURAL MONUMENTS IN ROSTOV-ON-DON (RUSSIA)**

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Abstract

The Southern Scientific Centre of the Russian Academy of Sciences (SSC RAS) focuses on the most interesting and promising research in Southern Russia. One of its activities covers the study of the historical and cultural heritage of the region. The article presents the results of a study on the forms and methods of preserving and enhancing historical and cultural heritage in Rostov-on-Don. The article analyses the project, which was implemented at the SSC RAS and aimed at developing a GIS-map of historical and cultural monuments in Rostov-on-Don. This interdisciplinary project involved staff from the laboratories of History and Ethnography and Information Technology and Mathematical Modelling. The paper details all the steps involved in developing a map. The authors focus on the technical characteristics of the project. The purpose of the study is to make scientifically accurate information about the historical and cultural heritage, monuments and memorial sites of the Rostov region available to a wide range of researchers, employees of cultural and educational institutions, representatives of public organizations and public authorities. The project and the article applied methods and approaches from various disciplines. The work is based on historical-analytical and historical-systematic methods. The map development process used mathematical and cartographic modelling techniques, geocoding. The care for monuments is an indicator of the spiritual health of a society that is capable of dealing with the historical past reasonably and respectfully. As a product of social development, monuments also have an active impact on society itself, its groups and strata.

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1. Introduction

Southern Russia is a fascinating region with a rich history. However, the Rostov region, the cradle of the Don Cossacks, occupies a special place within it. The events of the glorious past are reflected in the historical and cultural monuments erected in the region's towns and villages. The city of Rostov-on-Don, founded in 1749 as the capital of the Don region, is the centre of a considerable number of monuments.

Residents and tourists find sites of historical and cultural heritage interesting both as historical objects and as works of art. The complex of historical and cultural heritage (HCH) can be conventionally divided into ancient, medieval, modern, pre-revolutionary, Soviet and post-Soviet periods. HCH monuments include archaeological, architectural and historical landscape sites. Special interest belongs to monuments related to historical figures, memorable events, representatives of literature and the arts. In Rostov-on-Don, there are a significant number of such monuments. Recent decades show an increasing trend in their numbers. As elsewhere in the world, the study of monuments themselves and the social processes associated with them is an important task for contemporary researchers.

2. Problem Statement

The informatization of historical scholarship has been going on for a long time. Researchers use a variety of modern methods and approaches, including interdisciplinary ones. The application of GIS (geographic information systems) in historical research allows the handling of data with spatial characteristics (Geoinformatics - a glossary of key terms, 1999).

GIS systems are used in surveys that rely on geographical reference to the site. The first GIS projects appeared in the West when there was a need to use large amounts of population census data. Germany, Belgium, USA, China and UK have created historical GIS projects to reconstruct the borders of states (Southall, 2011).

Russian scholars have drawn on the experience of foreign researchers in the field of historical GIS. The beginning of historical GIS mapping dates back to 1994 in Florence, Italy, during the "Coordinates of Historical Maps" seminar held by the International Association of History and Computing.

The first Russian scholars working with historical GIS were Vladimirov (1995) and Piotuh (1996). Scientists have reflected on the possibilities of using GIS maps and computer technology in historical research. Vladimirov (1995, 2005) has written articles and a monograph examining the perspectives of geoinformatics in history.

In Russia, there are now several research centres that develop historical GIS related to various issues - in Moscow, Yekaterinburg, Barnaul, Tomsk, Petrozavodsk and Tambov.

The creation of thematic maps reflects the research of historians, geographers and sociologists on the analysis of population movements, the creation of new settlements, chronological periods of settlement of territories and their economic, social and demographic development (Koldakov et al., 2006).

An example of such GIS work is "Electronic Catalogue of Settlements of Karelia in the 15th–20th Centuries". This project was guided by A.Yu. Zhukov at Petrozavodsk University (as cited in Lyallia & Zhukov, 2007). With GIS, it is possible to retrieve information about objects from the catalogue database.

The GIS Toponymy of Karelia is of interest. It may be useful when there are no settlements on maps or other sources. Work has also been performed at the University of Petrozavodsk (Lyallia, 2007).

The experience of Tambov University scientists Baranova and Konchakov (2005) is a curious one. Researchers used two created GIS: "Tambov 1914" and "Tambov 1781". By comparing the entries, they could determine that Tambov may have been founded as early as the 18th century.

An interesting geoportal is the "Historical and Cultural Heritage of the Perm Region". The project has three-tier architecture: Database+GIS+Geoportal. The development was based on ArcGis software (local level), ArcGis Server, database server (Microsoft SQL Server). The developed web GIS can be accessed via any browser.

More and more scholars are now using GIS in historical research. When creating and implementing a GIS, it is necessary to allow for further additions and extensions. According to Rygalova (2015), GIS technologies are not losing their position, but on the contrary, they are increasingly gaining a foothold in historical science as a full-fledged technology of historical research.

The interdisciplinary project at the interface between history, information technology and law brought together staff from two laboratories of the Southern Scientific Centre of the RAS and brought the work of the laboratory to a new level. Modern information technology makes it possible to create GIS maps for a wide variety of purposes using various software programmes. The project team of historians, cultural scholars, lawyers and geoinformaticians were interested in the possibility of creating a GIS map of historical and cultural monuments in Rostov-on-Don.

There have already been attempts to create this kind of GIS mapping in recent years. The most interesting projects are the Memory Card project (Map of the Memory), the Memory of the People project (Memory of the People), the I Remember project and the interactive map of memorial sites in the Krasnodar Region. The projects took different approaches. However, the information on the monuments recorded on the above maps was, in fact, only very general information on the sites. The project organizers have done a lot of work, and this project has certainly analysed this experience. In recent years, there have been similar projects dedicated to the Great Patriotic War and the memory of the fallen. Work on the SSC project convinces of the need to work on all areas of historical and cultural heritage, including architectural monuments, monuments to prominent figures and museums as custodians of memory.

This map is of particular interest because it was created by professional researchers. It draws on scientific materials and documents, including research findings and publications of the staff of the SSC RAS. The map will be a mobile database at the same time. It is based on the principle of supplementing, extending and refining the information.

3. Research Questions

SSC has been searching for information on monuments, memorials and memorial sites in the Rostov region for a long time. In their research laboratory and ethnography staff members are engaged in searching and studying forgotten or destroyed monuments (Semenova & Afanasenko, 2020). They have collected a great deal of material, documents and photographs. This has raised the question of

streamlining the data. In the age of information technology, the idea of a GIS map was a logical one, both as a laboratory data repository and as a mobile data usage tool.

SSC of RAS uses GIS technologies to develop a series of Atlases of Socio-Political Problems, Threats and Risks of Southern Russia, published at SSC of RAS, dedicated to a comprehensive analysis of the prospects and obstacles to the sustainable development of the Southern Russian macro-region. The study focuses on threats and risks of various kinds, from geopolitical to environmental. Particular attention is paid to examining the latest trends in the socio-political and socio-economic life of the Azov-Black Sea region (Atlas, 2011; Matishov, 2019). SSC staff have developed works to use their experience, skills and technologies to create electronic atlases and GIS maps in various fields of scientific research, including the humanities (Arkhipova et al., 2018).

The project started with the following objectives:

- identifying and processing new documents and materials containing information on the historical and cultural heritage, monuments and memorial sites of the Rostov region; establishing contacts with document owners;
- collecting and processing data for inclusion in the interactive map;
- developing a database structure, combining heterogeneous information obtained by SSC staff during research for further analysis and use as input into spatial analysis models;
- developing an algorithm for entering spatial data into the map;
- creating a pilot project in the ArcGis environment ;
- creating a web application to showcase the accumulated data based on the interactive online service ArcGIS Online.
- analysing the legal regulation of the handling of citizens' personal documents for research and publishing purposes and developing guidelines for SSC researchers on cooperation with document owners.

The GIS was implemented in two versions: a local version (downloading the raw data and preparing it for publication on the Internet) and an Internet version (creating a web map with the possibility of modifying and updating the database, as well as creating a web application "Monuments, memory sites and Memorials in Rostov-on-Don").

Due to a large amount of heterogeneous material (documents, photographs, references, maps, interviews) stored in the archives of the History and Ethnography Laboratory, the work on the electronic map is divided into several stages:

1. Drawing up and approving a list of historical and cultural monuments, memory sites and memorials included in the pilot project map.
2. Identifying a group of objects: military monuments, monuments to historical and cultural figures, architectural monuments, museums, images of Rostov, temples of religious denominations, archival collections of documents.
3. Processing reference material to enter into the database. Clarifying data. Drawing up site references.
4. Coordinating the form and methods of data entry, design, format. Enabling the mobility of map additions.

5. Performing a range of object photography and photo processing.
6. Determining a coordinate point to put on the map.

During the project, the researchers also addressed legal issues, such as the possibility of using photographs of cultural sites on the Internet, compliance with personal data legislation, the handling of archives and documents of personal origin, and compliance with requirements for making information about certain cultural heritage sites publicly available.

4. Purpose of the Study

The purpose of this work is to make scientifically reliable information about the historical and cultural heritage, monuments and memorial sites of Rostov-on-Don available to a wide range of researchers, employees of cultural and educational institutions, representatives of public organizations and public authorities.

5. Research Methods

The main research methods are mathematical-cartographic modelling and geocoding methods. The study used traditional approaches and methods of spatial statistics. The project was based on the principles of historicism, objectivity and reliance on historical sources. It applied analytical, historical-typological and historical-systematic methods. Excel and ArcGisPro software were adopted to fulfil the tasks. The choice of software products results from the availability of licensed software and experience in GIS development.

6. Findings

The GIS database is loaded with data created based on the coordinates of object locations, and the attribute table has fields with hyperlinks to photographic materials and additional object data on the internet. To facilitate the presentation of results, all spatial data used were referenced to the same geographical area in a single coordinate system and projection, done to a single scale (WGS, 1984). OpenstreetMap served as a base map. Figure 1 shows a layer of the locations of the monuments on the map. An interactive online service ArcGIS Online was used to demonstrate the accumulated data. Managing and editing the database proceeds based on shared access to resources by field of activity. ArcGIS Online contains many customizable applications and application builders. ArcGIS Online contains tools and settings that allow the organization's administrator not only to customize the home page, but also to manage the whole organization. The resulting web map provides an interface for specialists to work on maintaining the map and entering information. It is possible to embed the ready-made map in a website or create an end-user application based on it.

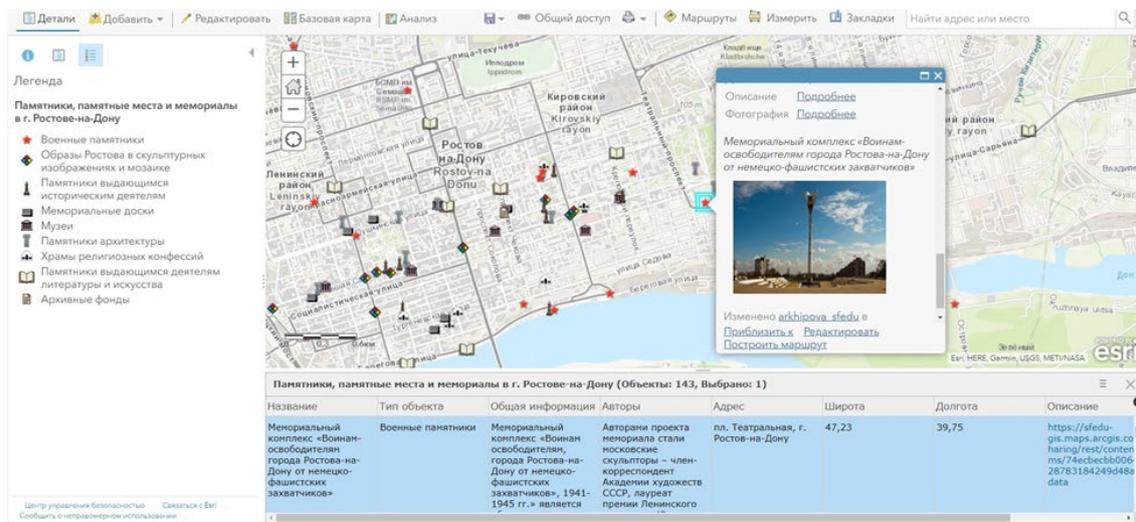


Figure 1. Web-map "Monuments, memory sites and memorials of Rostov-on-Don"

7. Conclusion

GIS technology 'as a digital documentation method is an excellent tool not only for visualisation, but also for the study of cultural heritage' (Bushmakina et al., 2017). This project has the potential to influence the preservation of historical and cultural heritage in Rostov-on-Don and the Rostov region and to stimulate interaction between academic and non-governmental organizations, public authorities and the protection of monuments. The GIS map makes it possible to follow the dynamics of the historical and cultural monuments' growth process, to consider new monuments and to prevent the destruction of existing ones.

This work resulted in entering the collected archival and bibliographic information about the monuments into a database, processing and verifying the accumulated data. The tested information is entered into a database table. There has also been digital processing of all the accumulated data. Researchers developed the basis for an online portal in the Arc GIS environment and implemented the pilot version in the ArcGIS Online portal. They have developed the concept of workspaces and access categories. The online resource database is filled with tables of monuments. There is a prototype application on the ArcGisOnline portal. The activity of adding new data to the GIS map will continue.

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