# The Role of Geospatial Habitus in the Research of Existing and Planned New Urban Landscapes

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**Abstract:** The cognitive role of habitus as a philosophical concept allows us to explore not only social space but also geographical space. Urban landscapes are shaped by people as a result of their life activities, and since people have certain habits, such habituses affect the environment. This relationship allows us to analyse the history of the creation of a particular urban landscape and predict what it will look like in a few years if the habitus is constantly influenced by a certain territory. In this study, geospatial habitus is proposed as a concept of vernacular district formation taking into account the time and historical factors, which allows us to study the nature and specifics of the urban landscape in more depth.

Keywords: Geospatial habitus, geospatial analysis, vernacular area, urban society, GIS

# 1 Introduction

Pierre Bourdieu noticed in his early anthropological research in Algeria (1956-1960) that Algerians have a different attitude to life than the French: time, work, savings, loans, etc. Similarly, within a city, the middle class has its habits that differ from the lower and/or elite, who in turn have a set of common traits and habits (LAU 2004, CROSSLEY 2013, AMBRASAT et al. 2016). This is habitus. Also, habitus is the attitude of a class of society to the environment, to the preservation of particularly valuable lands, and to the adaptation of urban land-scapes to the requirements of sustainable development of territories. The concept of "city habitus" was introduced to explain the peculiarities of the formation of the material structure of cities laid down in different historical periods in the theory of urban planning, as well as to designate a specific place, city, and region. The city habitus is a set of morphological characteristics of the material structure of a city that are inherent only in a certain era and a certain culture.

The authors of the paper have expanded the use of the term "habitus" and proposed a new approach to the study of urban landscapes, taking into account the geospatial habitus (i. e., habitus in geographic space). It does not depend on an administrative unit but focuses on the territory as an object of research in interaction with human activity, which has a direct impact on the environment.

The paper aims to research the city's territories using geospatial habitus to identify vernacular districts of the city and urbane landscapes of special value, using the example of Kharkiv, Ukraine.

#### 2 Methodology of Researching

Any territory may contain natural resources that people use in their activities. The pace and ways of using such resources (land, forests, water, minerals, etc.) depend on whether people are legally and/or morally allowed to do so. Habits, traditions, ways of life and lifestyles (habitus) also influence how natural resources are used and conserved by people. The authors of this paper clearly define the structure of habitus and describe its nature in order to explore its role in shaping modern urban landscapes (Fig. 1).



Fig. 1: The structure of the habitus and its interaction with humans and the environment

Human activity changes the landscape of an area (intentionally or not). In urban landscapes, this can be observed. A person forms a habitus in the social space with his or her habits, traditions, and rules. There are different habituses (economic, cultural, etc.), but this study focuses on the geospatial one, which is formed as a result of people's activities in a particular territory. Each class of society can use the resources on the territory differently, for example, the more valuable the territory is, the more attractive it will be to the elites, but such lands also have more restrictions on their use for sustainable development (especially valuable ones). There is also a tendency for residential development near industrial zones to be inhabited mostly by the working class. Such classes are formed by habitus (according to P. Bourdieu) and are interpreted as vernacular districts (or regions). There is no unambiguous methodology for establishing the boundaries of a vernacular district (SOSNOVA 2022). In (SOSNOVA 2022) the definition of conditional boundaries is based on the interpretation of the graphic responses of respondents to a survey conducted in 2019 in Lviv (the sample is not representative). The defined areas of the respondents' "own space" cover the territory of residence with infrastructure and an object symbol of this vernacular district.

Morphological features that are typical for a certain territory at a certain point in time correspond to habitus as a kind of concept about the characteristic form and structure of the material structure of the urban landscape, which was formed in a certain territory in a certain historical period.

In Table 1, the stages of the research of the geospatial habitus for built-up/rural areas are summarized in general, as well as the results obtained at each stage. The method of geospatial-retrospective analysis used in this study was described in detail in (KIN et al. 2021). For cities in the European Union, a study was conducted to determine the functional zones of territory development based on topographic maps of 1:10,000 - 1:50,000 scales. The authors proposed a methodology for automatically creating datasets of land use types based on retrospective data, along with an assessment of the accuracy of the results (LEVIN et al. 2020).

| Nº     | Stages  | Results   |
|--------|---|---|
| 1.     | Determining the purpose and scope of the research results   | Objective: to identify areas of historical,<br>cultural and tourist value to preserve<br>unique urban landscapes. |
|        |   | tourism.  |
| 2.     | Identification of the territory, period and classes of society to be studied                                      | Territory: Kharkiv city.<br>Period: 1783 - 2023.<br>Social classes: all.  |
| 3.     | Analysis of the research territory  |   |
| 3.1.   | Collecting input data and materials   | Catalogues of books, monographs, statis-<br>tics, reports, descriptions, maps, etc.                               |
| 3.2.   | Analysis of the cartographic and topograph-<br>ical knowledge of the territory                                    | Catalogue of 40 cartographic materials  |
| 3.2.1. | Checking and evaluating the suitability of retrospective maps for further analysis                                | Catalogue of 40 cartographic materials  |
| 3.2.2. | Analysis of the accuracy and completeness of the maps' content  | Report on the assessment of the accuracy<br>and completeness of 40 mapping materi-<br>als                         |
| 3.2.3. | Carrying out field surveys of objects that<br>were depicted on maps and are still pre-<br>served on the territory | 20 buildings and structures for religious,<br>cultural, administrative, educational and<br>scientific purposes    |
| 3.2.4. | Processing of retrospective maps (scanning, colour and tone correction, georeferencing)                           | 30 processed cartographic materials   |
| 3.2.5. | Loading the project's geospatial database into the storage and filling in the metadata                            | Metadata catalogue of 30 cartographic materials   |
| 3.3.   | Analysis of historical sources on the popu-<br>lation in the study area   | Conclusions and patterns based on 10 sources (books, monographs, statistical reports)                             |
| 3.4.   | Analysis of data (geotagged photos and tags) in social networks and open services for the study area              | Instagram, Wikimapia, Flickr,<br>OpenStreetMap, Mapillary   |
| 4.     | Geospatial-retrospective analysis   |   |

| Table 1: | Methodology stages and | l results of urban la | andscapes researching | g with a geohabitus |
|----------|------------------------|-----------------------|-----------------------|---------------------|
|----------|------------------------|-----------------------|-----------------------|---------------------|

| N⁰   | Stages  | Results   |  |
|------|---|---|--|
| 4.1. | Observation of changes in the contours of<br>the study territory for the selected period        | 14 classes of terrain objects were vector-<br>ized (e. g., hydrography, railways, roads,<br>buildings and structures, landscaping,<br>etc.) |  |
| 4.2. | Identification of stable vernacular regions<br>(those that have changed the least over<br>time) | 210 vernacular districts  |  |
| 5    | Interpretation of research results  |   |  |
| 5.1. | Formation of the potential historical area of the territory                                     | The area (16 km <sup>2</sup> ) within the city  |  |
| 5.2. | Formation of potential electoral districts  | In the further research   |  |
| 5.3. | Formation of potential tourist magnets  | In the further research   |  |

In Ukraine, based on a set of historical, geographical, cartographic, and mathematical and statistical methods of spatial analysis, the authors evaluated multi-temporal cartographic materials in Kryvyi Rih (KHOLOSHYN et al. 2018), as well as in Lviv (IDAK, 2019), to study the architectural habitus, such as facade features and building development. This is an example of the use of geospatial-retrospective analysis to study urban landscapes through the architectural features of different periods and the environment in which they are located.

Compared to the geospatial data of the Flickr service, namely users' photos by the geotag "centre" (HOLLENSTEIN 2008), they coincide by 90%, meaning that citizens and tourists are aware of the actual historical territory of the city, which confirms the existence of a vernacular district and, accordingly, a geospatial habitus concerning the historical area. It is also recommended to use this approach when creating new urban concepts, spatial planning projects, and determining the historical areas of settlements. The study of geospatial habitus helps to understand why people choose certain places to live, work, or play, how they interact with the natural and socio-cultural aspects of different regions, and how these preferences may affect the development and change of urban landscapes in the future.

## 3 Results

This research of geospatial habitus allows us to determine its cognitive role as a method of describing changes in the forms and specifics of the urban landscape and explaining such changes taking into account the historical period. The authors analysed the existing state of landscapes using geospatial-retrospective analysis in this research, which allowed them to understand the current structure and form. The authors explored the proposed approach in the example of the city of Kharkiv, Ukraine from 1783 to 2023. The longer period and the better the input geospatial data, the more adequate and accurate will be the research of the habitus, both historically and spatially.

First, the geospatial habitus was classified by origin and type of territory. For example, for the study of undeveloped areas, the geoinformation habitus is characterized by relief, hydrography, vegetation and land cover (feature classes of natural origin). There are a large number of classes of anthropogenic features, so their habituses are studied, for example, using morphological features. This can be easily done with the help of geographic information systems. The interaction between society and the terrain is higher in the urban area, because the impact on it from human activity is constant, which suggests that habituses are more clearly observed and correlated with the habitus of the social space.

Secondly, the definition of geospatial habitus requires taking into account not only historical conditions (wars, changes in the structure of territories, new economic policies, etc.) but also social and geographical conditions. Since the territory of a city has certain planning restrictions, the concept of its functioning, and the rules and regulations for development, social and geographical conditions are studied by using vernacular districts (LIESCH et al. 2015, VUKOSAV & FUERST-BJELIŠ 2016), which are interpreted in this paper as one of the representations of geospatial habitus. Vernacular districts reflect the perception of citizens of the territory where they live, work, and recreate. Such districts allow for the formation of working groups of citizens who can actively participate in the development of urban planning documentation: discussion, approval, objectivity, consideration of public opinion, expression of will, and minimization of lobbying for the interests of developers, city authorities, and businesses. The geospatial-retrospective analysis and geoinformation modelling were used to research the territory of Kharkiv (Fig. 2). Geospatial-retrospective analysis is the process of searching for geospatial patterns in the distribution of geographic data and relationships between objects using geographic information systems, taking into account changes in the period (ALKHUZAMY AZIZ & ALGHAIS 2021, KIN et al. 2021, SŁOMSKA-PRZECH & SŁOMSKI 2022, UHL et al. 2022).



Fig. 2: The map of the development of Kharkiv vernacular districts from 1786 to 1990

The research was carried out based on 30 archival cartographic materials from 1783 to 2018, and from 2019 to 2023 using remote sensing data and orthophotos at a scale of 1:10,000. The analysis of the reliability and completeness of the data was carried out using the reference historical literature (KIN et al. 2021), which indicated the dates of construction of prominent buildings and structures in Kharkiv, which were selected for further work because they are available on all maps.

### 4 Discussion

In the example of the city of Kharkiv, 210 vernacular districts were identified that correspond to geospatial habituses. Geospatial habitus change over time, with vernacular districts being one example: Nahirnyi (also sometimes referred to as Universytetska Hirka or Kharkiv Fortress) and Zhuravlivka (Fig. 3). These two districts are historical, as they emerged in the nineteenth century (Kharkiv Fortress in the seventeenth century) and the seventeenth century, respectively. The peculiarity of the Zhuravlivka district is its transformation from a sloboda (village) to a micro-district of Kharkiv. The height of the buildings has been preserved, but recently high-rise buildings have been constructed, changing the landscape of the territory. The Nahirnyi district is officially part of the city's historical area, which does not allow the construction of high-rise buildings and regulates activities in the area.



Fig. 3: The map of the current vernacular districts in Kharkiv city

#### Restrictions in the work are as follows:

- Only one city (with a population of more than 1 million) was studied using the proposed methodology.
- 2) Vernacular areas may not be stable in time, since they are formed by people, and people can change their place of residence, lifestyle, and worldview.
- 3) When determining the geospatial habitus, as many respondents as possible should be taken into account, and all classes of society (and social groups) should be involved in the survey.

The research is multidisciplinary and requires the involvement of as many specialists from different sciences as possible: sociologists, historians, urbanists, etc., which will allow us to refine the methodology and improve the quality of the results.

#### 5 Conclusion and Outlook

The main difference between vernacular districts and geospatial habitus is that habitus as a sociological category can take shape in geographic space through vernacular districts. The urban landscape also depends on the vernacular districts of the city, as people have different effects on the territory where they live and work. They can preserve this landscape or, on the contrary, destroy, change and transform it into a new one. Changes in urban landscapes and the analysis of possible consequences of such changes are researched using geographic information systems and geospatial models. This area will be explored in the following papers, as well as further approbation of the proposed methodology on the example of Ukrainian cities: Kyiv, Lviv, Dnipro, Odesa and Cherkasy, as well as for cities in European countries (EL GOUJ et al. 2022), which will allow us to identify new patterns, trends, and peculiarities. It would also be appropriate to use the geospatial data of the Basic and Main State Topographic Maps of Ukraine in further research (KARPINSKYI et al. 2021).

Acknowledgements: The authors would like to thank the anonymous reviewers for their sound recommendations, helpful remarks, and time.

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