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Thinking places: towards application of place-based GIS in urban morphology

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Abstract

This article sketches out a tentative direction towards potentials that might be opened by the formalization of place through place-based GIS for the study of urban form. In particular, models of place based on function and affordances are touched upon to explore their relevance within the domain of urban morphology under contemporary urban conditions. Established morphological relations and hierarchies of elements of urban form become more and more fragmented as new complex hybrid typologies emerge and proliferate. Such new types of spaces, being highly flexible, multi-layered, ever increasing in complexity, entangling built forms and open spaces, merging inside and outside, featuring stacks of green spaces in sophisticated vertical programming, call for an equally complex and multidimensional vision of urban form, its generative and operational principles. There is thus a need to search for new ways and approaches to take the conceptualization of urban form further, beyond its mere geometrical properties. Functional imperatives inter alia drive formation and transformation of urban form. Could then a place, understood through its functions or affordances, offer deeper insights into formation, emergence, and operation of urban form today? Could such formalization, embedded into GIS, allow for richer data flows to be analysed, opening up new experiential and operational facets of urban form? Could it lead towards better integration of a human-centred perspective allowing us to see 'lived' or 'experienced' urban form not only through phenomenological, subjective, individual accounts or narratives, but also as it is embedded in abstract blank space? Such are the questions touched upon by the article.

Keyword: space, place, spatial, place-based GIS

Introduction

The primary concern of urban morphology has always been — and would likely to remain — urban form, or physical form of the city [1]. If unpacked further, this concern naturally could not be divorced from that of conceptualization of space, since urban morphology deals with spatial configurations of urban tissues, spatial behaviour within those, movement in space, along with other concerns that could be labelled as spatial. Elements of urban form comprising urban tissues take up space; they are spatially distributed, woven into the canvas of (urban) space. Hence, the notion of space is not off the table in urban morphological research, although its conceptualization seems to be relegated to the background, wherein physical forms populating it (naturally) features on the foreground. Further, space could not be divorced from considerations which occupy the fields of urban design and architecture, be it in regard to building types, or questions of typology, but also in regard to treatment of space, and formation and transformation of urban (open) spaces (by means of architecture). For the latter is being concerned as much with built form as with space, since any architecture, including at urban scale, is comprised of voids inasmuch as it is comprised of solids. Open space thus features as one of the elements of urban form, and being considered such, it is given a certain form, namely, the form inverted from that of solids, all together these two being clutched into an interwoven entity

of urban tissue. The treatment of volume, built and non-built mass, space in architecture serves as a basic criterion for such categorization as “mass positive” versus “space positive” architecture [2], which is applied to architectural compositions, as well as to the architecture at the city scale, and, therefore, to urban form.

The role given to space as described above points to a few further issues. First, the juxtaposition of open space and built mass divorces solids from being accommodated in space, since these two entities appear as discrete. Space itself then (without the attachment of the adjective ‘open’ to it) disappears from the stage, goes ‘undercover’, or is being neutralized and relegated to ‘non-subject’. Further, the very interdependence of open space and built mass seems to be valid only for certain types of urban fabrics, or in certain periods of formation of urban tissue. Arguments are raised towards the view of modern or contemporary urban fabric as having a tendency to fragmentation, ‘free-floating’ sculpture-like behaviour. See, for instance, Albert Levy’s “A shift has occurred from a closed fabric [...] in which the links between the different elements formed a system, to a peri-urban fabric which is open and fragmented, with autonomous and atomized elements which do not relate to each other” [3]. Such behaviour of modern urban form gives up the role of formatting and shaping open space, instead being concerned only with its own individual self-positioning not in space, but as if ‘on the surface’ of space. The following sections attempt at unpacking some of the implications, which such changed relations of space and urban form could have for urban morphological research, offering possible conceptual tools to address such condition.

Treatment of space and urban form

A notable line of thought relevant for the present discussion is articulated by St. Peterson and B. Littenberg as they are advancing two categories — those of space and anti-space — each producing a certain type of urban fabric respectively. The argument underlying such categorization states that “there are two fundamental conceptions of space that have opposite and contradictory attributes” [4], wherein space is differentiated, formed, finite, particular, multiple and discontinuous, charged with presence, identity and value; and anti-space (which appears as modern space according to Peterson & Littenberg) is (vice versa) undifferentiated, universal, singular, continuous, and abstract. Peterson & Littenberg also use the term ‘place’: “Place requires constructed Space with unique specificity, confinement and closure, with measurable scale” [Ibid.]. Beyond the far from uniform use of terms and possible confusions as to conceptual difference between space, or different types of space, or how those are related to place, this approach seems to be important for the present discussion in that it advances conceptualization of space at the prominent position, and, what’s more, links it to formation of certain types of urban forms. Recognizing that the city has long been a searching ground for a place, Peterson & Littenberg’s concept also resonates with the well-established articulations of space within human geography but also adjacent disciplines dealing with spatiality (since the ‘spatial turn’ has affected a wide range of disciplines and fields), which could be taken down to the ‘space versus place’ debate (recognizing that such dichotomy is itself a matter of debate). Within such juxtaposition,

space is commonly seen “as a natural fact – a collection of properties that define the essential reality of settings of action – and place as a social product, a set of understandings that come about only after spaces have been encountered by individuals and groups” [5]. That is to say, place, as contrasted to space, “is defined as a portion of space that has accumulated particular meanings at both the level of the individual and the social.” [6].

What could such readings accomplish for our understanding of space within the city as it is coupled with (or, as the argument goes, decoupled from) urban form? The core question here: does it offer a radical paradigmatic change for the concept of space, substituting it for a certain ‘place-based’ reading, or does it remain a mere call to account for more qualitative features to be mapped over space, seen still as a ‘pre-given’ neutral container accommodating solids (i.e., material urban form), with no depth or dimensions except for coordinates?

Seeing space as an abstract surface by no means excludes accounting for human perception, cognition, other experiential and qualitative dimensions of space (in case of urban morphology often in conjunction with elements of urban form which ‘populate’ such abstract space: street networks and built form). Cultural, historical, social, among numerous other aspects feature prominently within the study of urban form, wherein different approaches might take up or emphasize different features. Further, visual, perceptual, and cognitive aspects feature no less prominently, as well as a functional dimension, also taken from multiple angles, including human activities, practices, performative aspects of (urban) space, etc. These varied aspects being attached either to built form, or its configurations, are heterogeneously conceptualized and being commonly represented in a layer-cake mode as mapped attributes upon the surface of ‘natural’ space (i.e. leaving configuration of space itself untouched). In further approaches relational aspects of space are being articulated. Thus, within the space syntax method, the term ‘space’ appears as an active matrix of settlement processes in which the physical layout of the city is closely connected to its social and cultural relations [7]. At the same time such conceptualization of space is confined to extrinsic properties of built environment in space (centrality, extension, contiguity and compactness) [Ibid.], and human cognition and behaviour within it, leaving aside human intentions, meanings, memories or other qualitative features which might play into functioning of urban space within the city and shape the functionality of it in no less prominent way.

Accounting for such a multitude of qualitative, relational, perceptual and any other aspects of urban space, and in conjunction with urban form at that, already seem a Sisyphean task. Further, in the conditions of diffusion, melting of ‘mass positive’ urban tissue into ‘space-positive’ one, could that be that space itself needs to take up a more prominent role within the study of urban form? Could it entail dropping the adjective ‘open’ and freeing the space in the same way as modern architecture has ‘freed the ground’? If open space had been listed as one of the elements of urban form, what should happen to its hierarchy once its changed nature and role are recognized?

Integration of place and urban form

Let us consider the addition of 'place' as an intruder into the nested hierarchy of elements of urban form. Perhaps it would be fruitful to assume that 'place' could be an apt conceptual tool addressing the two above-mentioned challenges. The first being the condition where unhinged open space has ceased to let itself being captured in its full capacity, as it overflows the urban tissue, no longer treated as volume to be formed by built forms into legible and bordered differentiated spaces; and the second being the need to encapsulate a richer range of qualitative dimensions bringing them together into a certain conceptual focal point.

For this purpose, we might evoke the above-mentioned attempts led by (but not limited to) human geography within the rich discourse around place, locale, etc., and further to the emerging direction under the umbrella of 'place-based', or 'platial' approaches concerned with formalization of place within GIS and drawing upon the said discourse. The emergence of place-based agenda in GIScience owes to attempting at overcoming the limitation of reducing "complex affairs into rather simplistic geometric primitives like points, lines, and polygons" [8]. Such calling appears to be a double-edge sword as notwithstanding the said limitation GIS offers rigorously defined and readily formalized ways to represent (spatial) data [9], unprecedentedly advancing spatial research. While fully recognizing the above, calls are made in favour of 'platial' approach, "as the place-based counterpart to the space-based adjective 'spatial'" [8] not in the least given emergence of new types of data (in particular user-generated data, urban geographic datasets, etc.). In this regard space is described as "a purely geographic notion, reflecting the dimensions of height, depth, and width in which all things occur and move, while place reflects the subjective human perception of segments of space based on context and experience." [9] (Note how this is echoing human geographical notion of place). It is argued that incorporation of the platial dimension will "ultimately allow geographical, sociological, and other related scholars to support their studies by more realistic quantitative inferences" [Ibid]. Which implications could it have for questions typically tackled within urban morphology?

Let us consider one of such typical types of studies that feature prominently in the field: accessibility to green space. Such study could be commonly conducted on the dataset of green space created and maintained by municipal bodies, wherein the classification of such space is made based on certain categories (parks, gardens, grass / lawns, individual trees, etc.). However, such categorization as a rule does not account for actual relations of users (people) to such space, their identification of such spaces as green, or intended use, their attachment, intentions, and other relevant features which can substantially affect the functioning of such formally designated spaces as 'green'. Let us then consider that the entirety of green spaces is instead accounted from within the platial approach. The dataset then might be generated from user-generated data allowing for labelling certain green spaces as places strongly associated and intensively used as 'green'. The configuration of greenery within the city will thus be different from the one obtained via formal zoning. And since, in this way, it impacts configuration of urban form (in this particular example the pattern of spaces considered as 'green'), it hence exhibits a certain morphological relevance, albeit not in physical structure,

but certainly in functional composition of the city. Here lies the substantial challenge of such spatial approach — it calls not only for addition of geolocated attributes in layered mode, instead it claims to exert formative impact over urban form, if not in material sense, but still substantial, or tangible enough as to (arguably) be definitive in proper understanding of its functioning.

Concluding remarks

Within the above discussion ‘place’ taken as a spatial unit hosting certain urban forms might allow for partitioning and differentiation of space within the city based on criteria incorporated into formalization of place. The urban tissue then appears as a configuration of thus formalized places, wherein the relations between (among) places overtake the relations between open space and built form and exhibit certain morphological weight (i.e., impact the functional composition of the city, as argued above). In this regard formalization of place appears to be a crucial task to either support the argument above and make it work for the purposes of urban morphology, or to render it non-feasible given the current constraints, limitations and existing approaches. Formalization of any geographical (spatial) entities poses very serious challenges. In the realm of GIScience such challenges stem both from the need to cater to a high level of rigor required for any computational formalization, and the need to a certain level of reductionism required to make such formalization possible. Place, being an inherently vague and informal entity associated with subjective, fluctuating or even temporally-dependent values, appears then as an unresolvable task. Further, “the lack of precise locations, crisp boundaries and single universal names for many places that people talk about in everyday life” [10] are named among main challenges of operationalizing place in GIScience. But even prior to that issue, we need to resolve the crucial challenge of coming to terms to the very definition of place and those parameters that would serve as a foundation for a strict and rigorous enough definition allowing to pin the place down to the urban space.

Out of all multiplicity of parameters, those related to functionality of space might seem the most relevant to employ for the purposes outlined here. This line of conceptualization is advanced by the compositional view of functional place developed by Papadakis, Resch & Blaschke [11; 12]; an affordance-based model of place by Troy Jordan et al [13], ontologies derived from human/user intentionality developed by Helen Couclelis [14], among others. The key argument favouring function as a pillar for formalization of place might be found in that function here could be derived from combinations of open spaces and urban form contained within the latter, united by certain affordances, or programs offered to its users. From there on, certain dependencies (with careful regard to avoid any deterministic statements) of interrelations between urban form and certain types of ‘places’ it engenders might be uncovered, testing the assumption that there is a conditioning, or mutual structuring relations between those, extending its impact as wide as to the entire functional composition of cities.

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