August 31, 2017

# Geospatial Digital Technologies and the Crisis of the Literary 'Affect': Rethinking Physical Space in Online Cartographies

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***Abstract***
*This paper set out to investigate physical geography as represented in online cartographies and asked whether they relay all that we need to know about the humanity of space as described in literary narrations. Using critical reading approaches to digital geospatiality, it argues that digital treatments of space are narrowed down only to their virtual essentials but say little about space as a spiritual value in terms of intuitive knowledge, and in the light of space as human time, as well as space as passage of volume, as a literary 'affect.' This gives the reader to appreciate the concept of literature as not only 'scripted' but also oral and experienced. Space is not just a physical representation on a physical screen or on the printed page of a map; it is also a literary narrative and a colonial and postcolonial habitus of (hi)story. Just like literature, it is not created in a vacuum but is anchored in culturally lived experiences. Therefore, there is a need for an interdisciplinary and therefore expanded approach as epitomized in postcolonial digital humanities that supports online cartographic representations of space with new narratives of space as spirituality, time, volume, history and culture, in order to render the digital idea of the environment into a complete aesthetic experience.*

***Keywords***
*Digital geo-spatiality, virtual cartography, the humanity of geography, spiritual knowledge, space as time, volume and culture, lived experience, creative art as tacit signifies of space*

## 1. Introduction

Geospatial digital technologies are now a disruptive force that came with their own advantages by introducing a 'mapping grid' practice which consists of placing an abstract geometric meshwork over a given space, from within which any individual, object or item is to be coordinated. The technologies are considered as a cure-all for the online problems that the geographical humanities cannot efficiently tackle. They organize information on maps in such a way that human knowledge of geography can be 'seen' in a new way rather than felt. So, the technologies have come with new strategies as well as new challenges that, on the one hand, leverage traditional assumptions, rendering them visible for re-conceptualizing and rethinking, but, on the other hand, dehumanize physical space. The digital technology opens up new spatial imaginings and practices and contributes to a new form of the enchantment of the geographical environment. The digital benefits and insights that the technologies are bringing are enormous: e.g., new forms of spatial awareness that are displacing old ones. The digital mapping technologies provide new ways of conceptualizing and practicing literary map-making and this map-making, in turn, changes the way people think about and deploy digital technologies. The digital technologies have become a means of rethinking the spatial interconnections and tensions that link the computer virtual world, the natural environment and the literary textuality of writers, authors, readers and the public imaginary. Nevertheless, technology cannot convey other insights, such as old 'vernacular cartographic practices.'

## 2.0 Review of the critical literature

Digital maps provide online explanations that assure us; however, the explanations also cause people to ask new questions and explore alternative possibilities (Turchi 2011). Consequently, there is a certain growing anxiety about how humans *see* physical space, how they become aware of environmental space and how they attune themselves with digital geo-space. Geospatial digital technologies are not universally glorified. They

have generated new interests in map-making but they have also triggered a decline in the 'literacy' of physical geographies. The employment of *cyborg* technology feeds like Satellite navigation systems in motor cars has generated a general fear that digitized modernity in its 'cold-blooded' forms is defeating the 'warm,' *vernacularized* forms of knowledge. From here, the additional fear is that roads do no longer lead to realistic geographical places. Following the counter-cultural mapping thoughts of radical thinkers like Rebecca Solnit and Guy Debord, maps serve us from the realism of places (Smith 2010). Satellite navigation systems are criticized for undermining the human sense of self and for demolishing human capabilities to read maps (Axon, Speake and Crawford 2012: 170). They diminish knowledge of topological relationships between places as well as of our consciousness of the textural complexity of environmental landscapes. Robert Macfarlane (2008, 2015), a landscape writer, published *The wild places* and *Landmarks* in which he voices preoccupations over the fact that the old but popular way of imagining space is being replaced by contemporaneous mapping practices based on the 'mapping grid.' The old way of discerning geographical space consisted of investing in people's sense and feel of the place as a *sensuous* experience. Mapping was a self-made practice that prioritized touch, feeling, intuition, visibility and provisionality. The language was used as a power to shape the way people sensed geography. In short, a map was 'told' as a story of space. But with the advent of digital technologies, these concerns have even increased. The digital screen's flat surface is represented as alienating people even further from the phenomenology of the environmental experience.

Prior to the digital age, concerns were already being raised about Cartesian interpretations of geographical space. Techno-skepticism narratives of disconnectedness between humans and nature increased and this was metaphorised as a heritage loss. For example, a number of scholars raised these concerns, namely, Martin Heiddegger, Gardner, Robert Macfarlane and so on. They argued that the plane surface of the digital screen depletes our phenomenological experience and removes us from our environment. Martin Heiddegger regretted that technology is bequeathing to mankind a very unhuman way of relating to the natural environment (Lefebvre 2011). The challenge for us today is how to manage the increasingly complex relationship between digital technologies, geography and text. How can we relate the old practice of geographical mapping based on sensuous *intuition*, the application of digital geospatial technologies endowed in the interpretation of literary texts? How do we employ digital mapping tools, techniques and strategies in cultural, geographical research by drawing insights from literary studies? How is the process of digital mapping altering the ways people perceive the environment around them? Can the literary map confirm meaning and change the way we think about and employ digital technology?

Consequently, this paper posits a hypothesis on the premise that there is a 'location of culture' at the confluence of postcolonial digital humanities, where digital technologies, human geography and literary studies, come into confrontation. Digital map-making has influenced the development and possibilities of literary cartography.

## 3.0 Methodology

This paper draws from the postcolonial theory of Jeremy Weate's social discourse as public 'writings' and from Michel de Certeau's theory of the 'practice of everyday life,' to investigate mapping technologies as an innovative method by which people orientate themselves and by so doing, re-negotiate their relationships with their environments. Digital maps are everywhere: in cars, newspapers, smartphones, aeroplanes computers, museums and so on. They facilitate the interpretation of and convey spatial information. The spatiality of statistics on election results, crime rates, etc., is visualized with the aid of GIS (Geographic Information Systems) in news agencies. Navigation apparatuses enable individuals to monitor their movements and locations with the aid of GPS (Global Positioning Systems). In museums and galleries, *Google Earth* and *Google Maps* are deployed to enrich the experiences of visitors. In homes, online resources are deployed to facilitate virtual flights to far off places. Thus, we live in an age of "map-mindedness" (Hewitt 2011), of *Google Earth* and *Google Maps* that are changing the perception of the landscape of mapping and setting a new standard for data and imagery projection (Harris et al. 2002). Together with EarthViewer 3D, GIS and Google

Maps, satellite imagery and aerial photographs have now been compiled into 3G virtual Globe and panoramic images at street view level are now possible thanks to Google Street View introduced in 2008 (Farman 2010: 872). The most popular geospatial application was developed in the world thanks to Google, whose Google Earth has the largest share of the market, namely, 65% in the US (Cooper and Donaldson 2016). The user with a single click of the mouse can access petabytes of information distributed across the surface of the earth. The popularity of the paper map has now waned because of the availability of the Google Map across the world and with affordable cartographic software. There is now a 'sea-change' effect thanks to the affordances of Google (Hewitt, 'Turn around when possible,' 2).

Nevertheless, users of the Google applications do not simply deploy the geographic information provided to them passively, but rather, participate actively in the process of spatial re-discovery. Through processual framing, it is understood that map making and map use are dynamic and embodied cultural practices that involve not only action but also affects in cartographic interactions (Kitchin et al. 2013). In this understanding, maps are not perceived as stable providers of surveyed geographical data that are materially objective. Maps are thus understood as cultural texts that are brought into being and performed. The geospatial technology is now witnessing post-representational cartography (Kitchin et al. 2013)

## 4.0 Findings

### 4.1 The physical and ideological knowledge

Geospatial digital technologies have potentials in three dimensional (3D) cartographic representations, but these potentials also embody limitations that can be addressed by making recourse to the domain of the affect, that is, the sphere of *knowledge, know-how, skills* and *expertise* that people obtain from the abstract experience of their geographical space. The online world now is witnessing an unprecedented high rate of technological changes in which geospatial ICT technologies are now easier to employ, access and are even cheaper to acquire. However, the risk the world faces is the possibility of falling into a false sense of security by believing that these digital technologies can be easily implemented. Whether in the enterprise and corporate setting, where geospatial technologies are facilitating digital transformations, enabling operational changes and improving decision-making, there is a growing need to bring in the 'literary' perspectives of people, so that geographical location and place can be knowledgeably re-embedded into digital workflows and processes and, in this way, added value (the affect) can be delivered and significant benefits can be augmented for businesses.

Today, the challenge in digital archaeology is to devise a dynamic picture of the geographical landscape which is *humanized* so that it can enable simulation processes showing interactivity between ancestral communities and their landscapes. Landscapes need not only to be represented on paper or screen, but also to be *felt* like the domain of the 'affect' through visualization, sound, smell, touch, movement and even instinct (Lock, Kormann, and Pouncett 2014). In addition, the portrayal of such relationships are affordances for action because the *signification* of cartographic landscapes can 'afford' us insights into why certain actions were carried out (Gillings 2012, Withagen et al. 2012). Thus, beyond the simulation of how ancestors perceived their built spaces and landscape, it is the imperative to understand why certain events, for example, occurred at certain times. A GIS map would only present a historical site as strokes on a screen, whereas a 3DGIS would go further to *humanize* a landscape map with, for instance, narratives of a wall *caption*, from which one can deduce that it survived to tell its history because the '*writing* on the wall' was able to serve as a warning *sign*, a 'buffer of presence' and was able to ward off enemies owing to its visibility (large size), bright colour, and dense texture, which *inspired fear* among inhabitants of proximity locations. Without such a value embedded into technology, the risk in the cartographic analysis will be the tendency to misjudge the sensorial perception of space and construct a prejudiced reality of the past (Hacıgüzeller 2012, Wheatley 2014).

Ballas and Howard (1987) attempted to recover the essential qualities of a *sound* environment for presentation to users who are navigating in different environments. Geographers and cartographers attempted to map *soundscapes* (from landscapes) and even *smell escapes* as complements to available ink maps, and by extension, digital maps. The *auditory* and *smell* sense of our geographical environments is very critical as

identities that go beyond landscapes: they have benefits and advantages when it comes to understanding scapes as spirituality and inputting such aspects in online geospatial information. It complements information not only in terms of the what but also the how so that the computer user's experience is doubly enriched. The greatest challenge in the employment of *sound* as an interface particularly in wearable computer and information devices and in small handheld screens, is the online-specificity of its location. For example, to localize sound/smell on a computer screen would necessitate a software that can calibrate speaker output so that it appears to come from particular places or locations on the screen. In the area of web browsing, which is in competition for space necessary for other management processes, a non-speech, auditory information device, or auditory display system would be necessary to handle, for example, file transfers, links, application processes and load monitoring.

Geographic information systems (GIS) are an extensively discussed thematic in archaeology (Harris and Lock 1995, Lock and Stancic 1995, Kvamme 1999 Lock 2001 , Wheatley and Gillings 2003, Conolly and Lake 2006). The current spatial representations yield a very approximate image of reality. For example, geometric symbols visualized as vector primitives (e.g., visibility tools like line-of-sight analysis, database query functions) are deployed mechanically to signify objects whereas all objects possess a *three-dimensional façade*. GIS significations are inadequate to reconstruct what Lock (2003) refers to as a *sense of place* as was perceived in ancestral epochs with detailed images of archaeological entities, whether as an artefact or as landscape. The human sensitivity and discernment of space are often very *subjective*. The real challenge, therefore, is this: how can the geospatial technology of GIS be transformed into a genuine *place to think* (Gillings and Goodrick 1996, Rahman, Pilouk and Zlatanova 2001). How can we simulate and recreate conditions that marked ancestral experience? (Llobera 2012). How can an appropriate foundation be set up to re-think various paradigms of data representation, and expand the restricted borders of archaeological GIS. As Lock (2003) confirms, there are ample possibilities to conjoin GIS and Virtual Reality.

In archeological computing, there is an increasing need for integration of a three dimensionality into the GIS system (the 3D-GIS). Thus, beyond data visualization in order to potentialize the interpretative competence of the archaeological record, is the need for a 'sensual' GIS. A sensual' GIS is a technology that prioritizes relationships between place, people, cultural and environmental questions so that they can be inquired more efficiently. By merging Virtual Reality and GIS, it is possible to simulate as opposed to simply imitating reality. This is a sensual type of communication which was suggested as the VRML language and was proposed as a solution that amalgamates 3D data representation and GIS, given that virtual archaeology (VA) is a digital reconstruction of ancient monuments and ancestral landscapes capable of providing a new narrative of the archaeological site (Forte and Siliotti 1997)

Site-scale types of documentation with 3D can be introduced to signify excavation units by inquiring into their volume thoroughly. Voxels can be deployed as a spatial analytic framework for this purpose (Bezzi et al. 2006). The challenge is not merely a question of moving and visualizing objects in a 3D canvas, but also a matter of investigating them and moving routine operations in 2–2.5D GIS to a completely 3D space. Data analysis of geographical space should not be restrained 2D map representation; rather, it should move towards a sophisticated way of portraying reality, namely, the 3D approach. It is important to create high-resolution textured three-dimensional models with high quality comparable to laser scanning (Aguilera and Lahoz 2006; Fassi et al. 2013; Cardaci and Versaci 2013). A number of commercial GIS software packages are now being erected into three-dimensional models as textured meshes comprised of polygons and vertices (Opitz and Nowlin 2012)

One can introduce an independent x,y,z-axis to the digital platform in order to perform spatial analysis that is a 3D space. This way, the 3D will not be a mere attribute to ameliorate users' visualization experiences but would become an exploratory instrument capable of facilitating sophisticated datasets analyses. The analytical potentials of GIS can strengthen the accuracy of data representation thanks to 3D graphics (Campanaro et al. 2015, Dell'Unto et al. 2015; Landeschi et al. 2015). There is an example of a 3D GIS that was applied at the intra-site scale level that was deployed to investigate damages done to a Viking Age

settlement site destroyed by a vehicle. 3D vector-informed intersection operations and 3D GIS images enabled archaeologists to appreciate the ground surface of the site in terms of the vehicle's passageway, the marks its wheels left behind, quantification of the profundity of erosion caused by the vehicle's wheels such as the partially smashed stones (Landeschi, Nilsson, and Dell'Unto 2016). [1] Three dimensional GIS and spatial analysis techniques can evaluate damages done to sites of archaeology by signifying multi-temporality, that is, the same land segment at various annual periods (Lock and Harris (1997).

**4.2 Physical space as time**

Prospectively, a four-dimensional GIS, which integrates time as a supplementary dimension, can enable archaeologists to generate a trustworthy image of the archaeological record, by elucidating spatial relationships between contexts, the diachronics of actions as they took place, etc. Field archaeologists can employ 3D as a source of fresh information to develop innovative approaches to site assessment. Therefore there is a need for the '3D-thinking turn' (Campana 2014) that will make the 3D GIS a new technology for advanced analysis of the 'archaeological landscape' as it was seen and felt in the past (Forte 2003). The digital-minded archeologist needs to read space through the eyes of the ancestors by incorporating the *symbolic* dimension that is often concealed behind the material, such as the oral culture. Digital archeology should be the cartography of context-dependence, of assumptions beyond the empiricism of presence 'in-the-field' or of being in the present times (Tilley 1994, Merlo 2004). Other interesting new paths can be explored by conjoining a GIS-based analytical framework and 3D data accuracy; for example, the Swedish Pompeii Project conducted a GIS-3D visibility analysis and opened up new directions in engendering insights on complex geometrical 3D models as visual barriers that can affect lines of sight linking viewers and targets (Landeschi et al. 2016). Thus, as opposed to the traditional 2.5 raster-based viewshed analysis, in the simulation process, a 3D visibility analysis can incorporate real 3D objects and augment overall dependability of a resulting model (Earl 2007; Paliou 2013, Wheatley 1995, Lake, Woodman, and Mithen 1998, Van Leusen 1999, Wheatley and Gillings 2000, Lock, Kormann, and Pouncett 2014). This possibility was tested in various datasets, namely, frescoes in Caecilius Iucundus' house and wall inscriptions. Vector-supported line-of-sight analysis can gauge space in which people are standing by to perceive artefacts with high value. There are always challenges linked to objects and their visual acuity (Ogburn 2006, Bernardini et al. 2013) and the capturing effects created by natural or artificial light that impact on human perceptibility of space (Papadopoulos and Earl 2014, Papadopoulos, Hamilakis, and Kyparissi-Apostolika 2015).

**4.3 Physical space as volume**

3D GIS can potentialize the calculation and analysis of *volume* in cartographies, thereby adding context to the investigation of artefacts like bones, pottery, and landscapes, trenches, caves, etc. This can enable cartographers to digitally reconstruct original cave layers excavated in the past by merging the 3D model of cave information with archival data to determine historical information like drawings thereby further refining three-dimensional borders. Each layer's volume can then be calculated so that soil quantity excavated from a trench can be assessed. The value of an environmental artifact can also be volumetric, density focused and this can enable archaeologists to perceive the presence of an artifact or a cave in terms of patterns, historical phases, categories, etc. Historical periods (e.g., early, late, post-Mesolithic) can be attributed to layers. In site analytics, history can be geo-referenced ('written') from pictures, data and boundary sequences with the aid of a 3D model that facilitates contextualization, interpretation and description. Thus, 3DGIS can 'humanize' archaeology, giving us the opportunity to perceive, for example, prehistoric space in the ways that ancestors abstracted their past environments (Green 1990) as opposed to over-simplifications and approximations in the perception of geospatial environments (Green 1990, Freundschuh and Egenhofer 1997)

**5.0 Discussion**

This paper has raised an issue of digital referentiality to the physical environment particularly as applied to the literary affect and the representation of the physical environment in the literature (Arnold, Jean, et al. 1999): 1089-1104). It has demonstrated that digital cartography needs to hypertext with the power of offline geography. These powers are a combination of physical and metaphysical attributes, as found in creative texts that reinforce their points through the writing tradition. But writing cannot embed all the rich treasury of oral sensory experiences that are found in folklore (Isola 1992: 17-26). People's definition of themselves is always in relation to their natural, physical and social environment. For example, the physical violence of the battlefield is followed by the psychological violence of the classroom (Ngugi. 1992). Like digital cartography, poetry raises deep questions about human relationships to their physical environment (Gaard and Murphy 1996: 1-6). The paper has chiefly emphasized how modern conventions of reading the digital cartography blocks out the environmental dimensions of the sensory experience of relationships (Buell 1995).

Sometimes embodiment and interaction are presented as instruments to provide a 'realistic' experience for a user within a virtual space is capable of affording an experience of the space as it was supposed to be in antiquity (Richards-Rissetto et al. 2012). In this respect, GIS and 3D GIS should provide further opportunities: the digital environment must become the place where different and complementary datasets converge and synthesis is produced; this means mapping any sensory experience that can be relevant in the interpretation process of the place. The digitalization of the GIS technology is very important because, beyond the physical presentation of maps is the need to add value in terms of capturing the proxemics and the role of scale to define areas within which certain senses have a certain predominance, pointing out how sight and hearing will still be the only senses capable of reaching over a long distance, typically on a landscape scale, whereas smell, touch and taste are experienced on a more intimate scale. Yet so far, not many attempts have been conducted to make geospatial technologies suitable for a multi-sensory analysis. An interesting method to explore multisensory data in a geospatial visualization system is presented by Harding and colleagues (Harding et al. 2002). This method can be deployed in addition to those of Weate and de Certeau to investigate outputs derived from the audio-visual and tactile perception of space integrated into the same visualization space in order to provide a more thorough description of, for example, underwater environments.

## 6.0 Conclusion

Further interdisciplinary studies need to be carried out on the discursive 'affect' in geographically digitized spaces. For example, e-cities are not just physical spaces, they have also practised spaces with their own cultural values. In an age when there is increasing discussion about smart cities of the future, it is critical that such an experience should not be artificial but real or else it may collapse in its conception. One way out to meet this challenge will be for e-smart city techies to work with poets who have a sensory sensitivity in their descriptions of the environment and then to transpose their descriptions onto the online spaces of the city when designing streets, landscapes, hills, and familiar milieu, etc.

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**Sketch Bio**

Alfred Ndi holds a *Doctorat d'État* Degree in postcolonial digital humanities with special interests in ICT political economy, critical studies and continental literature. His academic concerns are that in the dialectics of *praxis/theory* based on e-commerce, digital marketing strategies, online (project)management, cyberspace entrepreneurship and e-services, there are real and related questions of politics, post-development, law, history, culture, humanity of geographies, anthropology, society, international relations, etc., and identity politics. He investigates the dynamics of the hypertexts in the intersectionality where digital capital meets with these questions of society in both their explicit and tacit (artistic discursive) forms. His long term goal is to develop a critical archival database comprehensive enough to illuminate all the humanities discourses and create new potentials for outreach educational purposes and momentum for global peace.

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