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Spatial media and cycling spaces: a theory of coded attractors

Mike Duggan, Department of Digital Humanities, Kings College London

Abstract

This paper contributes to the literature on the digital geographies of cycling and everyday mobility by further examining the ways that spatial media have become embedded in the riding practices of amateur road cyclists. Road cycling offers a useful case study for examining the complexity of these relations because it is a primarily mobile practice that unfolds across multiple spaces, all of which may be contextually mediated by people, technologies and environments in various ways. Using empirical evidence taken from an ethnographic study exploring the impacts of spatial media in an amateur road cycling club, the paper demonstrates why geographers could pay more attention to the socio-material assemblages of leisure spaces. The paper complicates the notion that cycling is simply mediated, tracked and datafied by digital technologies, by arguing that cycling spaces are mediated by a multiplicity of socio-material modulations. Adapting the Deleuzian concept of *attractors*, the paper demonstrates how spatial media can be conceptualized as a form of ‘coded attractor’, which compete with other socio-material attractors to transduce and shape the spaces and practices of cycling. It is argued that this theoretical approach that could be applied by geographers and others seeking alternative theoretical perspectives on studies of spatial media and everyday mobility.

Introduction

Geographers and mobilities researchers have become keenly interested in studying digital media as it has become increasingly embedded in everyday mobile practices. Much of this work has studied the impacts of so-called ‘spatial media’, which include locative mobile devices, location-based social networking services and digital mapping technology (Ito et al 2005;

Kitchin et al. 2017; de Souza e Silva and Sheller 2014). This trend follows the broader focus on how digital media have reconfigured the spatialities of everyday life over the past two decades (Couldry and Hepp 2017; Kitchin and Dodge 2011; Leszczynski 2015; Thrift and French 2002).

In recent studies of cycling, spatial media has been a focal point, particularly with regards to the self-tracking technologies that riders routinely use to record, map and share data from their rides using mobile GPS devices and cycling social media networks (Barratt 2016; Larsen 2016; Pink and Fors 2017). This work has largely focused on the socialising and performative role of spatial media in shaping cycling practices and identities. This follows other studies of fitness trackers and wearable technologies, which have been similarly examined under the banner of the quantified-self movement (Lupton 2016a; Neff and Nafus 2016).

Nevertheless, relatively few studies have closely examined how spatial media relates to other socio-materialities in constituting the spaces of cycling. If we are to make social and political claims about the datafication of cycling (cf. van Dijck 2014), much of which is afforded by spatial media operated by large technology companies, then more must be done to expose the intricate socio-material relations of these spaces. Doing so will help us to investigate the extent to which data and spatial media matter in constituting the life-worlds of cyclists (Sumartojo et al. 2016). To echo recent discussions in the ‘digital geographies’ literature, geographers should refrain from any assumption that the impacts of digital media are universally experienced. It has been widely shown that digital media and practices of datafication rarely have a universal application, but rather become bound up in varying socio-material practices, all of which determine where, how and why they might be put to use (Horst and Miller 2012; Pink et al 2016), and all of which complicate assumptions about how digital media saturate and co-produce everyday practices.

In this paper I begin from this premise to unpack the spaces of amateur road cycling. Drawing from an ethnographic study of a UK based cycling club, I highlight the intricate ways in which cycling spaces emerge as assemblages constituted by socio-material relations, including but not limited to spatial media. By doing so I build on and develop theory seeking to frame the datafication of cycling and spatial practices, not as simply given, but as a contextual

process that emerges from the lived experiences and contingencies of mobility. This paper makes a contribution in this regard by drawing from materialist philosophy to develop a vocabulary and theoretical apparatus for thinking about spatial media and contemporary cycling spaces, which may also be usefully applied elsewhere in studies of mobility.

The paper has four sections. Firstly, I situate cycling as a digitally mediated practice by discussing the impacts that spatial media has had on the practices of cycling. This section looks specifically to the social, performative and embodied impacts of locative and self-tracking media. Secondly, I outline the methodology for my research, where I suggest that non-media centric ethnographic approaches can be usefully applied to studies of cycling, mobility and spatial media. In the third section I discuss cycling as a contextually mediated practice, where I demonstrate how cycling spatialities emerge from socio-material assemblages. I situate this section within a discussion about how we might adapt the Deleuzian concept of *attractors* to develop a framework for understanding when, where and why digitally mediated cycling space emerges. In conclusion the paper introduces and demonstrates how this approach could be applied by geographers and others seeking alternative theoretical perspectives on studies of spatial media and everyday mobility.

Cycling: a digitally mediated practice

In recent years, scholars from across the social sciences have turned their attention to examining the impact of digital technology on cycling. Barratt (2016) examined the ways that spatial media in road cycling led to a gamification of riding practices. His study revealed how the use of ‘virtual’ time trial features and post-performance data analytics influenced and encouraged competitive tendencies in riders. Crucially, this research highlights how spatial media influence the competitive practices of riders when they are riding, but also when they are away from the bike in other contexts mediated by social media. Barratt asserts that these ‘post-performance’ practices are significant because they highlight how spatial media have impacts across the different spaces where cycling identities are produced.

Focusing in on the affective dimension of cycling, Sumartojo et al (2016) examined the ways that riders coupled with self-tracking technologies produced novel ways of being in the world. In their ethnographic study of commuter cyclists in Australia, they argued that it is crucial to pay attention to spatial media in the minutia of everyday routines if we are to understand the phenomenological experiences of commuter practices. Their study echoes the work of Pink and Fors, who state that 'self-tracking technologies are involved in the complexities and contingencies of wider environmental configurations with humans, rather than simply being technological objects which can be studied for their capacity to generate contingent affects or other qualities with humans' (2017: 11). Collectively, this body of research asks that we think more about the ways that spatial media are deeply embedded in the constitution of our life-worlds (cf. Ingold 2011) rather than something simply augmenting our practices. Similar conclusions were drawn by Lupton et al. (2018) in regard to the 'data lives' of commuter cyclists. In their study they argued that it is important to reflect on the affordances of technology, the spaces of practice and the bodily sensorium in order to understand how digital data and devices become part of the mundane and routine experiences of cycle commuting. In many ways this research builds on studies which have highlighted the affective, sensory and kinesthetic experiences of cycling (Jones 2012; Spinney 2006) by focusing specifically on the role of spatial media in producing these experiences.

This paper develops this work by probing further at 'the complexities and contingencies of wider environmental configurations' that constitute cycling life-worlds. Well regarded theories of digital mediation, including code/space (Kitchin and Dodge 2011), datafication (van Dijck 2014) and deep mediatization (Couldry and Hepp 2017) often state the importance of contextual and relational approaches to researching digital media and social practices. Yet rarely is the minutia of everyday mediated practice at the forefront of our efforts, such as it is, for example, in research using ethnomethodological approaches to study digital practices (see Laurier et al. 2016).

Whilst these theories are useful for broadly framing how cycling spaces may be digitally mediated, they do not always offer a suitable vocabulary for looking closely at the

113 assemblages of socio-material relations that constitute cycling spaces. I suggest that geographers
114 could go further by experimenting with theory that explores the possibilities of what Dodge and
115 Kitchin (2005) determined as ‘background coded space’, which they suggest is a form of coded
116 transduction in waiting; space ‘where code has the *potential* to mediate a solution if
117 purposefully activated (2005: 173 my emphasis). This is in contrast to the more well know
118 formulation of ‘code/space’ and ‘coded space’ (Kitchin and Dodge 2011), which assert that
119 certain socio-spatial practices have undergone a process of transduction afforded by code
120 (code/space) and that certain socio-spatial practices have partially (but not irreversibly)
121 undergone a process of transduction afforded by code (coded space). As the previous studies of
122 cycling have demonstrated, cycling spatialities are thought to emerge as assemblages that are
123 increasingly characterized by the effects of spatial media, yet more needs to be done to examine
124 the inherent instability of cycling spatialities transduced by code to get to grips with when,
125 where and why these coded transductions are activated and have an impact on cycling practices.
126 This calls for theory that attempts to tease apart ‘background coded space’ to explore the socio-
127 material processes and conditions that might lead to coded transductions of space.

128 Anderson (2018) has recently argued that cultural geography is increasingly interested
129 in *representations-in-relation*, and Adams (2017) has recently called for theories of media
130 representation to focus on the forms of metaphysical encounter between human and non-human
131 agents. These are both directions I want to explore further here in regard to cycling, by
132 questioning the extent to which spatial media (the representations of spatiality, topography,
133 mobility and corporeality captured and displayed on portable small screen devices) act in
134 relation to other objects, people, processes and forms when constituting the spaces of cycling.
135 One way of doing this is to adapt the Deleuzian notion of *attractors* as a theoretical tool to make
136 sense of the ways that emerging socio-material contexts modulate the use and effect of spatial
137 media on cycling spaces.

138 Delanda (2002) has asserted that all spaces of possibility have a singularity or
139 competing singularities which the virtual capacities of these spaces are attracted to. Singularities
140 in this context can be regarded as the points of least resistance at which the virtual capacities of

space converge to produce an event. The notion of ‘attractors’, Delanda suggests, is a useful Deleuzian concept for theorizing what influences and draws virtual capacities towards the actualization of an event. This concept is also useful when theorizing how cycling spatialities emerge in-situ, because in any cycling space (a space of possibility) there are virtual capacities waiting to be actualized by converging around a singularity through the actions of attractors. This mirrors the emergent properties of space highlighted by geographers (cf. Massey 2005), who suggest that space emerges from convergences within a constellation of relations.

Turning to our attention to the practices of amateur road cycling, we can theorize spatial media as ‘coded attractors’ to get a sense of the work they do in actualizing (or transducing) cycling spaces in specific contexts. This highlights not only the when and where spatial media come to shape the constitution of cycling spaces, but also the moments when the digital mediation of cycling spaces is backgrounded.

Methods

Between November 2014 and May 2016, I carried out fieldwork with a South London based amateur road cycling club, which I will call the Wheels Cycling Club (WCC). The purpose of this study was to examine how and why spatial media had become embedded in the spaces and practices of the club. I took a decidedly non-media-centric approach (Morley 2009; Moores 2012) that sought to investigate the club and its spatial media practices as a whole, rather than simply asking or observing how these representations were being used in isolation. In this manner I followed Pink et al in developing research methods to investigate the impact of digital (and non-digital) media by focusing on ‘the relationship between digital media and other things and processes, and considering how the practices through which these are played out become blurred’ (2016: 57). I did this by participating in weekly ‘ride-alongs’ (Spinney 2006) with individual riders and groups of riders where I studied how cycling unfolded as a social, corporeal and topographical practice, as well as a digitally mediated practice. Additionally, I carried out six in-depth interviews with individual members (four men and two women) and

became an active participant on the club's social media and online forum discussions. Data in the form of field notes, audio recordings and 'screen grabs' was coded and thematically analyzed to generate the findings presented here. This form of multi-sited ethnographic participation (Marcus, 1995) allowed me to engage with riders on the move as they travelled through various spaces of practice and in their social activities away from riding. Whilst this study is somewhat limited in scope by its focus on one type of cycling within one club characterized primarily by affluent white British members living in the South East of England, it does offer a useful snapshot for highlighting the complex socio-material assemblages which constitute amateur cycling spaces.

Coded attractors and cycling spaces of possibility

From my observations and conversations with a regular group of Saturday morning WCC riders, each of which used some form of specialized GPS units attached to their handlebars, there was no clear pattern as to when these devices were engaged with. Indeed, there was not always a clear pattern or indication as to when the spatialities of cycling were, or about to be, transduced by these coded attractors. Riders were frequently seen tapping and swiping their devices, all the time appearing to make ad-hoc decisions to check their average speed, heart rate, cadence, calories burnt, the gradient of the inclines and the time of day. Nevertheless, these interactions were not universal but based on the experiences of individual riders in specific socio-material contexts, which influenced the intensity and effects of coded attractors. Ben, a regular rider, said that the use of his device was ultimately dependent on his position in the group and on the type of ride that he had planned.

I'm not going to use it [his Garmin device] really if I'm at the back or in the middle somewhere... I just follow what's going on in front of me and try and stay out of trouble... I've seen crashes happen when people are too busy messing with their Garmins! When I'm riding on the front, I do actively use it to see where I'm going [if a

new route] and to keep my eye on the speed of the group...At the front you kind of have that responsibility, you know, just to make sure everyone stays together as much as possible.

On my own I think I use it much more for keeping track of my numbers. I think everyone must do. It can be a bit boring sometimes [riding solo] so I mess around trying new stuff on it [Garmin].

Simon added to this by noting how the transition from urban to rural spaces during weekly rides affected the use of his GPS device.

I don't know why I keep checking it [his Garmin device] really. Sometimes it's just something to do when waiting for the lights to change. In the city it's really pointless because we just stop start, stop start, all the time so it's not really telling me anything useful... Well maybe the maps but that's about it.... I use it much more in the countryside when there's less to worry about and I've got more space to go for it and make use of it.

In addition to what riders said about their use of devices, the strength of coded attractors could also be examined when riders came up against the challenging hill climbs of the North Downs, which was a key feature of every week's ride. The hill climb was a significant event for most riders, and many took the opportunity to test themselves on it. This was usually done as riders engaged in well meaning battles with each other to reach the top first, and / or as riders set themselves strict time trials, making use of the features on their digital devices ('split times', 'virtual rider', 'segments') to keep them on track for their respective training goals. Whilst small groups of riders sped off up these hills in competition with each other, others were left (thankfully) to concentrate on their own efforts for a short while. Some riders paced themselves up hill using the speed, cadence, gradient and map data presented on their devices. Henry, a

relative newcomer to the group, was particularly fond of the feature on his Garmin that represented the gradient of the road. Cycling alongside him as we made our way up hill, Henry showed me how he used the incline graphic represented on the screen to measure the effort he was putting in. If his device showed a steep gradient up ahead, he would know to prepare to adjust his effort and riding style, and if showing a shallow gradient, he could be confident of maintaining the steady pace he had set himself. Others simply judged their efforts based on if they ‘had the legs for it’ and avoided interactions with their devices, which were seen to distract them and hamper their efforts. On the regular club route climb, well-versed riders would do a combination of both, but also stick to the right hand side of road where the tarmac was smooth and the going less bumpy. This goes to show how the quality of road surface was also significant as a non-coded and competing attractor that fell in and out of focus over the course of most club rides.

The significance of coded attractors was far less apparent when riders came up against events which required their undivided attention, such as when hurtling down hills or riding through heavy traffic. During these moments, coded attractors were backgrounded and hardly mattered as riders concentrated on a safe descent or passage through the busy streets. In these moments of riding it could be said that the strength of coded attractors was weak, with other socio-material attractors being noticeably stronger in co-producing these events. Harris (2017) has asserted the notion of ‘competing attractors’ in the use of interactive documentary (i-Docs), whereby attractors may be in competition with one another to actualize the virtual viewing capacities inherent to this documentary format. In the case of the WCC, we might say that coded attractors worked with varying degrees of intensity, whereby the higher the intensity, the higher the possibility that they would draw virtual capacities together to produce an event. As described, it was clear from riding with the group that the intensity of coded attractors depended on dynamic riding conditions. However, it is also worth noting how certain design features of the devices being used acted to support higher intensities. For instance, riders would often be drawn in to using their devices as they made audible beeps when we stopped at a set of traffic lights or when we started or finished certain ‘segments’ on the route. Following studies of

addictive digital design (see for example, Schüll 2014) this demonstrates how the work of coded attractors in transducing cycling spaces has the potential to be manipulated by design that seeks to hold attention from users.

Moreover, there is evidence to suggest that coded attractors have latent capacities, which may become significant attractors in constituting post or future riding spaces, thus reflecting Barratt's (2016) finding that cycling can be digitally mediated in post-performance practices. Off the bike and on social media, riders often discussed and joked with each other about the statistics derived from their digital devices during these weekly rides. Speaking on this issue via email, Adam, a long time member of the club, suggested that these technologies had a significant effect on weekly outings, in terms of the speed of these rides but also in terms of what motivated people to participate:

I'd say in many cases, its [spatial media] made riders more competitive than ever and group ride speeds have gone up as a result. It's also caused a split in many social groups, where one or two riders using Strava will turn a social event into a competitive one. I think this is slowing down though, and people will eventually return to riding socially without ranking each-other as often. A benefit to this online community is that some people have found groups and others to ride with in their area through seeing where their local rides are and at what speed/ability they are capable of riding at.

Barbara, another regular on these rides, gave a more detailed account of the reasons why she used spatial media when riding, which gives us a better sense of how different types of riding can affect the strength of coded attractors in transducing cycling spaces. During what she described as her 'training rides', her Garmin device was often consulted, studied, tapped and swiped. She explained these frequent engagements as 'necessary', for each swipe through different 'pages' on the device revealed different aspects of her ride; from a page which displayed her cadence, speed, time, distance and heart rate, to other pages which displayed the profile of the terrain, her pace, split times and maps. This information was important during her

281 training for long distance sportive events, especially when involved in interval training sessions
282 – repeated short sharp bursts of effort followed by short recovery periods – where she judged
283 the physical efforts she made based on the data displayed in front of her. In these moments,
284 Barbara appeared glued to the screen to keep an eye on the time and her power output
285 (measured in watts by a ‘power meter’ attached to the crank of her bike). She noted, ‘I use the
286 Garmin to gauge my efforts. It’s become part and parcel of training for me.’ In this context we
287 could say that the coded attractor was especially strong for it transduced much of Barbara’s
288 riding experience. In contrast, on more leisurely rides the corporeal data was said to be less
289 important for Barbara, though she still recorded it and pored over it later at home. Instead she
290 made more use of the map features on her device, which she said helped her explore new places
291 and routes.

292 This analysis of Barbara and others club members demonstrates that the cycling spaces
293 of the WCC were dynamically co-constituted by spatial media as it came in and out of focus for
294 riders in different contexts. The ethnographic insights presented here show that the digitally
295 mediated spaces of this club – primarily its riding spaces - were not stable but rather produced
296 in situ, as these coded attractors competed with a world of other socio-material attractors to
297 actualize virtual capacities in the production of these spaces. This could be observed as rider
298 attention to and interest in spatial media fluctuated depending on how the group was formed and
299 how its members socialized with each other, what the aims of individual riders were, and what
300 the terrain, topography and riding environment was like. I argue that all of these contingencies
301 had some effect on how and why riding spaces were transduced by spatial media, and how these
302 spaces were experienced by riders. This follows Jansson’s (2013) assertion that the
303 mediatization of practices is always a process shaped by socio-spatial forces, and highlights how
304 the realization of ‘background coded spaces’ in cycling are dependent not only on individuals or
305 devices purposefully bringing those spaces into being, but also on the wider socio-material
306 conditions of the environments in which spatial media are used.

Conclusion

Following geography's recent 'digital turn' (Ash et al. 2018), there is potential to re-think how geographers study the impacts of spatial media on cycling and other everyday mobile practices. This paper provides a theoretical and methodological framework for doing this. There is a growing body of work exploring the impacts of spatial media on mobile practices (Kitchin et al. 2017; Leszczynski 2015). However, there is notably less research examining the intricate entanglements of everyday mobile practices and spatial media, which are often subject to dynamic and contextual changes that effect how these entanglements are revealed. Following Marres (2017), social research into 'the digital' must pay closer attention to the complex ways that digital media rearrange social relations and practices. In this paper I have made a contribution here by adapting the Deleuzian concept of attractors to theorise how the socio-material assemblages of cycling may be transduced and affected by spatial media. The suggestion is that the study of spatial media and mobile practices should always be examined as part of situated processual practices, and that the concept of 'coded attractors' may be useful for unpicking the complexity of these entanglements.

Whilst theories of media ecology have long advocated that the production of space and spatial practices are always-already mediated by different media (Cavell 2003; McLuhan 1964; Peters 2015), these theories have seldom attempted to examine the intricacies of spatial media and the production of cycling space. In this paper I have tried to rectify this by giving ethnographic insights into how spatial media are configured in the always-already mediatization of cycling spaces. As cycling continues to be discussed in relation to the effects and affects of spatial media in the academic literature, it is important to consider these impacts from the granular perspectives of everyday lived experiences, as well as from the grander perspectives of how digital media are shaping society at large. As Fraser has recently stated:

Plainly, technology firms do play a part in the production of space: they must compete, satisfy shareholders, and therefore create ongoing geographical configurations of materials that reshuffle and recreate the worlds we encounter and theorise. However, the

unpredictability of iterative interplays – the emergent shape and dynamics of the constellations of contingencies flowing from digital life and given vitality by digital subjects – actually amplifies the significance of ‘happenstance juxtapositions’ (Massey, 2005, p.94) in conceptualizations of space and spatiality (2019: xx)

The theory of coded attractors put forward in this paper could be useful for studying the ‘unpredictability of iterative interplays’ between us and spatial media in the production of space, especially when considering the spaces of mobility. This follows Holt (2019), who has argued that assemblage thinking offers a useful framework and vocabulary for recognizing mobility as an important dimension to how people, places and technologies are intertwined in everyday life. A framework of coded attractors could therefore be used to examine everyday mobilities that are increasingly enmeshed with spatial media, including other leisure activities where self-tracking technologies are prevalent such as running and swimming, navigational practices that make use of digital mapping technologies such as driving and walking, and locative gaming practices premised on location based software and augmented reality applications.

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