

REPORTING TOGETHER: TRANSACTIONAL SOCIABILITY, DIGITAL COMMUNITIES AND ALTERNATE EMBODIMENTS ON THE ROAD THROUGH THE USE OF WAZE

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Abstract: The research discussed in this paper situates itself within experiential and critical approaches to architectural and urban space through GPS-based mobile app technology. It uses Waze, a crowd-sourcing satellite navigation app, as its case study to discuss how the app enables new digitally mediated spatial practices performed and embodied by users. To explore how Waze informs spatial relations and practices – both physical and digital – the app is analyzed as a material object, particularly addressing the design and spatial properties of the interface, while framing it within a Cyberfeminist theoretical framework. The paper seeks to fill a gap in digital spatial theory by upholding that apps are made at a fast pace to help increase their commercial value, but their development, design, and research currently lacks critical study. As such, it looks into Waze’s implications regarding the social reconfiguration of urban relations and identity-formation. Collecting its data through a series of interviews with users as well as personal analyses, this paper aims to critically address how through its interface Waze: *a*) contests notions of “community” among a group of drivers on the road, *b*) creates transactional collaborations between Wazers, and *c*) sets up a digital space where users perform and move in relation to each other. The paper argues that studying Waze’s properties enables a space-based theorization of embodiment, and that through Waze’s avatars, users construct a sense of embodied self-awareness and a social understanding of their immediate context by being able to visually position themselves within an expansive network of others.

Keywords: Waze, GPS app, embodiment, digital community, urban space.

INTRODUCTION AND CONTEXT

Within the field of the built environment, certain architectural and urban theorists have addressed how mobile technology is shifting people’s relationship, experience, and understanding of urban space. Among others, Manuel Castells upholds that the Information Age has led to a variety of social and urban transformations, interconnecting and linking people and cities through a “space of flows” (1996); Adriana de Souza e Silva and Jordan Frith (2012) look to portable technologies (books, mp3 players, mobile phone, etc.) to study

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how these strengthen users' connections to location; and Anastasia Karandinou (2013) urges architects to not simply map the visual, but to also think about technologically mediated environments in a phenomenological, multisensory way. However, these efforts – accounting for the impact of technology on cities – fail to go beyond the implications of the mobile device. Their focus is on the machine and its relation to space, not on the spatial practices the interfaces are enabling, and in this way, they inevitably create unnecessary, exclusive distinctions between technology, space, and body.

Looking past the properties of the mobile device, this research paper argues that through GPS applications (apps) the interrelations between body, space, and technology foster alternate configurations of spatial relations such as “community” as well as new forms of embodied spatial practices – in this case driving. Current research into GPS mobile apps has an immense focus in quantitative analyses of how they perform as commodities and systems, but there is a gap in scholarship looking into their cultural, material, and embodied practices. As such, apps are largely treated and perceived as value-free commodities, rather than powerful catalytic agents in the production of located, twenty-first century citizens.

Last year, “International Business Times” published an article reporting that the Apple App Store was growing by over 1,000 apps on a daily basis, with more than 1.5 million apps available in June 2015¹. In addition, data compiled by “pocketgamer.biz” reveals that during the month of July 2008 alone, a total of 1,001 new apps were submitted to the App Store; in September 2016, just eight years later, the number of submissions grew to an astounding cypher of 160,756 apps solely that month². It is evident then that apps are made at a fast pace aimed at increasing their commercial value, but their development, design, and research currently lacks critical study into apps' implications regarding the social reconfiguration of urban relations, as well as the formation of new forms of embodiments and identities.

The research discussed in this paper situates itself within experiential and critical approaches to architectural and urban space through GPS-based mobile app technology. It uses Waze, a crowd-sourcing satellite navigation app, as its case study to discuss how the app enables new digitally mediated spatial practices performed and embodied by users. To explore how, for its users, Waze informs spatial relations and practices – both physical and digital – the app is analyzed as a

material object, particularly addressing the design and spatial properties of the interface. This paper's aim is to critically address how through its interface Waze: *a*) contests notions of "community" among a group of drivers on the road; *b*) creates transactional collaborations between Wazers; and *c*) sets up a digital space where users perform and move in relation to each other. It argues that studying Waze's properties enables a space-based theorization of embodiment, and that through Waze's avatars, users construct a sense of embodied self-awareness and a social understanding of their immediate context by being able to visually position themselves within an expansive network of others.

RESEARCH CONTEXT: WAZE

Waze, released in 2008, is a GPS satellite navigation app which uses active and passive crowd-sourced information to help drivers find the quickest route to their destinations in real-time. With over 50 million global users, the company is one of the largest community-based traffic and navigation apps in the world (Cohan 2013). The description and analysis of Waze in this paper is based on personal experience as an app-user and on a series of interviews conducted with Wazers in the UK during 2014-2015.

Upon launching Waze, a smiling bubble on wheels greets its users with a blurb that reads, "Outsmarting traffic, together" (fig. 1). Immediately a map of the area appears on the screen, showing the location of users all around: Waze assigns each user a digital body in the form of an avatar which users can select, each depicting different personalities – or as Waze calls them, "moods" (fig. 2). From smiling Wazers with crowns, to some who are sucking on a pacifier, the map of the user's area is dynamic as it is jovial and friendly.

After users create their profiles and are launched into a digital map of their surrounding, they have a series of options to tap on the screen: the target, search, friends, and report icons. The target symbol allows users to find their position on the map if they wander around and get "lost" on the screen. Tapping the search icon discloses the main menu where users can see their profile, input their destination to begin their drive, and change their display settings. The friends icon shows how many Waze-using friends a user has, and allows them to send their location, to contact them, as well as check

their inbox for messages. Finally, and most importantly in this paper, the report icon is key to Waze: by tapping it Wazers are able to report on road conditions such as traffic jams, presence of police, car accidents, road hazards, fuel prices, map issues, presence of speed cameras, and take pictures of places (fig. 3 and 4).

Although there are a number of sat-nav softwares available, and some of them – such as Tom-Tom – have been in the market for much longer, Waze differs to them because it grants its users agency, mapping each driver's navigation depending on the road conditions inputted by its community of users. Wazers are not just passive consumers. Through reporting, they have an active role in the way the app performs. In this way, Waze becomes a strong case study for research on digital spaces and embodied practices; it was selected because of its popularity among a large group of users, its GPS properties which tie it into a space-based discussion, and its relation to embodied performance through its interface design.

LITERATURE REVIEW

As mobile connectivity evolves, researching its reverberations allows us to more thoroughly describe and elaborate on the relations between people, technology, and spaces; this research discusses how, through digitally mediated forms of embodiment and subjectivity, Waze fosters alternate notions of space as well as social relations which pinpoint to new readings of “community”. I arrive at these postulations largely due to my readings of Cyberfeminist literature, particularly the work of Rosi Braidotti (1996, 2006, 2011) and N. Katherine Hayles (1999, 2005) which were selected due to their discussions on how technologies help shape people's identities and give way to evolving forms of being. I counterpose these ideas with Sherry Turkle's arguments on how digital spaces create illusions of communities (2011). In this way, I situate feminist digital theory into a digital spatial theoretical framework advocating for a critique of GPS apps, neither technofetishistically nor technophobic, but rather as performative agents with material manifestations, and as forces at play within the processes of becoming subjects.

Cyberfeminism describes the postmodernist philosophies of a contemporary feminist community interested in cyberspace, while also being rooted in the dichotomies of hu-

man/non-human, mind/body, and organic/machinic. Dominant Cyberfeminist perspectives focused on exploring the Internet as a means to break free from normative social constructs (such as gender) as well as a means to link the body with machines. A selection of Cyberfeminist texts are key to this research: Donna Haraway's *A Cyborg Manifesto* (1985); Rosi Braidotti's *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory* (1994) and *Transpositions: On Nomadic Ethics* (1996); and N. Katherine Hayles's *My Mother Was a Computer: Digital Subjects and Literary Text* (2005). These four texts all account for the fluidity of the subject as an embodied entity while focusing on technology – as Haraway and Hayles do; and on spatial and geographic specificity – as Braidotti does. This provides novel ways in which the role of GPS-based apps can be studied. The originality of using these theorists lies in linking their ideas on technologically-mediated embodiment onto a situated, localized and spatialized context, particularly because they have been discussed in fields such as biology, medicine, and feminism, but have been underdeveloped in discussions related to urban space.

Space. To expand on the role of space as a site for the construction of subjects, as well as examining how Waze fosters new forms of spatial practices and community, it becomes necessary to acknowledge pioneering spatial theories which addressed non-traditional notions on the complexities of space. Perhaps most notable are Henri Lefebvre's ideas, as he advocates for a non-Cartesian exploration and analysis of urban space, stating physical space has no reality without the energy that is deployed within it (Lefebvre 1991). This “energy” is a way of portraying the social exchanges and embodied practices that make up public spaces in cities. As such, Lefebvre seeks to understand the operations users perform upon spaces by means of a triadic relationship he proposes: spatial practices, representations of spaces, and representational spaces. His triad considers then not the physical properties of space but rather the social actions of the subjects who perform in them.

When examined alongside this theoretical framework, Waze – by allowing its users to report on road conditions, which in turn determines which route it directs drivers through – attests to social exchanges and embodied practices in spaces. Although Waze guides users down routes, its navi-

gation is entirely dependent on the reports Wazers have uploaded onto the system, presenting a fluid, dynamic exchange between user, space, and app. But through these shifting negotiations between the agency of technology and of people, Waze contests Lefebvre when he argues, “Space commands bodies, prescribing gestures, routes and distances to be covered”, because the app creates power negotiations for a digital subject which moves through routes not prescribed by the space itself, but by the interface.

Troublesomely, within the field of the built environment, research into technological elements in urban spaces has largely focused on two tropes: first, pragmatic and functional aspects related to safety, efficiency, and productivity – particularly in research being undertaken on the topic of “smart cities”, as can be seen in the work of Michael Batty (2005) and Carlo Ratti’s ongoing projects at the MIT Senseable City Lab; and, secondly on mobile technology in urban playscapes as well as augmented reality, as can be seen in the work of Adriana de Souza e Silva (2009a, 2009b, 2010) and Maurizio Carta (2017). Similarly, additional literature supporting the study of GPS mobile apps has an immense focus in quantitative analyses of their performance, such as in the work of computer scientist Anthony Steed (2004) and George Camacho et al. (2006). However, research into how apps like Waze are morphing existing spatial practices such as driving, are too often left outside architectural and spatial discourse. Through Lefebvre’s definition of space by social practices, not by geometry, a deeper exploration into Waze can be carried out, one that situates its reverberations within a larger, collective context.

Digital Community. While a number of spatial designers and researchers focus on functional aspects which skirt around matters of embodiment and community, Internet theorists researching bodies, spaces, and technologies have in turn overstated the social importance of virtual worlds such as Second Life and MUDs (Multi-User Dungeons) as spaces allowing embodied, digitally mediated communal sociability (see Taylor 2002; Jones 2006). In these worlds, users create an avatar and establish interpersonal relationships with other users in an artificial environment. According to digital theorist Shannon McRae, many of these spaces are text-based virtual worlds, in which it is possible to craft highly complex, extremely vivid environments that simulate a feeling of actual

presence (McRae 1997: 76). In MUDs in particular the term “community” is used differently role to its traditional definition – that of a group of people holding common qualities, properties, identities or ideas – in that, as McRae mentions, users might feel a sense of being present in the same space, when in reality physical, geographic commonality might be in-existent.

The collaborations taking place through Waze share some of these aforementioned qualities of communities, but they differ to other social digital spaces such as MUDs or even online message boards in that its users necessarily and inherently hold geographical commonality: Wazers inhabit a mutual physical space while partaking in interactions that help other users. In this way, the app contests arguments that refute the inclusion of “community” within digital discourse, such as those by Internet theorist Shawn P. Wilbur (1997: 14): “Virtual community is the illusion of a community where there are no real people and no real communication. It is a term used by idealistic technophiles who fail to understand that the authentic cannot be engendered through technological means”. Using words such as “authentic” and “real” is problematic, as they are often placed in categories that, tending towards the absolute, imply fixity and determinacy. In the case of Waze, though interactions can indeed be transactional and detached, it would be erroneous to define them as indicative of a “non-real person” partaking in “non-real communication”: by helping others spend less time on the road, Wazers’ collaborative nature attest to social exchanges on a digital space that lead to material effects – from road safety to minimization of petrol use (Also see Ahn and Rakha 2008; Gere 2012).

METHOD

Research Questions. The transactional collaborations within Wazers hold the central focus of this research. The aim is to generate a deeper understanding of how Waze, as an app, allows user to partake in performative practices affecting their relationship to space, and that this performance is not solitary but rather influenced by others (see Ahmed 2006). Thus, this paper discusses Waze through the embodied practice of driving, while situating Waze’s avatars within Cyberfeminist literature. In doing so, it discusses how these digital performances are embodied spatial practices by asking three questions: a)

How do Waze users experience spatial connectivity to other Wazers through the interface's properties? *b)* How does Waze contest notions of "community" among a group of drivers on the road? *c)* In what way do Waze's avatars sustain a spatial theorization of embodiment?

Interviews. Because of the study's focus, the methodology chosen to engage, observe, and analyze the nuances in subjectivities and embodiments fostered by apps was ethnographic, qualitative research (Hine 2005; Hammersley and Atkinson 1983). As part of my doctoral research studying three GPS apps – Waze, Grindr, and Mappiness – I conducted 49 interviews in the UK focusing on the relationship between body, space, and app technology, with 15 of these interviews solely focusing on the particularities of Waze. This set of 15 interviews, each lasting between 25-38 minutes and composed of 38 questions, were held during Spring 2014.

Gathering Participants. A call for participants was sent via University College London's mailing list, forwarded to its staff and students. Four participants were recruited by UCL email, so alternative methods to find more participants were employed using social media platforms Twitter and Instagram to get in touch with UK-based app-users, by reaching out to users who followed the official @Waze accounts. Because the Waze participants were scattered throughout different cities in the UK, eight of the 15 interviews were conducted in person in London, two of them were video calls on Skype, three were audio calls, and two were email interviews.

The participants chose where to be interviewed: at their work place, public university space, private campus space, and at coffee shops. To ensure the anonymity of the participants, their identities will not be revealed. Their individual physical traits and names will be kept confidential and coded in a format of: W#D#. All of the participants were interviewed individually, except for W0D8 and W0D9 who had a joint interview at their work place. The first 14 participants were males and W1D5 was the only female participant.

Analysis. After signing a consent form, an iPhone was used to record the audio for the transcription and analysis, while email interviews were analyzed directly. These analyses were guided by the research questions, conceptualized within a Cyberfeminist framework primarily through: *a)* Haraway's

call to rethink the relationship between people and machines while highlighting the negotiations of power and agency that take place through these interactions; *b*) Braidotti's view of postmodernity as a threshold of new relocations for cultural practice and her proposition that technology "must be seen as co-extensive with and inter-mingled with the human" (1996); and *c*) Hayles' theories on embodiments and the posthuman, which link subjectivity and technology.

The analysis was two-fold. Firstly, overlapping themes in each interview were identified, as well as their discrepancies. These themes were also drawn from personal experience after downloading and testing Waze for six months, approaching it as both a researcher and a new user. Secondly, each interview answer was coded graphically into a series of geometric, colored figures to help identify patterns visually – these are referred to as avatars (see Pink 2001; Mitchell 2005).

Avatars. These written codings for each participant – a series of letters and numbers that replaced each name – such as "W0D1" – granted a strong sense of anonymity, while presenting difficulties in distinguishing each participants' stories (fig. 5). To recover a sense of embodiment lost in their quotes within the text, each participant's interview was recoded via graphic analysis and patterns showing a reconstructed persona as an avatar, relating to Lefebvre's theories on space codification (1991). The avatars do not allow the reader to decode the actual interview answers by looking at them, because the avatars are not intended to perform as readable maps but rather as methods for personal analysis and studies into embodiments.

Limitations. It is understood that due to the nature of the research, a degree of selectivity was inferred during the recruitment process, as the participants would by default need to belong to a demographic of people who own a smart phone. Meeting the participants in person was beneficial to the research in the sense that it was possible to not only engage more directly with them but it also guaranteed that the conversation could be steered if it ever went of course. There were times when the participants answered a question in a manner in which they thought they needed to, in regards to what they felt was expected by the nature of the research topic. However, having oral conversations with them ensured that the question could be asked again, modified, or rephrased in

order to generate an alternate perspective on the answer. In the interviews that were conducted by email, some of the answers were very brief and thus lacked the in-depth discussion that oral conversation allows.

RESULTS

Question 1: How does Waze contest notions of “community” among a group of drivers on the road?

The word “community” is addressed here, as a response to Waze’s appropriation of the word; on their website the company advertises itself as “the world’s largest community-based traffic and navigation app”³. Through its interface and mode of performance – allowing users to input data into the app, to help other drivers reach their destinations in the least amount of time possible – Waze fosters previously unseen socio-spatial constructs and modes of embodiment that question the traditional take on “community”. The presence of multiple avatars on the Waze map, ability to report, option to thank other users for their input, ranking among each user, and ability to choose an individual avatar (as opposed to being assigned one) all point to a kind of social order – a suggested community of subjects (see Ohler 2010; Gere 2012). The result is a map with small avatars moving through the streets in real-time, giving a sense of diversity within a systematic and limited group of choices. Upon seeing these others with “personalities”, rankings, and individual names, users are reminded that each moving icon is a real, living person – a citizen occupying a particular space in the city for a brief moment:

Has Waze changed the way you perceive others? W1D1: Yeah, actually. Within the United Kingdom, I’m ranked at about 14,000 so there’s probably 20-30 thousand people out there who are using it on a regular basis. I was in disbelief, when I first downloaded it, that it would be that popular, but it is. There’s a community there, but it’s somewhat exclusive.

In the case of W1D1, being ranked 14,000 among Wazers gives him a sense of scale and spatial position among a long queue of users: his position is closer to the front than others who are behind him. Comparing and positioning oneself in relation to other Wazers creates a digital subject that projects themselves onto the app’s interface. In turn, this allows the us-

er to feel scale, size, presence of a population, a feeling of belonging, and a way of relating to other members.

Do you see Waze as a social network? W0D8: It's kind of a social network [...] in that we all have a similar goal and we're all trying to get there. We'll help one another out but with one extra stepped removed from each other. It goes: person-phone-phone-person. And so all you need to do to help other people is press a button, and it's done.

The conversation with W0D8 helps sustain how Waze enables new forms of communication between members of a group, which are based on an exchange of interactions shifting in agency: from individual user, to app, to community of users – a series of three steps. This form of communication, where the user is “one step removed from the other user”, does not by default weaken the connection between people. Rather, it reconfigures the public and private spatial coding of the road (see Sheller and Urry 2003). In this way, it instills a collective practice this research denotes as transactional sociability. This loosely relates to Lee Rainie and Barry Wellman's concept of networked individualism, in which he describes as new forms of sociability oriented around loose, fragmented networks when compared to traditional ideas of community (2012).

As opposed to small, close social groups (or networks) such as those in neighborhoods, where each member plays a part in the sharing of information, Wellman's networked individualism creates new ways for people to solve their problems and meet their particular needs, including those related to navigation and mobility. However, despite the similarities in our two concepts, there are nuanced differences between them which warrants their exclusivity. Networked individualism, firstly, over-relies on the assumption that communal and familial bonds are decreasing, and that our affinity for the aid of technologies is a reflection of this. Secondly, it does not carry the weight of identity and performance which I load transactional sociability with.

Although the term “community” is more vast than its reliance on a common neighborhood or region – and much more complex than merely having a group of strangers congregated in the same space – the question becomes whether apps like Waze are responsible for producing new, alternate types of communities or if there should be a different name for these types of social relationships. Geographer John Pickles, aware

of these socio-spatial changes brought about by technologies writes:

Images of a whole earth, representations of relationships that transcend local, regional, or national identities, new notions of community that transcend parochial conceptions of locality and place, and new mediations of self and other (constituted through digital interfaces and new representational forms) all became realities through these mappings of nature, society, and the body-subject (Pickles 2004: 146).

For Pickles, the emergence of different social constructs with intrinsic relations to technologies, territories, and space contest traditional ideas of communities. However, contrary to Pickles – and bearing in mind that Wellman’s networked individualism challenges the social bonds formed in densely knit groups – sociologist and robotics theorist Sherry Turkle upholds that broadening the definition of “community” to include non-physical places would be stripping the word of its meaning, stating (2011: 238), “it is easy to forget what the word used to mean. From its derivation, it literally means ‘to give among each other’”. Here, Turkle’s unrelenting phobia of forgetting – a fetishism for the past and a dread for future advances – paralyzes her from moving forward, something which poststructuralist digital theorists – the Cyberfeminists in particular – would digress with. Although the Cyberfeminists never truly tackle the idea of community in relation to the digital, Braidotti’s nomad figuration helps indicate where Cyberfeminism might position itself in relation to this discussion. According to Braidotti, the nomad – a figuration acting as a marker for subjective difference within poststructuralist philosophy – expresses a subject’s biography in relation to spatialized and temporal relations. As such, the nomad’s identity is constructed out of an inventory of localized *practices* and *traces*, whether digital or physical; it is a subject produced by place and territory. The nomad argues for a vision of the subject as a dynamic, embodied entity – one without a fixed identity, but with an inherent relation to space. Within this framework of Braidotti’s nomadic thinking, by being transfixed amidst technologically mediated changes in society, Turkle theorizes as a migrant, not a nomad. Braidotti writes:

The migrant, on the other hand, is caught in an in-between state whereby the narrative of the origin has the effect of destabilizing the present. This migrant literature is about a suspended, often impossi-

ble present; it is about missing, nostalgia, and blocked horizons. The past acts as a burden in migrant literature: it bears a fossilized definition of language, which marks the lingering of the past into the present. The migrant's favorite tense is the present perfect (Braidotti 2011: 59).

“Community”, for Turkle, is fixedly about physical interactions and exchanges, which require a territorial commonality. But failing to adapt words for the sake of preserving established meanings ignores the ever-changing context of contemporary society. Rather than using “community” Turkle suggests that a more appropriate word for these digitally-mediated communal relations would be “club”, as it would – quite simplistically – describe a group of members with common interests. Upon first glance, the term seems to apply to Waze due to matters of exclusivity which come inherently to using the app (not everyone owns or drives a car, and not everyone who does necessarily uses Waze). But although digital spaces such as websites, celebrity-fan message boards, and online forums for “motor heads” (to name a few) might arguably be closer to being described as clubs, there is one important aspect that would be lost if it replaced the term “community” – that which has to do with an element of communal solidarity, an effort to help other members, and working towards a common goal.

Where a “club” is centered on a particular topic – on driving, on a brand of car, a sport or a hobby, for instance – the word “community” is spatialized. In an effort to infer that communities and digital spaces are mutually exclusive, Turkle states (2011: 239) “communities are constituted by physical proximity, shared concerns, real consequences, and common responsibilities. Its members help each other in the most practical ways”. But according to this, Waze would not be excluded from “community”; the main dissimilarity lays in that the helpful transactions are digitally mediated, even though their finality are material. For its users, Waze fosters a collaborative and cooperative dynamic optimizing their time on the road, as they work together in a symbiotic manner with no need to be physically linked to each other. Through the interface, users are empowered by a collective sense of duty.

Do you ever submit data such as traffic reports, presence of police, or road damages onto Waze? W0D7: Yes, so other drivers are warned of issues, but not police. I don't report police as I don't want to warn dangerous drivers.

The act of reporting traffic, police, road blocks, accidents, floods, and any other type of road problems, is similar to that of a traditional neighborhood watch, where a group of neighbors patrol an area, looking out for hazards and suspicious activity. But instead of neighbors, the Wazers are simply passers-byers – anonymous bodies who may never meet, know, or come across each other again. Of course, not every participant felt that Waze is a community, and understandably so: users do not necessarily come together, meet, or interact. As such, the traditional – perhaps nostalgic – notion of “community” is not entirely represented through GPS platforms such as Waze. For some of the Wazers that were interviewed in this research, the anonymous aspect of the Waze avatars made them feel like they were not part of the community, while for others the performance of community was stronger than the need to know the individual, such as W1D4’s account below:

Do you ever submit data such as traffic reports, presence of police, or road damages onto Waze? W1D4: Yeah, quite regularly. If I come across them, as soon as I can get a chance, I’ll do it. I guess as I’m feeding off the system, it’s only fair I feed into the system, because I’ve benefited from other people. I can’t see why I shouldn’t let people benefit from me.

Reporting hazards and road conditions on Waze is completely optional – a voluntary form of communal cooperation that suggests a form of digital ethics (see Mossberger, Tolbert and McNeal 2007)⁴. This sense of ethics is particularly evident in W0D7, who chooses not to report the presence of police, in the interest of the greater driving population at large – Waze users and non-users alike. What is interesting here is that although the interface provides a method – perhaps unintentionally – for users to evade systems of regulation and control on the road, there is a sense of integrity and perhaps even respect for authority which contrasts to the liberating, emancipatory and disruptive quality of internet technology (Jenkins 2006). In a digital space where often anything goes, there are Wazers who perform in accordance to spatial systems of control that penalize those who deviate from regulations.

Different reasons could be elaborated as to why some users choose not to report and others do: these range between infrequent use of the app (these were found to have a more diluted sense of responsibility towards the Waze community) to some users wanting to purposefully help others. But reporting could also be associated to a feeling of being indebted or a

sense of responsibility to giving back to the app, as was seen with W1D4 above, while for others reporting traffic conditions is an outlet to express their frustrations. Whether it was selfless or self-gratifying action, the common denominator between all participants in this study was that Waze's report button gave them a voice and the power to actively contribute to something larger than the self.

However, it should also be noted that while reporting plays a fundamental role in the behavioral similarities between Wazers and community members, it is not the sole factor in engendering a sense of community among its users, its formation of performative subjects, nor in the way these subjects relate to space. For instance, throughout some of the interviews, participants spoke about the presence of avatars traveling on Waze's screen. For some users, the feeling of being part of a community arose from being able to *see* others on the app's interface, such as W0D5, who stated "When I see the other drivers on the map I feel more of a community; when it's empty it feels like a regular sat-nav". This is to say, one of the design decisions that makes Waze unique from other sat-navs – fortifying a feeling of collaboration and sociability – is the presence of its various users on the map at the same time; without them, the idea of a digital spatial subject performing among and in relation to others would be diluted, inferred rather than explicit (see Wilbur 1997; Ahmed 2006; Ohler 2010).

Question 2: How do Waze users experience spatial connectivity to other Wazers through the app's avatars?

Driving fluctuates between being a social experience and a solitary one (Miller 2001; Borden 2013). The arrival of the M1 motorway to the UK helped shape the very being and ontologies of vehicle drivers, requiring new kinds of skill and spatial awareness (Merriman 2004). Driving called for new techniques for moving, looking, and reacting; still today, concentration on the road is the priority, and even certain forms of communication – such as talking on the phone and even making eye contact with others – are considered distractions and hazards. Therefore, it is to be expected that throughout the interviews conducted for this research, some of the participants expressed they saw the car as a physical divide from the outside:

How is your sense of sociability affected by driving? W1D3: At a basic level you're only extending sociability to the people who are in the car with you. You're creating a physical divide between the world around you, the screen, the wider city, and the private space. It's very easy to isolate yourself from what's happening in [...] the outside world.

Accepted forms of road sociability and interaction thus involve non-verbal, non-human forms of communication: they are codes and signals in the form of blinking lights, bursts of sounds, and two-dimensional graphics in signage – something which is mirrored in Waze's performance. However, contrasting to the anonymity and withdrawn behavior involved in the practice of driving, in Waze – by seeing the presence of other users on the interface's map – participants experience a sense of connection to a larger group of users.

Have you used Waze in other cities? W0D8: Didn't we do it around Geneva? W0D9: Oh, yeah, we did! [...] I wanted to see if Waze would work abroad, and it did. I don't think there were any Wazers out there. W0D8: We found one in France though. W0D9: We found one in France, and I think in Sicily there were none.

When you say you "found one", you mean you saw a Wazer on the map? W0D8: Yeah. [...] We had to figure out how to get back to the hotel from the airport. We turned [Waze] on and we were like, "Oh, there's no one here". And then we saw one little Wazey blob on the map.

W0D8 and W0D9's narration attests to how Waze can enable users to feel a sense of connection to others, allowing the app to be discussed as a tool giving way to new constructions of interpersonal relations mediated through the digital interface. The incorporation of a digital embodiment on Waze's interface (in this case an avatar) then plays a significant role in the way users construct a sense of connection to each other. W0D8 and W0D9's wording attests to this when they say "We found one in France". The word "found" is used inherently in processes of searching, differing from their second phrasing, "And then we saw one [Wazer]". By continuing their description with "Oh, there's no one here", W0D8 and W0D9's account suggests that there is indeed a spatial and social reading of Waze's interface. Waze users position themselves within a group of others on the interface, and in this way, any lack of visible users on the interface points to – perhaps not a feeling of loneliness but rather a degree of spatial

awareness inseparable from the singularity of the individual body in that particular moment in space and time.

The motive behind “searching” for others on Waze is not to establish direct, personal relationships with users (although this might be the case of some, for different reasons). It has to do with making sense of the relationship between self and space, through the presence of others simultaneously inhabiting that same location. This certainly resonates with longstanding ideas by communications and media theorist Joshua Meyrowitz in which he looks at how media affect our everyday experience, behavior, and sense of identity – although the focus of Meyrowitz’s seminal text *No Sense of Place: The Impact of Electronic Media on Social Behavior* is on the television (1986). However, Meyrowitz claims that our sense of place or location is less defined by physical space than by the electronic landscape of media. In this way, he proposes that electronic forms of media give way to social situations that are no longer shaped by where we are or who is with us. In Waze, location is crucial and those who surrounds us are in great deal responsible for our knowledge of road conditions ahead, and thus the routes we take. Wazers’ behaviors are conditioned by both physical space as well as the presence and input of others on the interface, contesting what it means to be present in a location with others.

Question 3: In what way do Waze’s avatars sustain a spatial theorization of embodiment?

Rather than looking into the participants’ interviews to answer this third research question, I will do so by positioning Waze’s selection of avatars within Braidotti and feminist theorist Nina Lykke’s ideas on cyborgs and monsters (1996), as well as Katherine Hayles’s theories on the posthuman (1999). This is because the discussion of the avatars surfaced as a result of the interview analysis. This is to say, the avatar discussion was not premeditated before the interviews took place, but rather emerged as their product. Analyzed through this Cyberfeminist framework, Waze’s avatars – which range from gender-neutral to effeminate, and from machinic to animalistic – they can then be placed in the context of embodiment on the road space, particularly because the road, along with the automobile and the figure of the driver, have historically entailed male-oriented constructs.

Waze avatars infer a process of “othering”: they create alternate representations that challenge traditional notions of how embodiment and identity unfold in the space of the road. Exemplifying this are gender difference as well as the idea of driving as a masculinized form of mobility. According to historian Virginia Scharff (1992: 75), “Manufacturers’ notions of masculinity and femininity shaped the very nuts and bolts of the machines they created, affecting the uses to which cars can be put and the consequences of such use”. Similarly, Merriman gives an account of the genderization of the M1 motorway, discussing how the motorway driver was frequently constructed as a distinctively masculine figure, with the presence of all-male police patrol teams reinforcing the construction of the motorway as a space of male expertise (Merriman 2004: 167). Challenging this masculinized coding of the road, the caricature-like Waze avatars are designed in a variety of depictions that help diversify the identity of drivers. Every Wazer begins with an avatar of the Waze icon, a bubble/blob, sucking on a pacifier. Upon driving over 100 miles, the Wazer is then able to unlock different avatars, or as Waze calls them, “moods”. Waze provides characters that make reference to gender in an attempt to create the representation of a heterogeneous community, allowing different types of Wazers to find an avatar they best feel represented by. This element of choice shows how much gender distinctions have progressed since the 1900s, when according to Scharff, women who wanted to drive would only do so using electric cars due to their low radius of mobility, lack of speed and gentle demeanor:

Certainly, some women who wanted the increased mobility that came with driving shared the idea that gas cars, being powerful, complicated, fast, and capable of long-distance runs, belonged to men, while electric cars, being simple, comfortable, and quiet, though somewhat short on power and restricted in range, belonged to women (Scharff 1992: 77).

Waze’s avatars suggest the emergence of gender equality in the space of the road, even when these embodiments are appropriated digitally. At first, most of the Waze avatars seem gender-neutral, particularly because the Waze character/icon is not human. But for every ambiguously gendered character, Waze has purposefully created a “female” (or effeminate) equivalent, giving way for the interface to yield an equal participative role, presence, and voice to females or users who identify as queer. Furthermore, Waze does not assign default

gendered avatars to any users regardless of their profile settings – by not taking their set gender into account, Waze does not recognize a fixed idea of gender. Instead, each Wazer is able to choose whichever avatar they wish to appropriate, whether it looks effeminate or not. As Braidotti and Lykke write (1996: 2), “Through science and technology, the biological capacities of women and men had been equalized in order to definitively prevent the (re)-emergence of gender inequality”. Instead of focusing on anatomical differences, Waze’s depiction of gender is effectuated through long hair and fashion accessories such as bows, speaking more about stylistic trends – albeit trends typically associated with femininity – than about biological differences between males and females, allowing a more fluid idea of embodiment on screen (fig. 6). Similarly, inadvertently echoing Haraway and Braidotti, Waze also includes avatars that depict the non-human (fig. 7). A T-rex, cat, sunflower, dog, zombie, 8-bit Waze bubble, and robot are all listed as part of the selection of avatars – all attesting to affinities humans are able to make with surreal and bizarre modes of being (fig. 8; also see Haraway 2003).

By placing a dog, a cat, and a flower as embodiments for Wazers to appropriate, I argue the app sparks potential conversations on expanding traditional ideas of subjectivities and their relationships with space, while simultaneously showing an element of irony – of having a flower merrily drive a vehicle that releases so many pollutants, and whose roads involve so much territorial destruction. The T-rex and the zombie, on the other hand, offer a direct response to the figure of the monster, which has been closely related to feminist science and technology studies by Haraway (Lykke and Braidotti 1996; Haraway 1991). The boundary between human and non-human has long been accompanied by a strong hostility towards monsters and hybrids – such is the case of Frankenstein, for instance – because these are figures which adhere neither to the human or the non-human sphere (Lykke and Braidotti 1996: 15). Monsters have always defined the limits of community within the imaginations of those who live in the West:

The Centaurs and Amazons of ancient Greece established the limits of the centred polls of the Greek male human by their disruption of marriage and boundary pollutions of the warrior with animality and woman. Unseparated twins and hermaphrodites were the confused human material in early modern France who grounded discourse on the natural and supernatural, medical and legal, por-

tents and diseases – all crucial to establishing modern identity. The evolutionary and behavioural sciences of monkeys and apes have marked the multiple boundaries of late twentieth-century industrial identities. Cyborg monsters in feminist science fiction define quite different political possibilities and limits from those proposed by the mundane fiction of *Man and Woman* (Haraway 1991: 180).

Framing Waze's avatar analysis within Cyberfeminism helps to critically contextualize them within a larger discussion outside mere whimsy and folly, including them in a conversation looking to contest dominant uses of technologies and what it means to be a twenty-first century subject/ user/ consumer – as Haraway does in the previous account of centaurs, monkeys, and cyborgs. On Waze, these fantastic figurations depicted by the avatars, invite theorizations rooted in alternate imaginaries of spaces and embodiments, while also acting as agents that reveal the politics within the interface. As such, Waze's avatars encourage a deeper study into the complex realities behind space, technology, and bodies, something which has so often been absent and rendered irrelevant in contemporary practices of geospatial technologies (Kwan 2011).

CONCLUSION

Looking to fill a gap in scholarship regarding the spatial and social implications of GPS app technologies, this research conducted a critical exploration of architectural and urban space by looking at the spatial and digital practices fostered by Waze and how these destabilize traditional ideas of community and embodiment. Prior research into the relationship between digital spaces, communities, and avatars heavily focused on virtual worlds such as *Second Life* and *MUDs*. But although these platforms are used by people with shared interests they perform independently from geographic commonality.

One of the key findings of this research is that despite an inherent quality of self-serving interest in the use of the app (in this case, reduction of driving time), Waze produces subjects with a transactional sense of sociability, who perform through and by the presence of other bodies on the interface, thus behaving similarly to members of a community. However, I do not seek to impose the term “community” onto the networks of interpersonal relationships manifesting through Waze, but rather suggest that the term is destabilized by the subjects that take part in the digital and spatial practices of

driving and reporting. My aim is to encourage a conversation rooted in digital forms of spatial relations rather than clinging to nostalgic ideals of community. The reason why I argue for a rethinking of what “community” might encompass in the twenty-first century is because, in contrast to other sat-navs, Waze is unique in that it produces digital and material manifestations by showing collective and group benefits (such as reduction of petrol consumption, minimizing pollutants caused by excess travel time, and warnings of road hazards and obstructions), a sense of looking after others, inherent geographic commonality, and a general sense of collective values.

From ninjas to cats, Waze gives the option for its users to select an avatar, whether its human, gendered, or monstrous. Through these seemingly frivolous representations – which may be intended for humor or to grab people’s attention – I sustain that alternate modes of theorizing about space and embodiment become possible, aligning this study with Hayles’s theories of the posthuman subject, along with Braidotti and Lykke’s ideas on figurations. Appropriating these digital figurations open a space for critiques and discussions that can aid in understanding non-normative, latent relationships we have with the technologies and spaces of our everyday lives.

Although this research approaches the study of GPS apps through a framework I describe as digital spatial theory, I, of course, am not the only one looking into communities and the digital sphere. The digital forms of transactional sociability enabled by Waze can be placed within a larger context in media and culture theory currently looking into communities. Media theorist Charlie Gere acknowledges that technologies also foster separation and distance, destabilizing the traditional conception of community (2012). Media theorist Henry Jenkins is known to have developed two concepts that are useful here, “participatory culture” and “collective intelligence” (2006). The former challenges the role of media producers and consumers transforming them into interactive participants without a clearly established set of rules. In this sense, participative culture might offer certain insight into how Wazers perform, but I would argue that they perform and interact with the interface itself, rather than with the developers (or producers, to use Jenkins’s term). The latter, collective intelligence, is driven by the claim that people are incapable of knowing everything, but that there is immense power in pooling each person’s individual skillset, knowledge and resources. Waze’s interface facilitates this collection of knowledge from

its participants to successfully navigate each one to their destinations as quickly and safely as possible.

In this process of pooling a collective knowledge of real and accurate road conditions, however, there is a group of developers and investors making a profit from it, echoing McLuhan's claim: "Ours is the first age in which many thousands of the best-trained individual minds have made it a full-time business to get inside the collective public mind. To get inside in order to manipulate, exploit, control is the object now" (McLuhan 1951). Of course, McLuhan was talking about how media was changing the nature of advertising, not about Waze. But I would be remiss to not bring it up now to acknowledge that Waze is indeed and above all a business – although it is free of cost, it is not a philanthropic endeavor. While the app certainly empowers users by making them active participants, interactive agents that both document and dictate mobility in roads, they are simultaneously taken advantage of. As a matter of fact, Google bought Waze in 2013 for an estimated \$1.3 billion; Waze's user engagement is likely to be one of the top reasons for the acquisition's price tag. Users do not pay for downloading Waze for one very clear reason: they are Waze's economy.

This research's interviewees partook in individual reporting to create a localized mapping of traffic conditions in real-time – while helping other Wazers navigate through the most efficient roads – a sense of collective symbiosis among the Waze network can be identified (fig. 9). However, they did not interact with each other nor did they feel a desire to socialize with other drivers. This type of digital interaction – where users reported because it was either novel, entertaining, or beneficial to others – showed how the Waze participants constructed a sense of collective collaboration through the app.

As a result, this research proposes that the type of subjects produced by Waze point to users with a sense of wanting to help themselves while also helping others, but with a limited level of investment. They are subjects who at times feel a sense of responsibility for making an impact on the wider Waze community, something which compels them to report traffic conditions onto the app. Through this key act of reporting I conclude that on Waze, driving and digital guiding become embodied, situated, and material practices of everyday life, as modes of performance that give way to alternate, digitally mediated urban practices, and social relations.

APPENDIX



FIG. 1

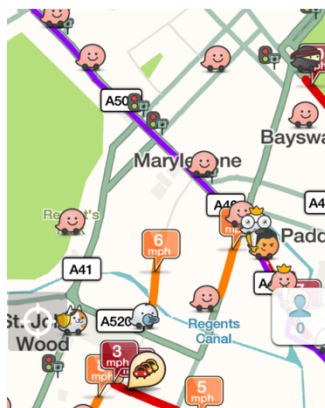


FIG. 2

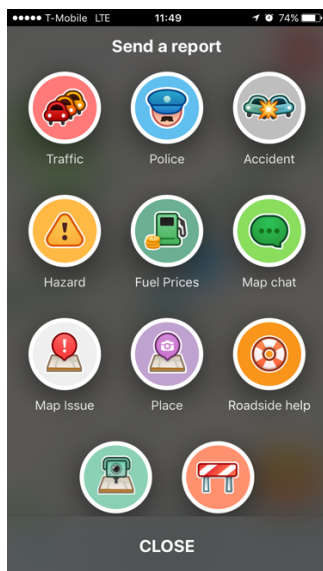


FIG. 3

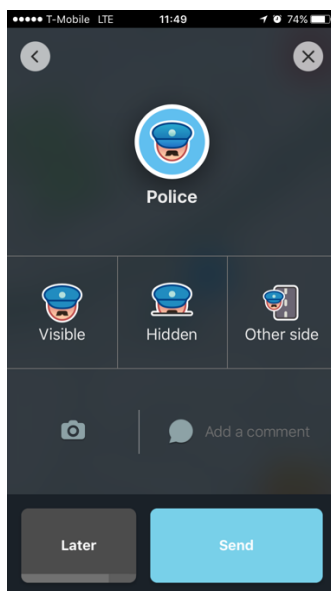


FIG. 4

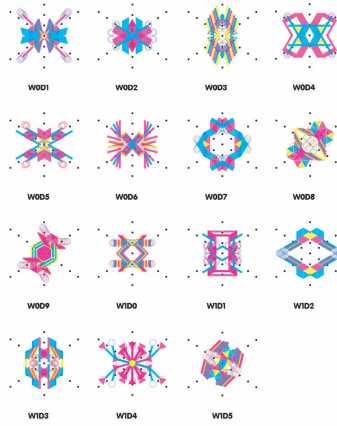


FIG. 5

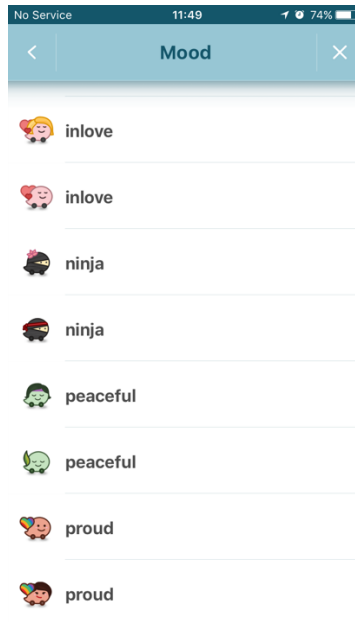


FIG. 6

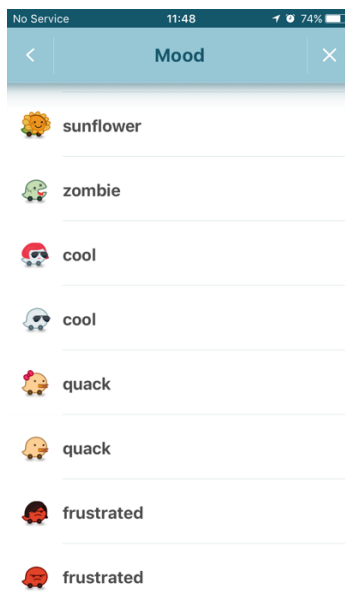


FIG. 7

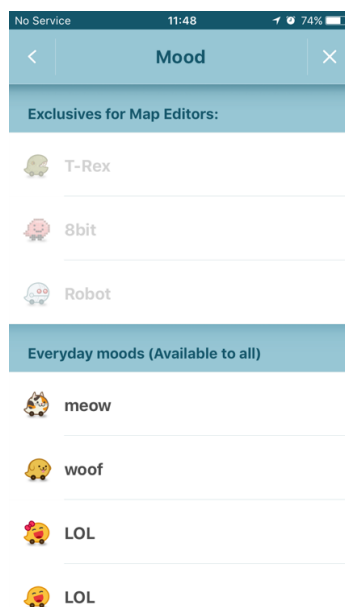


FIG. 8

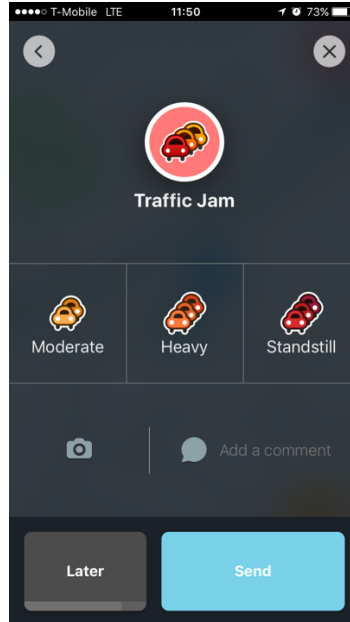


FIG. 9

NOTES

¹ *Apple App Store growing by over 1,000 apps per day*, in “International Business Times” (2015), available at: www.ibtimes.co.uk/apple-app-store-growing-by-over-1000-apps-per-day-1504801 (accessed 7 December 2016).

² *Count of Application Submissions*, in “PocketGamer.biz” (2016), available at: www.pocketgamer.biz/metrics/app-store/submissions (accessed 7 December 2016)

³ “www.waze.com” (accessed 7 December 2016).

⁴ Ethics in relation to the digital is an ongoing discussion. Philosopher Agustin Moratalla uses the term “infoethics” in his work to analyze the ethical problems that have arisen throughout the past decade, while considering infoethics as an agent that enables alternate forms of citizenship (2009). Also see M. Gold (2012), *Debates in the Digital Humanities*; K. Kernaghan (2014), *Digital Dilemmas: Values, ethics and information technology*, in “Canadian Public Administration”, 57; A. Davisson and P. Booth (2016), *Controversies in Digital Ethics*.

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