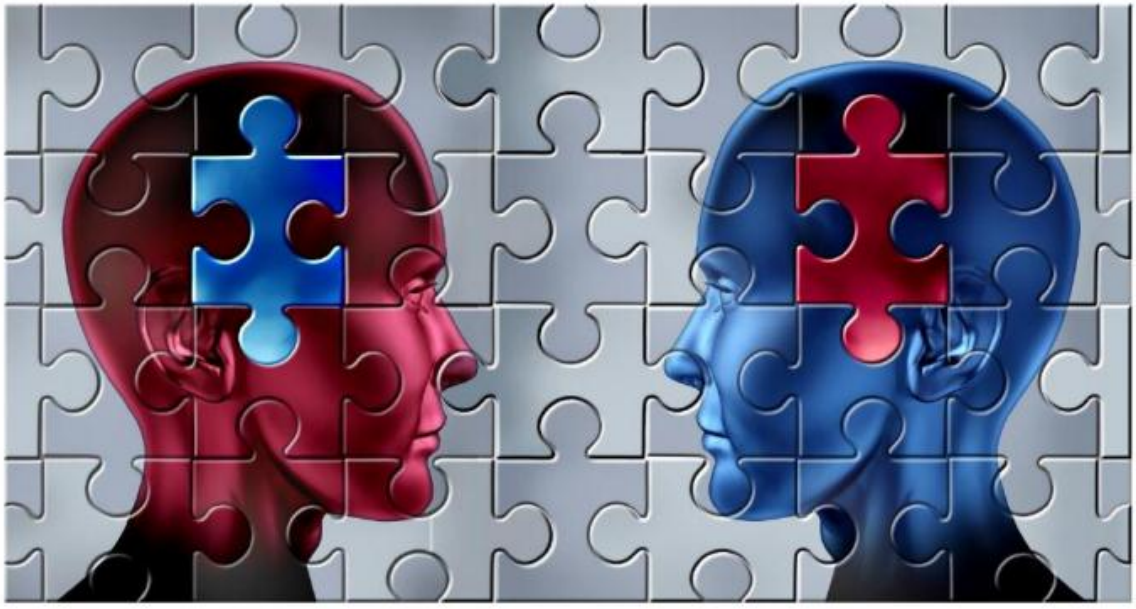

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'Outsmarting Traffic, Together': Driving as Social Navigation

Sam Hind (University of Warwick, UK)

Alex Gekker (Utrecht University, Netherlands)

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Sam Hind (University of Warwick, UK) and Alex Gekker (Utrecht University, Netherlands)

Abstract: *The automotive world is evolving. Ten years ago Nigel Thrift (2004: 41) made the claim that the experience of driving was slipping into our 'technological unconscious'. Only recently the New York Times suggested that with the rise of automated driving, standalone navigation tools as we know them would cease to exist, instead being 'fully absorbed into the machine' (Fisher, 2013). But in order to bridge the gap between past and future driving worlds, another technological evolution is emerging. This short, critical piece charts the rise of what has been called 'social navigation' in the industry; the development of digital mapping platforms designed to foster automotive sociality. It makes two provisional points. Firstly, that 'ludic' conceptualisations can shed light on the ongoing reconfiguration of drivers, vehicles, roads and technological aids such as touch-screen satellite navigation platforms. And secondly, that as a result of this, there is a coming-into-being of a new kind of driving politics; a 'casual politicking' centred on an engagement with digital interfaces. We explicate both by turning our attention towards Waze; a social navigation application that encourages users to interact with various driving dynamics.*

Keywords: Social navigation; ludic interaction; GPS; casual politicking; digital mapping technologies; automobiles

Introduction

City streets are now a mesh of software and materiality. New technologies are changing the way drivers interact with their own vehicles, the wider driving environment, and other road-users. Satellite navigation devices - perhaps the ultimate driving aids - are adept at capturing, storing, tracking, anticipating and visualising the vast array of possible driving interactions, much more so than the traditional A-to-Z road atlas. But just like the humble latter, the former is called upon to adjudicate in everyday navigational matters. In this article we will look at how 'social navigation' - a term coined by the developers of a satellite navigation platform called Waze - is arguably changing the everyday nature of driving. This work aims to build on an expansive literature that has interrogated the evolving socio-technical nature of

automobility (Dodge and Kitchin, 2007; Featherstone, 2004; Sheller, 2007), and continues with an interdisciplinary sensibility befitting a world in which engineers, technologists, advertisers, executives and lay people combine with pistons, onboard electronics, and social media campaigns to not only eradicate the clean distinctions between the production and consumption of such driving experiences, but also to prove further the emerging 'assemblage' of everyday mobility (Dant, 2004). Here, then, we intend to make two provisional, exploratory, points.

Firstly, we contend that 'ludic' approaches to analysing digital technological networks, such as the driver-car assemblage, can help to close any lacunae in thinking on the possible reasons behind the insatiable take-up of new satellite navigation technologies by publics around the world. By ludic approaches, we mean any analyses that take 'play' to be an inherent component in social relations. As the videogame world loses its already precarious exclusivity over the concept, new driving technologies premised on touch-screen interaction, are drawing on playful mechanics in order to stimulate habitual engagement. These range from point-based scoring systems and game-like avatars to wholly manipulable, editable and mutable platforms in common with the 'sandbox' worlds of Grand Theft Auto (Chesher, 2010).

We then employ the notion of ‘casual politicking’ (Gekker, 2012) to orientate new understandings of the ways in which drivers engage with digital interfaces. This term, we believe, appropriately encapsulates the kinds of moves being made in the automotive industry even ten years ago, when Nigel Thrift (2004: 41) made the claim that the experience of driving was slipping into our 'technological unconscious'. The naturalisation of the mechanics of everyday driving has created the conditions for a subconscious, 'casual' form of politics; one formed through an interaction with digital devices. We exemplify this with reference to the social navigation application mentioned above; Waze, taking particular interest in three dynamics: the reporting of road hazards, the collaborative management of vehicle flow, and the addressing of latent map errors.

Ludic Interaction: From Gamification to the Casual

The ‘ludic turn’ in new media studies has argued that play is a fundamental component of all human culture, even turning up in the very domains often 'considered the opposite of play' (Raessens, 2010: 6) like education, politics, business and modern warfare. It is suggested that

a ludic outlook pervades all manner of everyday practices and all kinds of interactions with digital devices, rather than being restricted to a specific game space, or 'magic circle' (Huizinga, 1955; Salen and Zimmerman, 2004). As Glas (2013: 4) suggests, this 'formalist' separation between the play world and the 'real' world belies the pervasive nature of ludic activity throughout the whole of human life. Interaction with any kind of interface - be it a desktop computer in the workplace, a cash machine in a shopping centre, a mobile phone on public transport, or a games console in the home - permits ludic behaviour. In many cases, as will be discussed, it is positively encouraged. Advancing an understanding of how digital interfaces are being played with, and especially, as being played *casually and daily* (rather than in any 'magic' game space) has therefore become a primary concern. Interfaces are not simplistic windows into an isolated realm (cf. Manovich, 2001) but instead are enablers of general, social practices (Galloway, 2012). As such there is a politics to their design, functionality and deployment.

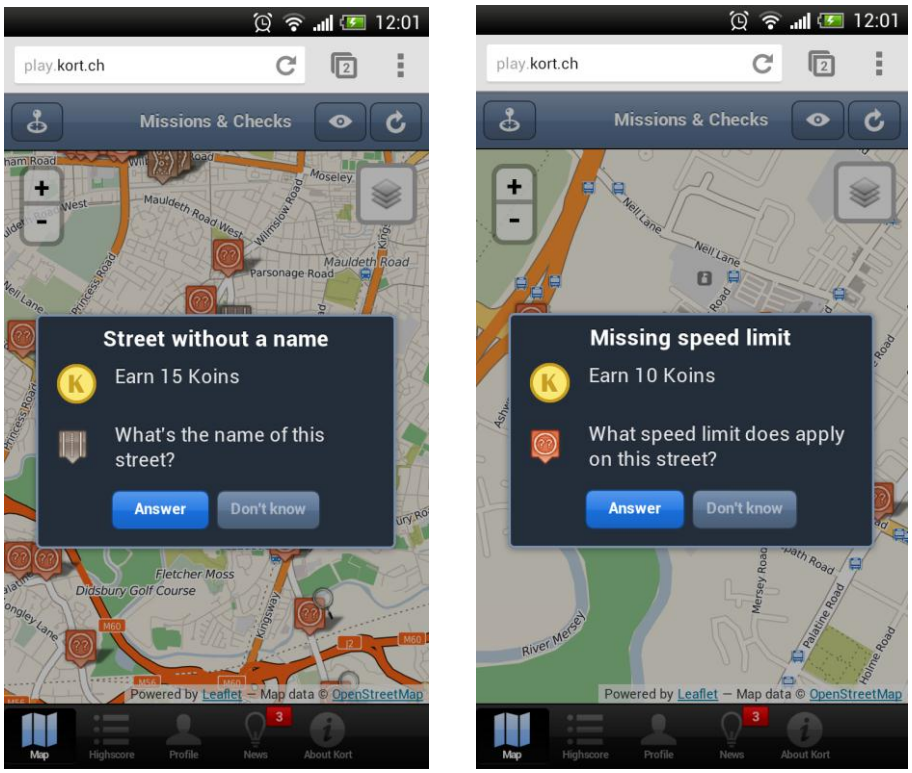

Figure 1: Kort as smartphone-optimised OSM editing game. Source: Author screenshots.

Within the ludic turn more specific changes have been noted. One is ‘gamification’ (Bogost, 2011; Deterding *et al*., 2011; Mosca, 2012). The adoption of game-like mechanics, rules,

modes and structures for everyday tasks is now widespread, although only recently taken up in the field of digital mapping, for example. Those who contribute to collaborative mapping platforms such as OpenStreetMap (OSM) can use an application called Kort to carry out missions collecting ‘koins’ and badges to rise up a leaderboard, which in turn, improves the validity of the OSM database. Humanitarian volunteers looking to contribute in the aftermath of natural disasters can also now do so digitally via a platform called MicroMappers. Each case is a step-change from how the process of digital map editing has historically been performed.

But in the context of automotive practice, the possibility of 'cognitive distraction' (AAA, 2013) from mobile application interaction whilst driving has provided a level of concern not present in other debates (Roose, 2013; Richtel and Vlasic, 2013), even if recent legal ruling has deemed their use whilst driving acceptable under certain conditions[1]. Design prototypes such as Matthaeus Krenn's 'New Car UI' (2014)[2] suggest that new modes of interaction are necessary to combat this perceived distraction whilst driving. 'Social navigation', then, is perhaps a tentative evolution stretching the limits of current statutory frameworks, cultural norms and acceptable levels of bodily attention.

A second, complimentary shift that the ludic turn has cast attention towards is the growing casualness of game-playing itself (Juul, 2009). Distinguishing casual games from ‘hardcore’ games as Abt (1987) and Ritterfeld *et al*. (2009) have, has allowed for a deeper understanding of how ‘gaming capital’ is built-up (Consalvo, 2007) and play conventions are acquired (Pargman and Jakobsson, 2008). Typically casual games are defined by low barriers to entry (easy to pick-up), incremental progress (lots of short levels), forgiveness towards player mistakes and the use of ‘social mechanics’, such as the option to invite or compare results with friends on social networking sites (Juul, 2009). Additionally, they often include 'micro-payments' to unlock bonus content as opposed to traditional ‘pay-once for everything' models.

The growth of mobile platforms - smartphones and tablets - has contributed greatly to their uptake. Playing the best-selling Angry Birds game for 2 hours a month, as creator Peter Vesterbacka suggests many do, would only amount to around 4 minutes of play a day (Braw, 2013). A significantly lower figure than just about any traditional console game, and one that suggests many simply play such games to 'kill time' in between other tasks, as Bouca (2012: 7) finds. As such, these casual gamers portray a relatively different set of attributes and interests to other long-form players. The titles they play stand at the far end of a long gaming

continuum, with the vast, immersive (and 'hardcore') worlds of Halo and Bioshock at the other end.

Just as digital maps have allowed us to capture, track and store the records of quotidian interactions and expressions, so games have become embedded within, and arguably transformed everyday life, constituting a gamification of common rituals (Kort as map editing *game*) and a casualness of the game-playing itself (Kort as a *smartphone optimised* editing platform). The fact that many games make use of maps as their playing boards, whether imagined (Total War, Civilization) or through the utilisation of location-based data (Ingress, Zombies, Run!) (Lammes 2011), only underscores how digital mapping and gaming share common interface characteristics. The Grand Theft Auto (GTA) series is perhaps the most obvious example of this commonality. As Chesher (2013: 316) suggests, both satellite navigation interfaces and contemporary video games are primed to do three similar things; reify route-making, subjectively orientate action, and normalise the overlay of 'real-time' data. Gameplay in open world titles such as GTA is non-linear, allowing players to roam freely and complete tasks at will.

The adoption of touch-screen interfaces embodies a drastic turn in the nature of digital game-playing, map editing and technological driving assistance. The intuitive and ludic nature of capacitive sensing technologies (Verhoeff, 2009) as well as the possibility of tentative, probing and proximal interaction with such mobile devices (Paterson, 2007) have led to their now-almost ubiquitous presence. In allowing for quicker and, arguably, more intuitive control in everyday situations (driving included) such interfaces utilise playful bodily action as a mechanism for increased coherence in habitual practices such as scrolling menus, issuing commands and selecting phenomena. A plethora of new tactile strokes, sweeps and taps are steadily and qualitatively replacing the metronymic and calculative clicks of computer mice, keys and other vehicular dashboard controls.

The touch-screen interface is a 'thin, but essential and visible membrane' (Verhoeff, 2012) at once inviting seemingly inconsequential moves whilst actualising wider cognitive, cultural and 'micro-political' potentialities. Both gamification and casualisation are dependent upon this precept. The new driving landscapes that arise from such interaction are similarly transparent and innocuous, but nonetheless shape and direct the actions of everyday drivers. To illustrate, next we will examine the social navigation app Waze.

Hazards, Flows and Issues: Outsmarting Traffic Through Collaboration

Unlike standard GPS software, Waze populates the driving interface around a constellation of fellow drivers. As a smartphone application it competes with the standalone device market (TomTom, Garmin etc.) and other free turn-by-turn applications such as Navfree. In 2012, Waze had a global community of 36 million drivers, sharing a total of 90 million traffic reports, and driving a collective 6 billion miles. 65,000 map editors also made 500 million map edits, reflecting 1.7 million on-the-ground changes (Waze, 2013a). OSM by comparison, had just fewer than 100,000 editors in 2012 making 800 million edits (OpenStreetMap, 2013).

But as alluded to in the introduction, it is not necessarily easy to make a clean split between those who 'produce' the map, those who 'edit' the map and those who 'consume' the map. It is easier, rather, to conceive of a kind of data feedback loop, where Waze users contribute - knowingly and unknowingly - through active driving, desktop editing and passive metadata collection. These feed back into future route-calculation. The data gleaned helps to not only build up a vast picture of the journeys made with Waze, but also the state of the road network in general.

The application's mechanics thus have a circulatory function, as user action builds a more comprehensive database. But as the database updates so does the digital map. The status of roads, the designation of speed limits, the set-up of junctions and vehicle restrictions are all changeable based on user data. Due to this active enrolment the digital map itself does not serve as a mere representation of the road ahead: it transforms the very driving world itself. It becomes a ‘mutable mobile’ (Kitchin and Dodge, 2007; Lammes, 2008) - an object capable of changing shape and moving across territory - rather than being an *im*mutable mobile (Latour, 1986) as maps have traditionally been conceived as. Other satellite navigation systems present the driving world as an immutable 'base map' upon which to plant the individual driver. But this world is bare and lifeless; phenomena are rendered foundational but unerringly quiet and impervious to change. The driver simply glides over the surface with no knowledge of what is “below”, let alone with the possibility of altering it. In the Waze world the digital map exists on the same ontological plane as the road environment itself - as a fluid, transportable object.

Road hazards, vehicle flow and map issues, for example – three dimensions of the Waze driving experience – all exist on this same active platform; open and malleable to the driver.

They are dynamics that feed into this data loop between driver, database and map. Thus, this form of satellite-aided navigation is a performative act that does not relegate the map to a secondary level beneath the 'real driving world' of asphalt, traffic lights and junctions. Ludic mechanics are central to how our primary example encourages this performance with the mobile interface and reconfigures the act of driving. This reorganization, we argue, has a distinct political dimension as drivers are gifted the ability to fundamentally change the driving landscape as they travel through it, challenging the way in which we have historically relied on state agencies to provide us with information on road conditions.

Reporting Hazards

One of the main features of Waze is the ability to identify hazards. Spotting potential dangers for other users (or 'Wazers') is not just a handy addition to an otherwise social tool however, but a potentially valuable driving aid. These notifications ameliorate the disruption caused by three types of hazard: obstructions, distractions and anticipatory impediments. Obstructions provide direct dangers (debris, barriers), distractions are indirect and usually visual disturbances with the potential to become driving dangers (live animals, bad weather), whilst anticipatory impediments affect the ability of the driver to make upcoming judgments (stationary vehicles, missing road signs). Although these driving hazards are the product of loose interpretations, with their existence precarious, users are nevertheless instructed to pin the incident down. Once submitted the hazard is placed on the map as a geo-located 'pop-up' message. This codification is vital for collective map use. It renders a (relatively) solid, isolated and verified incident upon which to act. As encouragement, Waze users receive a number of points for their contribution of a hazard, and similar to consumer reward schemes and videogame 'combo' moves, additional bonuses are available for greater contributions such as detailed descriptions, photo evidence and weekend notifications.

Altering Flow

In addition users can also collectively affect vehicle movement, direction and flow by closing existing roads, verifying nascent routes and opening up entirely new ones. Although traditional satellite navigation systems are capable of keeping users up-to-date with road information that adds to an already existing map (TomTom's Live Traffic etc.), Waze is unique in its crowdsourcing of wholesale map recalibrations. As mentioned earlier, users

have to be live drivers to make changes, although passive (meta)data collection does, as mentioned earlier, take place (Couts, 2013). Navigational assistance for other drivers is therefore grounded in the performative act of driving (or 'Wazing' as it is known), and alterations cannot be made either by desktop or without GPS and a data signal[3].

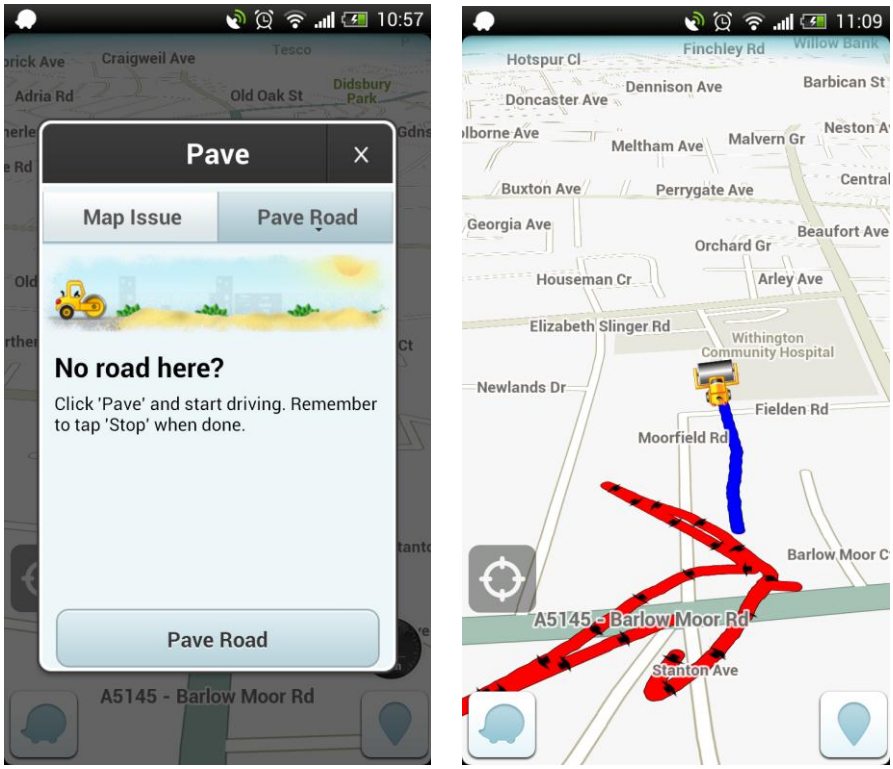

Figure 2: Live road mapping in Waze. Source: Author screenshots.

This interaction between the existing (imperfect) map as noticed through the Waze interface and the unaligned driving world as seen through the vehicle windscreen provides the catalyst for contribution. Road closures can be attributed to an on-road hazard (car crash, fallen tree), a construction job (road re-surfacing, underground repairs) or a local event (marathon, street party, protest march). Users make the selection by tapping the appropriate direction of the closure on the Waze driving map, and 'no entry' symbols notify others of the diversion. Unlike the previous hazard category, flow incidents are shown as linear overlays rather than isolated symbols. This allows active drivers to take heed of automatically re-calculated paths once the map is updated to reflect the changes. Wazers can also 'thank' the initial user reporting the issue in much the same way Facebook users can 'like' a post and Twitter users

can 'favorite' messages. These tactile interactions on the smartphone screen render playful, casual interaction with the platform as default.

Routes that have been imported into the Waze database or created in the Waze Map Editor can also be verified by drivers in a process called 'road munching'. In an unverified state these roads show up as sequential dots as opposed to a single, continuous line, but as drivers trace the route they ‘munch' these dots akin to Pacman characters, successfully turning them into completed, verified and drivable routes for other users (Waze, 2013c). Similarly, Wazers can bring new driving worlds into being directly through the 'road recording' function. By comparison, OSM editors are required to use applications such as OSMTracker or a traditional GPS receiver to record new tracks, and edits still have to be uploaded through JOSM, Potlach or another OSM editor. Drivers using traditional satellite navigation devices do not possess this 'real-time' editorial capability, but Waze users are able to map new roads live and on the move[4].

Wazing, road munching and road recording are actions populating, verifying and building a live navigational environment through collaborative driving performance. On this evidence Waze is more than simply an addition or ‘aid’ to the driving experience: it is a direct agent in the act of driving itself. The ability to open, close and verify roads on a map interface has heretofore existed as a preserve of either state agencies or satellite navigation companies. This shift in agency is therefore a significant one. Whilst many other aspects of society have been transformed by open, collaborative and citizen-led agendas, the driving world is relatively late to the party. Waze represents the most advanced example of this shift to date.

Flagging Issues

As a final dynamic, users can also flag navigational issues. The Waze application allows users to report map errors whilst driving, with reports linked directly to the location of the error via GPS. These performative edits are based on the habitual know-how of drivers. If users believe the Waze map has a problem they are permitted to raise a concern. Common issues ranging from forbidden turns and incorrect junctions to missing bridges, overpasses or exits are pre-listed, but users are also given space in order to detail a more specific, or irregular error. But unlike the ‘external’ hazards discussed previously, the 'internal' map issues function progressively updates the application itself.

Rather than dedicating time and energy to large swathes of track uploads as is routine in many collaborative mapping projects, users can clean up map errors as they drive. Although missing roads can be live-mapped by Wazers desiring to travel the unpaved route, the map issue function allows drivers to flag up potential errors for others to investigate. Rewards range depending on prolificacy, offering users a reason to alert others to errors they might otherwise ignore. As a specific example, Waze offers up candy treats for drivers willing to verify map data; planting bonuses in cul-de-sacs and other side-roads to tempt them, with the points contributing to the same general scoreboard as hazard reports, distance milestones and road munches. Once again, the users' avatars gobble these 'goodies' up in a Pacman-fashion, with varying totals based on the scarcity of particular treats.

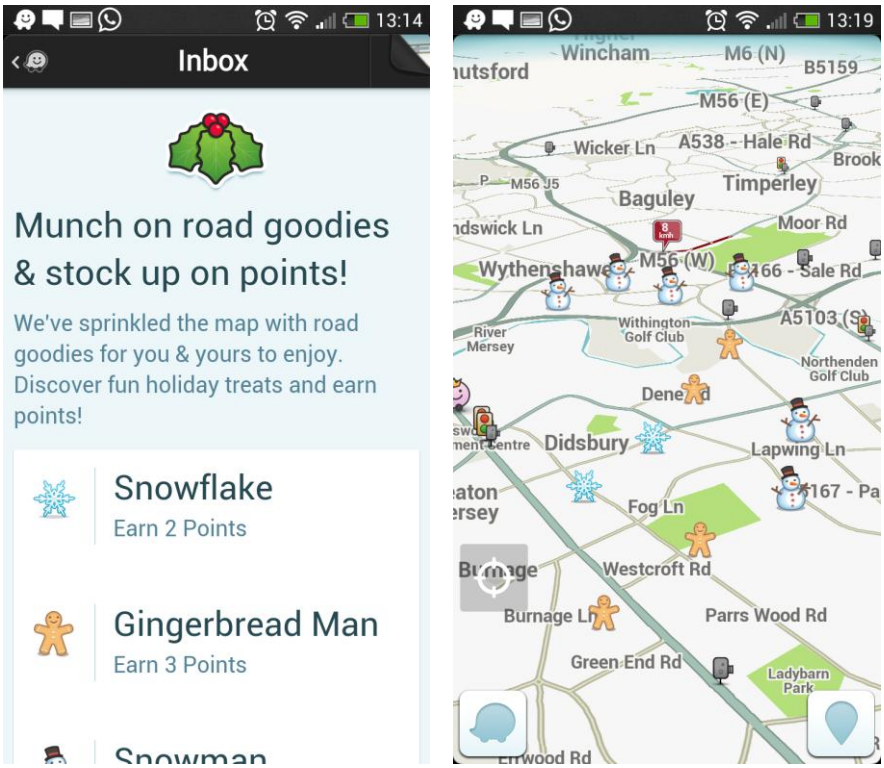

Figure 3: Festive-themed rewards for Waze users. Source: Author screenshots.

Casting a critical lens on this practice, it could be suggested that such ‘gameful design’ (Deterding *et al*., 2011), rather than providing a kind of playful, emancipatory service, in fact simply masks a volunteered, mass data-collection practice for a major digital technology enterprise (now a division of Google Inc.) as 'fun' and somehow socially rewarding. Participating in the mapping of road networks users are led to believe they are contributing to

a common, driving public. Whilst messages received through the application imploring users to 'always drive with Waze open' might be characterised as helpful tips to aid use in the spirit of this common, driving public, they also, arguably, constitute efforts to ensure Wazers contribute full and extensive streams of driver data to the Waze/Google servers for exclusive advertising purposes (Couts, 2013).

Alerting other drivers to accidents or hidden police vehicles, for example, are part of culturally ingrained driving practices. Such efforts to help collaboratively alert others to road accidents, render new routes, or flag map errors on a smartphone interface are simply seen as mere extensions of these historical actions. But courtesy of the game mechanics deployed in applications such as Waze, coupled with their casual use on a smartphone device, error reporting arguably becomes an embedded and naturalised interaction - a 'technological unconscious' (Thrift, 2004) - rather than a forced action associated with traditional forms of labour. This hybrid practice being what Julian Kücklich (2005) has famously termed 'playbour'. As a new field of politicised action, this ludic interactivity permits a wholly different - and perhaps pernicious - force.

Each of the above exemplifies a new kind of automobile tactic; a new way of attending to the disturbances, disruptions and hazards in the driving world. Historically drivers have been unable to have any effect on the collection, verification and visualization of road data, aside from passive participation in the network itself. But as applications such as Waze have embedded themselves into everyday spatial routines, collectively involving users in the creation of such publics, there have been radical alterations to the contemporary driving experience.

Mapping Futures

In this paper we have suggested a rise of so-called social navigation. But as future driving worlds increasingly look fully-automated - with driverless vehicles, mechanical parking systems and all manner of sensor-mediated technologies - will this become somewhat oxymoronic? Or, as perhaps we argue, will the present technological preference for social platforms become further integrated into future driving experiences? Our two-fold analysis has enabled us to tease out the nascent dynamics. In the first instance, we have argued that ludic interaction is increasingly - thanks to the simultaneous rise of both touch-screen devices and social platforms - the default mode for automotive navigation. The multi-touch gestures

routinely demanded by satellite navigation systems are replacing the metronomic clicks of plastic console buttons, or the circular motion of radio volume and airflow dials. As a way of engaging individuals, social navigation applications such as Waze incorporate many of the ludic features more commonly witnessed in the gaming world.

In the second, we have then contended that this ludic interactivity is breeding a new kind of political action; one premised on the everyday practice of driving-with-devices. Although we do not necessarily suggest that other political tropes (vehicle as inscribed status object, carbon emitter etc.) do not provide appropriate frameworks for automotive study, we do argue that the rise of social navigation is a novel development with the potential to provide rich empirically-focused work. As has been briefly detailed, Waze engages its user through a satellite navigation interface that prompts them to report hazards, alter flows and flag issues. Each dynamic affects the act of driving, as well as the constellation of other drivers. It brings new driving-worlds and 'driver-car' assemblages into being (Dant, 2004). Thus it underlines the act of driving as materially political; as the practice of affecting the very geographical possibilities of automobile use through interactive play with the smartphone device. To understand these nascent processes we require a different hybrid view on the nature of driving, navigation and the social; one that takes into account the casual, habitual and the playful.

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Endnotes

[1] The Californian Court of Appeal overturned an earlier conviction of a man originally found guilty for using his Apple iPhone map application whilst driving. See: http://articles.latimes.com/2013/apr/25/local/la-me-abcarian-distracted-driving-20130426 on an initial appeal, and the final Court of Appeal decision here: http://www.courts.ca.gov/opinions/documents/F066927.PDF.

[2] See: http://matthaeuskrenn.com/new-car-ui/.

[3] Desktop edits can be made through the Waze Map Editor, but this is also dependent upon the locations driven in the past 3-4 months (Waze, 2013b).

[4] User are still prompted to add metadata via a desktop editor.

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