CHAPTER 5: ‘OUTSMARTING TRAFFIC, TOGETHER’: DRIVING AS SOCIAL NAVIGATION

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More than ever before city streets are a mesh of software and materiality. As part of this and under the auspices of the ‘smart city’ and its underlying surveillances propositions, urbanization has been imbricated with technological control. One aspect of such change that we wish to focus on in this chapter is tracing the way drivers interact with their own vehicles, the wider driving environment, and other road-users. Specifically, we highlight the ludic as an important factor in how this interaction takes place. Satellite navigation devices - perhaps the ultimate driving aids – are adept at capturing, storing, tracking, anticipating and visualizing the vast array of possible driving interactions, much more so than the traditional paper A-to-Z-style road atlas. This also opens up new playful affordances.

But just like the humble road atlas, such satellite navigation devices are 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 and translations between software and materialities through play. This work aims to build on an expansive literature that has interrogated the evolving socio-technical nature of automobility, 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.

Despite the propositions of some, especially those implicated in the automobile industry, such assemblages are always political as seen in the deployment of fraudulent emission testing software by German auto-manufacturer Volkswagen. There, environmental, technological and economical concerns became interwoven into a scandal that affected the driving realities of more than 630,000 owners whose vehicles were recalled and subsequently

Firstly and close to the argument made in the first chapter of this book, we contend that 'ludic' approaches to analyzing digital technological networks can help to close lacunae in thinking on the possible reasons behind the insatiable take-up of new forms of cartographic displays by drivers around the world. By ludic approaches, we mean any analyses that take ‘play’ to be an inherent component in social relations. We then employ the notion of ‘casual politicking’ to orient 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\(^6\) made the claim that the experience of driving was slipping into our ‘technological unconscious’. The naturalization 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 then exemplify this in the next section with reference to the social navigation application mentioned above; Waze.

Here we take particular interest in three dynamics: the reporting of road hazards, the collaborative management of vehicle flow, and the addressing of latent map errors. Through this highlight the way ludic practices contribute to the emergence of a single ontological plane, that combines the map and the road. In the last section we anchor these exemplary cases in what Alexander Galloway calls ‘ludic capitalism’,\(^7\) where social fabric of labor and compensation are threatened by utilizing play as a coercive device.\(^8\)

**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 arising in the very domains often ‘considered the opposite of play’\(^9\) 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’.\(^10\) As Glas\(^11\) suggests, after Consalvo,\(^12\) 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
center, a mobile phone on public transport, or a games console in the home - permits ludic behavior, contingent on the attitudes of the user and functionalities afforded by the machine’s designer.\textsuperscript{13} In many cases, as will be discussed, it is positively encouraged through the implementation of visual cues and feedback-rewarded behavioral loops that broadly fall into the realm of ‘gamification’.\textsuperscript{14} Advancing an understanding of how digital interfaces are being played with, and especially, as being played \textit{casually and daily} (rather than in any ‘magic’ game space) has therefore become a primary scholarly concern. Interfaces are not simplistic windows into an isolated realm\textsuperscript{15} but instead are enablers of general, social practices\textsuperscript{16}. As such there is a politics to their design, functionality and deployment.

The notion of ‘gamification’ is a controversial term within the ludic turn, viewed by some as manipulation that takes into account the \textit{appearance} of ludic activities without allowing for their \textit{spirit}.\textsuperscript{17} 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 \textit{OpenStreetMap} (OSM) can use an application called Kort (figure 5.1) 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’\textsuperscript{18} from mobile application interaction whilst driving has provided a level of concern not present in other debates,\textsuperscript{19} even if legal rulings have deemed their use whilst driving acceptable under certain conditions\textsuperscript{20}. Design prototypes such as Matthaeus Krenn’s ‘New Car UI’\textsuperscript{21}

\begin{itemize}
\item 16 Galloway, \textit{The Interface Effect}.
\item 18 AAA, ‘Measuring Cognitive Distraction in the Automobile,’ AAA Foundation, 1 June, 2013.
\item 20 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.
\end{itemize}
suggest that new modes of interaction are necessary to combat this perceived distraction whilst driving. Such attempts join the discourse within academia and industry in enlisting cognition and neuroscience into a competing framework of behavioral governance.\textsuperscript{22} ‘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.\textsuperscript{24} Distinguishing casual games from ‘hardcore’ games as Abt\textsuperscript{25} and Ritterfeld et al.\textsuperscript{26} have, has allowed for a deeper understanding of how ‘gam-

\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure5_1.png}
\caption{Kort. Screenshot\textsuperscript{23} of Kort as smartphone-optimised OSM editing game.}
\end{figure}

\textsuperscript{23} All game screenshots are made by the author[s].
\textsuperscript{26} Ute Ritterfeld, Michael J. Cody, and Peter Vorderer (eds) \textit{Serious Games: Mechanisms and Effects}, New York: Routledge, 2009.
ing capital’ is built-up and play conventions are acquired. 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. Additionally, they often include ‘micro-payments’ to unlock bonus content as opposed to traditional ‘pay-once for everything’ model. 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 did at the height of its success, would only amount to around 4 minutes of play a day. A significantly lower figure than just almost any traditional console game, and one that suggests many simply play such games to ‘kill time’ in between other tasks, as Bouça 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 (see Gekker or Perkins in this book), whether imagined (Total War, Civilization), through the utilization of location-based data (Ingress, Zombies, Run!) (see Lammes and Wilmott in this volume), or in the form of table top exercises (such as the fictional town of ‘Sandford’, discussed by Hind in this book), 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 suggests, both satellite navigation interfaces and contemporary video games are primed to do three similar things; reify route-making, subjectively orientate action, and normalize 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

29 Jesper Juul, A Casual Revolution.
nature of capacitive sensing technologies as well as the possibility of tentative, probing and proximal interaction with such mobile devices have led to their now-almost ubiquitous presence. In allowing for quicker and, arguably, more intuitive control in everyday situations (driving included) such interfaces utilize 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 (car?) dashboard controls.

The touch-screen interface is a ‘thin, but essential and visible membrane’ at once inviting seemingly inconsequential moves whilst actualizing wider cognitive, cultural and ‘micro-political’ potentialities. Both gamification and casualization 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. By comparison, had just fewer than 100,000 editors in 2012 making 800 million edits. By 2016, Waze – since then acquired by Google but kept as an independent entity – grew in size. The company claims to have 50 million monthly users, 360,000 map editors and maintains data-partnerships with 55 municipalities around the globe which provide real-time and expected traffic information.

But 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. It is this capability that is also driving the automated vehicle revolution, with rivals such as Tesla hoping to create a so-called ‘fleet learning network’\textsuperscript{40} comprised of a user-generated cartographic database.

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’\textsuperscript{41} – an object capable of changing shape and moving across territory – rather than being an immutable 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

\textsuperscript{40} Chris Perkins, ‘Tesla Is Mapping out Every Lane on Earth to Guide Self-Driving Cars,’ Mashable, 14 October, 2015.

play 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.⁴²

**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 (figure 5.2). As mentioned earlier, users have to be live drivers to make changes, although passive (meta)data collection does, as mentioned earlier, take place.⁴³ 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 signal⁴⁴.

![Figure 5.2 Waze. Screenshot of live road mapping in Waze.](image)

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⁴⁴ 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).
This interaction between the existing (imperfect) map as noticed through the Waze interface and the unaligned driving world as seen through the vehicle windshield, 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.

Wazers can bring new driving worlds into being directly through the ‘road recording’ function. 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. This in turn highlights the ludic attitude that the designer attempt to embed into the user interface, alongside the use of celebrity cameos in guidance voice packs, or the introduction of seasonal iconography for the driving screen. By comparison, OSM editors are required to do ‘serious’ work and use applications such as OSMTracker or a traditional GPS receiver to record new tracks, and edits still have to be uploaded through JOSM, Potlatch 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.

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 has come 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

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46 Users are still prompted to add metadata via a desktop editor.
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 (figure 5.3) 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.
Casting a critical lens on this practice, it could be suggested that such ‘gameful design’, 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 (Waze is now a division of Alphabet Inc., Google’s umbrella corporation) 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 characterized 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.

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 naturalized interaction – a ‘technological unconscious’ – rather than a forced action associated with traditional forms of labour. This hybrid practice being what Julian Kücklich has famously termed ‘playbour’. As a new field of politicized 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 chapter 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

48 Andrew Couts, ‘Terms & Conditions.’
49 Nigel Thrift, ‘Driving in the City.’
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.\(^{51}\) 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.

It is through (active) playful user interaction, ‘passive’ fleet-level data collection, and municipal agreements that Waze generates capitalist value. Alexander Galloway\(^{52}\) discusses a similar process in his critique of modern digital media assemblages. He notes the existence of:

> [a] new socio-economic landscape, one in which flexibility, play, creativity, and immaterial labor – call it ludic capitalism - have taken over from the old concepts of discipline, hierarchy, bureaucracy, and muscle. In particular, two historical trends stand out as essential in this new play economy. The first is a return to romanticism, from which today’s concept of play receives an eternal endowment…. Game theory, ecology, systems theory, information theory, behaviourism – these many scientific disciplines point to the second element, that of cybernetics.

To him, the entwinement of the romantic elevation of play with the seemingly objective language of cybernetics can explain the rise of various ludic practices. The automotive world provides a clear example of this, as consumers are bombarded with seemingly non-conflicting messages of vehicle’s technical prowess, coupled with lifestyle choice. The gradual diminishing of agency experienced by the human driver, and its transfer onto the broader socio-technical arrangements implicated in driving will, without a doubt, create new demands for ludic engagement. If we are no longer to drive our cars fully, those who wish to sell us such cars will need to come up with ways to sell us the experience of driving, without actually enrolling us into it.

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.

\(^{51}\) Tim Dant, ‘The Driver-Car.’
\(^{52}\) Alexander Galloway, The Interface Effect, 27.
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References


