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Delivering Edinburgh: Uncovering the Digital Geography of Platform Labour in the City

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Abstract

This article makes visible the unseen and obscured cycling routes of on-demand, app-based food couriers in Edinburgh, Scotland, drawing from qualitative research (twenty-five interviews with riders), original digital data gathered through smartphone apps, and a custom-made mapping workflow developed in collaboration with student researchers and used by Deliveroo riders to track and map their delivery work. Qualitative research among riders suggests the presence of “two Edinburghs,” or a city divided not only by its physical geography but by the navigation of risks. Riders actively discuss the strategies they use to negotiate the city and stay safe while working, and the geolocalised digital data they produce reveal the ways in which such negotiations become collective navigations throughout the city. By exploring, visualising, and mapping these navigations, this article uses unique data to illustrate how on-demand food couriers create, modify, and reproduce social space in the city. We suggest that forms of urban platform hacking, when coupled with qualitative work, constitute a powerful instrument to challenge top-down urban narratives that foreground the integrated, optimised flow of resources and labour as a hegemonic vector in the city.

Keywords: platform urbanism; urban hacking; platform labour

Introduction

This paper contributes to an understanding of how digital platforms, and the attendant digital labour these platforms require, shape local urban and economic space. Situating our analysis within the fields of platform urbanism and urban hacking, we take the case of Deliveroo in Edinburgh, Scotland, to interrogate the question of how the on-demand food-delivery platform adapts itself to city space, in turn forging its own platform geography. While platforms such as Deliveroo position themselves as global, seamless, top-down logistics agents, such platforms are also embedded in and dependent upon the material city, particularly city streets, as much of this work is conducted via bicycle, motor scooter, and motorcycle. Furthermore, Deliveroo is enabled by a fleet of riders—that is, a local workforce—who must learn how to adapt the platform’s logistics challenge to urban environments. In the case of Edinburgh, this requires that workers learn how to navigate a city of hills, cobblestones, and unpredictable and often inclement weather conditions within the time and efficiency constraints determined by the Deliveroo app. Through a mixed-methods approach, this article explores what Rodgers and Moore (2018) have called the “emergent, irreducible, co-generative dynamics between platforms and the urban,” and we place a particular interest in the role that human labour plays here.

Original digital data gathered through smartphone apps and a custom-made mapping workflow, as well as through interviews with Deliveroo riders, allow us to illustrate how the on-demand platform forges new lines of demand and consumption while also reproducing existing geographies and geographical divides. Through our app data, we visualise and map the patterns established by Deliveroo riders as they are directed to move throughout the city by the platform's coordinating logistics software, which often moves riders along existing and crowded flows of traffic. While these maps show how and where the platform adapts or embeds itself within the city, the app data also makes visible obscured working patterns of the riders. Yet, beyond the command-and-control logics of the platform, our interviews illustrate how workers make sense of the city, continually make choices about when and where to work, study the local urban conditions to stay safe, and develop their knowledge of shortcuts and "best routes." The riders tell us about how they negotiate these working conditions while also pushing back against the algorithmic control of Deliveroo's proprietary algorithm.

In placing novel app data next to interview data, this article asks the following questions: What methods might be employed to understand the relationship between the platform and the city? Does the platform restructure delivery routes through algorithmic command and control, or do workers forge this terrain? What methods can afford us insight into the urban geography of the platform? In answering these questions, we structure the article as follows. First, drawing from the field of platform urbanism, we map out the guiding logics of the platform economy, with an emphasis on the roles that labour, the human body, data, and the built environment play. Then, we look to the literature of "urban hacking" for inspiration in intervening in these logics, and we show how this literature inspired our mixed-methods approach, introducing the unique data-gathering strategies and workflow we designed for this project. We then illustrate the findings, using original data and interviews to illustrate the platform's presence from both the data sensor's and the worker's perspective. We discuss these findings in light of the concept of "urban hacking" to suggest that this method constitutes a powerful instrument to challenge top-down urban narratives that foreground the integrated, optimised flow of resources and labour as a hegemonic vector in the city.

Literature Review

Platform Urbanism: Platform Logics in Indeterminate Spaces

Countering narratives of platforms as essentially cloud-based or purely data-driven companies, platform urbanism draws together an interdisciplinary, critical study of the social, legal, cultural, and political-economic effects that platforms have on the built and material environment (Barns 2018, 2019; Rodgers and Moore 2018; Fields and

Macrorie 2019; van der Graaf and Ballon 2019). Platforms have been understood as giving rise to new forms of value and governance (Sadowski 2019, 2020), new markets (Richardson 2019; Richardson and Bissell 2019), and new data infrastructures (Plantin et al. 2018; Poell et al. 2019). In the case of Deliveroo, the company aims not only to create new markets for food delivery but also to capture and control the pipeline for food preparation, delivery, and consumption in cities (Panja 2018). As Graham (2019) has argued, platforms seem to have gained a seemingly inordinate level of command and control over urban economic geographies and urban interactions, particularly when they are embraced as part of many cities' agendas for economic development (Gregory and Sadowski 2019).

Still, platforms are not all powerful, uncontestable, or fully embedded in urban space. As Graham (2019, 4) suggests, platforms bring new economic and spatial geographies into being through a "conjuncture of tethered and untethered relationships with space." This is accomplished, on the one hand, by mobilising labour as a commodity to be impersonally managed both algorithmically and at a distance and, on the other, by being dependent on local and preexisting resources and infrastructures, such privately owned homes or transportation or roads. In the case of Deliveroo, Richardson (2019) has argued the platform is best understood as a "flexible spatial arrangement" where restaurants, riders, and customers are coordinated, each with different degrees of choice to participate. Here, a meal delivery is an accomplishment made possible through tentative social ties. As Leszczynski (2019) has suggested, these ties are susceptible to glitches – or moments of failure and difference – that temper the command-and-control logic of platforms by drawing attention to the real and material effects of contingency and conjecture. While platforms may currently operate with little democratic or legal accountability to urban spaces, they are nonetheless open to intervention.

One path to intervention is through the paradoxical location of labour, in which workers are both caught in the logics of platform control through continual surveillance, dataveillance, and algorithmic management yet seemingly left to their own devices to accomplish the work. As Waters and Woodcock (2017) have documented in their worker inquiry into the day-to-day life of Deliveroo riders, app ranking and metrics inform an individual's ability to secure further shifts and to remain contracted by the company. These metrics, which assess attendance, rates of delivery refusal, and length of delivery time, inform an overall weekly performance score. As Ticona, Mateescu, and Rosenblat (2018) have shown, metrics structure a surveillant relationship between platform and worker while also forcing workers into dependence on top ratings. As Veen et al. (2019, 6) have suggested, Deliveroo and UberEats have both been able to establish "control regimes," which are dependent on three features: "the technological infrastructure;

deliberately created information asymmetries constraining worker choice; and the obfuscated nature of the performance management systems.” Still, as numerous studies have shown, these hypersurveilled yet atomised conditions have also given rise to new forms of community (Grey et al. 2016; Grey and Suri 2019), new and structured antagonisms between workers and platforms (Wood and Lehdonvirta 2019), new forms of solidarity (Tassarini and Maccarrone 2020), and formal organising (Cant 2019).

Urban Hacking

Given that platforms have, to date, successfully operated as proprietary intermediaries where the operations of data science and data analysis remain obscured from workers and from customers and citizens (Langley and Leshon 2017), the third field that we engage here pertains to the practices of urban hacking, particularly in connection with critical making. The top-down protocols embedded into Smart Cities and other hegemonic data-driven platforms (Bullivant 2017) pursue narrow goals of resource coordination and optimisation (Offenhuber 2017), thus focusing solely on the performative and predictive aspects of urbanity (Offenhuber and Ratti 2014). In contrast to this, urban hacking champions the creative use of (digital) media to “open up urban institutions and infrastructures to systemic change in the public interest” (Ampatzidou et al. 2015, 9). This entails a bottom-up appropriation of the city through interventions that engage critically with relevant, contested urban issues (de Waal, de Lange, and Bouw 2017). As Townsend (2014) discusses, the “hackers,” or stakeholders in processes of urban hacking, are active citizens wary of dominant smart-city narratives, working collaboratively to organise alternative networks of digital civic collaboration. Critically, the resulting collaborative interventions do not aim to articulate representations of collective interests or determine specific “solutions” to the urban issues at stake. On the contrary, they endeavour to capture and foreground the moments of difference and friction in the urban field, allowing “for an emergent and critical redefinition of the positions and rules at play” (Tironi 2018, 121).

As de Waal, de Lange, and Bouw (2017) note, rather than adopting the expansive, universalist approach to the city found in data-driven “smart” paradigms (Greenfield 2017), the practices of urban hacking proceed by “tinkering,” trying out potential avenues for action through incremental changes. In doing so, urban hacking implements forms of learning by doing that are grounded in the production of shared knowledge. Ultimately, its goal is to foreground collective curiosity and attraction above strict functionality (Pe 2017). By dismantling the subjectivities embedded in the dominant data-driven representational frameworks, a fluid, multiplicitous form of collectivity appears that incorporates the unpredictable, the serendipitous, and the creative aspects of “messy” urban situations (Haque 2017).

As a means to articulate its critique of dominant data-driven urban processes, the work presented in this paper mobilises urban hacking through various forms of critical making (Ratto, Boler, and Deibert 2014; Wylie et al. 2014; Offenhuber 2017). As Ratto (2011) writes, this term refers to a fundamentally pragmatic pursuit of critical thinking through actions of goal-based physical making. In this sense, DiSalvo (2014) suggests that critical making not only provides the conditions for collaborative practices of participation in design to emerge but also articulates avenues for collective inquiries pertaining to the politics of such participation.

Materials and Methods

This article positions researchers and Deliveroo riders as urban hackers capable of tinkering with the proprietary platform and its data flows. Our methods here are twofold. First, student researchers took up the case of Deliveroo in Edinburgh as a site of data interrogation. This project entailed a creative endeavor to explore the cycling routes of riders through GPS data. Second, in-depth, semi-structured interviews were conducted among the core group of riders. These interviews explored the nature and experience of working for Deliveroo in Edinburgh and followed up on issues of worker agency, decision making, and work-related risks. Deliveroo is reliant on “self-employed” individuals to carry out delivery labor, yet workers are fundamentally constrained by the platform’s algorithmic demands, which determine when, how, and where riders can work. We aim to bring together urban hacking with qualitative research in order to understand how this tension between worker agency and algorithmic management plays out in the city.

The use of digital data to develop a spatialised understanding of the urban geographies of Edinburgh as inflected by the Deliveroo platform stems from the custom-made process of capture and subsequent visualisation of the routes of 33 Deliveroo bike riders during a Sunday night in October 2016. This visualisation and its originating data collection methodology, carried out by students William Tooze, Angus Henderson, and Noah Judge, developed in the context of an architectural design studio led by Miguel Paredes and Sophia Banou at the Edinburgh School of Architecture and Landscape Architecture. This project was initiated in Edinburgh’s Grassmarket, a central square and tourist destination in the city’s historic center, which at the time was being used by Deliveroo as a meeting point for riders to await delivery requests. In an attempt to develop a more in-depth understanding of the mechanics of the platform, the students signed up individually as Deliveroo riders, subsequently spending a few hours every evening in the Grassmarket over one week. During this period, the students engaged in an informal discussion with local, more experienced riders. At this particular point,

Deliveroo's employment practices were facing considerable public scrutiny. Toward the second half of 2016, the previously atomised workforce of individual riders had not only recognised their collective agency but also became organised, demanding proper contracts and a living wage.

In the context of this discussion, the students invited riders to install a freely available GPS-tracking app on their smartphones and share their accumulated trajectory logs at the end of one night. This exercise relied on riders self-selecting and voluntarily joining the project under the understanding that their trajectory data logs would be fully anonymised. No specific ad-hoc app was developed for this purpose, nor were riders required to install a particular app from the range of freely available tracking software for smartphones – most of these tracking apps are used by cycling and jogging enthusiasts, who use them to keep records of their progress and share them with fellow cyclists and runners. The only requirement to participate was to use an app that could record and share trajectory logs in the GPX file format (also known as GPS Exchange Format). This is a simple, open-source file system where a sequence of time-stamped “track-points” with location data (latitude, longitude and height) are stored in tags and can be interchanged between GPS devices and software.

After a full shift of work, riders forwarded their data logs to the students via email or text messaging. The log files did not reveal any information from the riders other than their recorded locations at a series of points in time. The students collected all the files received in a digital folder and numbered them sequentially, with no reference to their individual origins, ensuring riders' anonymity.

This exercise duplicated the tracking action of the proprietary Deliveroo app used to log and organise the work of riders, albeit bypassing the centralised scrutiny exercised by the company as part of its operations. This constituted an important motivation for riders to volunteer for the proposed project, insofar as they were fully conscious that their data logs were already being collected and processed by Deliveroo – albeit not anonymously. The group of participating riders acknowledged that, in taking part in the alternative data-collection exercise, they were building up a repository of digital data that was unmediated by the narrative and the metrics of the Deliveroo labour platform. However, this data-collection methodology can be regarded as a “parallel” platform in its own right, insofar as it deployed a series of data-driven queries aiming to co-create urban knowledge. Critically, the methodological design of this “parallel” platform incorporated its own forms of mediation into the co-creation process: First, the decision not to dictate the specific tracking software to be used allowed the participating riders to gain additional control over their own sharing of data, while the use of the open, broadly used GPX file standard facilitated data collections that were not inflected by the

specificities of proprietary sharing formats. However, this also introduced self-selection among the group of riders, whereby those already familiar with GPX-based tracking apps tended to be more interested in participating. Second, participation in the “parallel” platform was highly dependent on the ability of the students to informally build rapport with the riders. Strategies to build links with the riders included students signing up for work with Deliveroo and completing several shifts before discussing the proposed exercise with the group of riders. Third, whereas the goal of the Deliveroo platform is to flatten local city conditions to ensure consistent expectations in delivery times, the “parallel” platform emerging from our data collection methodology – alongside its associated mechanisms of representation – was explicitly designed to render these conditions visible.

The next step in this process entailed importing the collected, anonymous position logs into 3D CAD software and assembling them as trajectory curves. Each individual curve in the resulting CAD map represented one of the 33 individual rider trajectories recorded. Further to this, and in conversation with the studio leaders, students developed three distinct visual pieces from this set of collected data: First, a static map representing the traces formed by the trajectories of the riders toward the end of the data-collecting exercise. Second, a time-stretched animation in which these trajectories were gradually traced from the beginning to the end of the work shift. Third, a 3D-printed topographic representation of the accumulated traces.

The data collected through the research project predated the interview process, which followed up with a core group of riders in the city. Those interviewed were contacted through a private Whatsapp group; snowballing sampling was used to interview twenty-five riders. Riders were offered a £20 voucher to the local bike co-op for their participation in the interview process. Interviews took place at the University of Edinburgh and lasted approximately one hour. Interviews were semi-structured, and interview questions were organised thematically around issues of risk and decision making. All interviews were recorded, professionally transcribed, and coded (by hand and through the use of NVivo software) for emergent themes. Pseudonyms were used to ensure riders’ anonymity.

Findings

1.) Visualising Platform Labour

The anonymised trajectories of the riders were used to create three separate data visualisations. Each visualisation aims to make visible and manifest the obscured working conditions of riders. The first piece (Figures 1 and 2) was produced by juxtaposing the anonymised trajectories from all 33 riders that participated in the collection of geo-localised digital data tracks. Therefore, it represents the accumulated traces of displacement corresponding to that group over the course of the evening on Sunday, 9 October 2016. This piece produced a partially reconstructed map of the urban fabric of Edinburgh by visualising the accumulated effect of the negotiations and navigations of the Deliveroo couriers. On the one hand, the areas surrounding the centralised meeting point of the Grassmarket, streets with an abundance of restaurants and eateries, and comparatively affluent neighbourhoods appeared prominently traced. On the other hand, there were notable absences and blind spots—for instance, less affluent neighbourhoods or areas that were geographically out of bounds for a bicycle ride.

Map Key:

1. Grassmarket meeting point, 2. South Bridge-Nicholson Street axis, 3. Lothian Road-Tollcross axis, 4. Fountainbridge-Dundee Street axis, 5. North Meadow Walk and connection to Marchmont Road via Meadows, 6. Princes Street crossing with The Mound-Hanover St axis, 7. Site of Edinburgh Castle

Figure 1: Close-up view of Deliveroo rider trajectories, focused on Edinburgh Old Town and its surroundings. Includes labelling of major rider circulation routes.

Map Key:

1. Grassmarket meeting point, 2. Fountainbridge / Polwarth, 3. Brunstfield, 4. Marchmont, 5. Newington, 6. New Town, 7. West End, 8. East End / Leith Walk

Figure 2: General view of Deliveroo rider trajectories in central Edinburgh. Includes labelling of the neighbourhoods that are most clearly delineated by the repeated overlap of trajectories.

The second piece was a short video where the juxtaposed trajectories from all 33 riders were animated as a time-lapse according to their originally recorded time stamps. The animation progresses from the beginning of the evening shift towards the final data point logged by each rider as they finish work for the day. Figure 3 presents four still frames from this video, starting with the first displacements after the beginning of the shift (top left), with the urban fabric of Edinburgh eventually becoming more recognisable as the shift draws to a close (bottom right). This piece represented the work shift of riders as a dynamic event of accumulative navigation across the city, materialising the range and dynamics of the group and indirectly rendering the distributive particulars of the Deliveroo algorithm visible. Importantly, it made some aspects of the collective navigation logic – such as circulation around topographic

features, traffic during rush hours, or personal safety – more apparent than the static map.

Figure 3: Four still frames from the time-lapse video animation of the accumulated trajectories of the 33 participating riders.

The third piece (figure 4) incorporated the GPS height data recorded by the participating riders into the previous maps to produce a three-dimensional representation of the collated trajectories. The goal of this piece was to facilitate the understanding of the specific digital geography emerging from the navigations of Deliveroo riders by embodying it into a physical, tactile object. To that extent, the 3D modelling functionalities of the CAD software were used to interpolate all 33 three-dimensional trajectory curves into a single, three-dimensional surface. This surface was, in turn, 3D-printed as a solid physical object: a topographical interpretation of Edinburgh inflected by the circulations and negotiations of the participating riders.

The implications of the methods and processes involved in fabricating this object are twofold. First, the piece does not constitute an accurate representation of the actual

physical topography of Edinburgh: As the trajectories of riders were the only source material used to build it, the resulting three-dimensional landscape is exclusively informed by their traces. This method of digital modelling exaggerates the topographic importance of the routes traversed by riders in relation to the areas of the city where no trajectories were recorded. Whereas the riders' routes translate as "ridges" or "crests" in the 3D-printed object, less-traversed areas are interpolated as "plains" or "valleys" situated between more prominent features. Put differently, this piece presents a rebalanced geography of Edinburgh that reflects the specific experiences of Deliveroo riders.

Second, this rebalanced geography affords a series of insights into the collective physical knowledge held by the group of riders as they navigated the hilly topography of Edinburgh. Steep, highly trafficked streets in the Old Town featured very prominently in the physical model, insofar as they were repeatedly traversed at a slow speed by multiple riders several times during the shift (thus recording a higher number of height data points, which in turn produced more defined "ridges" and "crests"). Similarly, central cycling circulation arteries already situated alongside actual topographic ridges (such as Lauriston Place or the South Bridge–Nicholson Street axis) were further amplified in this physical representation. In contrast to the "flattening" of urban and human conditions embedded into the design and the representational framework of the Deliveroo platform, this piece (and the "parallel" data-driven platform that gave rise to it) helps render visible a collective urban geography constructed around physical effort but also around multiple individual negotiations regarding traffic, time, and labour.

Figure 4: Photographs of the 3d-printed topographic model of Edinburgh, incorporating emphasis on the z-axis (height) in the trajectories of the 33 participating riders.

2. Negotiating The App

While our data visualisations illustrate an aggregate of riders' routes and allow us to create snapshots of riders' locations and trajectories through Edinburgh, our interview data show how riders themselves intervene in the control-and-command logic of the

platform. Overall, we see that riders (1) make choices about where to work in the city, (2) continually attempt to avoid risk and danger, and, (3) to correct the algorithm's faulty directions, rely on personal and subjective knowledge of the city. While riders are instructed to move about the city by the platform, these interventions illustrate how riders negotiate with the app and, in some cases, push back or resist the algorithmic directives.

For Morag, a part-time rider and current university student, her Deliveroo work is a relatively "local" experience, in that she currently prefers to only work on the southern side of the city, where she also lives. As she said:

I normally work in Edinburgh South, so that's kind of like Meadows, Tollcross, Stanton Bridge, Bruntsfield, Newington. Everything like this side of the tram tracks. I live in Bruntsfield, so, it means, for example, I can sign on when I'm meant to be starting my shift, and because I'm in the zone, I can just wait at home until an order comes through, so that's quite nice. Then, I also just know this area a bit more, and I think it's just easier cycling.

While many riders need to ride into the platform's central city catchment area, or "zone," in order to be detected by the app, Morag is able to log on at home, where she can be "available for work" while also not actively cycling. Morag uses her home to define a boundary of where she will work, which she limits to neighborhoods she knows. As Morag also explained, "I've done a few shifts in Edinburgh North, and it's really hilly, there's loads of cobbles, I don't really know my way around. I just find it, I don't like it as much." Here, knowing one's way around the city and "liking" the job are intertwined, as knowing an area is fundamentally related to having some control over one's safety.

For Morag, cycling on the south side is "easier" in part because the southern portion of the city is flatter (as opposed to the inclines seen in Figure 4) but also because of a tram line and train tracks that divide the city between its northern and southern halves. As Morag went on to say: "The tram track is the boundary! Maybe it's because they don't want people to be crossing it as much, I don't know." As it has been reported that nearly two hundred cyclists have been injured or killed by the tram between 2009 and 2016 (Herald Scotland Online 2018), the tracks have become notorious among Deliveroo riders as a site to avoid.

For Sandra, a current part-time rider in her twenties, the issue of having local and personal knowledge of the city is important to her sense of safety. As she said,

There's been a few times where I get this direction to go somewhere, and I'm like, I have no clue where that is, so I follow it and, kind of, going out of town,

you're going into places that you... I don't know, like, neighbourhoods that don't feel very safe, and, yes, you don't know where you're going. You do often get accosted. Teenagers will shout at you, like, "Hey, give us the food," so, if you're in a place that you don't know, and you're cycling slowly around to try and find your way, then it can feel a bit sketchy sometimes. There's been a few times where I've, yes, not felt very safe.

Interviewer: Where was that in Edinburgh?

Kind of like, some sort of housing estates, like Dalry, and places like that, that are fairly close to the centre still, so they're within the zone, but I don't know very well, and feel quite out of things.

Interviewer: Would you say you generally feel safe, though, working for Deliveroo?

In general, yes. I do worry about my bike being stolen, and sometimes I do worry about the traffic and stuff. I know I said it wasn't a primary concern, but, I think, sometimes, because I am thinking about where I'm going so much, I feel like maybe I'm not as focused as I would normally be on the road, and the other traffic.

For Sandra, the issue of knowing where she is in the city can become a dangerous distraction, but it is also essential for being able to complete delivery work and for compensating for the Deliveroo app-based map. As Jonathan, a full-time rider suggested,

I think you need to know it [the city] quite well. The map on the app that you get the deliveries, it's not the best. I think having some knowledge of the area is quite good because when you see an address you roughly know where it is.

The issue of learning the city while working was addressed by several riders in interviews. As Iain suggested, learning the city is a process one undertakes through trial and error:

I found it quite hard learning all the one-way systems, especially around Tollcross, because, I guess I'm used to just, I don't know, cycling to a certain place from my home, for example, so I kind of know how to do that, or just walking, and, obviously, you can just walk anywhere. Then, getting from one awkward place to another awkward place, across one-way systems, can be kind of tricky, and quite annoying. I think I'm learning the one-way systems and how to

navigate them a bit more now, but, yes, I think you do often end up doing kind of illegal moves.

For Iain, breaking the law was not an intentional maneuver but rather part and parcel of learning to do the work required. As Jonathan went on to suggest, Edinburgh can be a particularly difficult place to ride a bicycle, comparing the city to London, which he finds safe:

I find Edinburgh at some points dangerous, and more challenging than London. I think it's because London had so much CCTV that drivers stopped doing crazy stuff. They wouldn't try and run you over in front of a camera, right? Here you have 20 miles per hour, busy family areas, like Marchmont, and a guy bangs [into you] at 50 miles per hour, that goes over the handlebars. I know it's difficult, this is a medieval city from the 11th century, so it's really difficult to throw in cyclists and cars and everything here. I think they [car drivers] have been more aggressive here.

Yet, despite safety concerns, riders also discuss the pleasure they take in learning the routes of the city, finding that their negotiations can even become a satisfying form of flow. As Sandra went on to discuss, the work not only helps her learn the city and hone her sense of direction but also to see the city differently:

I guess you'll go to a restaurant, and you'll wait there, and they'll give you the food. You put it in your bag, and you always roll up your bag in the same way. Find out where you're going, jump on the bike, and then you're cycling along, and I kind of do this thing where I'm visualising the routes in my head as I go. Sometimes, if I don't know exactly where I'm going, I'll look at the route that they're suggesting, but, other times, if I know the road, I'll just jump on my bike and I'll be visualising the map in my head as I'm cycling along, figuring out the fastest route, which means that your mind is sort of taken up with that.. I've discovered little shortcuts between places that I never really connected in my mind before, and doing things like that is quite satisfying.

Discussion

Our findings suggest that while Deliveroo riders are highly visible in the city, their visibility only affords a glimpse into the relationship between the platform to the city. Methodologically, qualitative interviews give us insight into how riders make sense of platform labour, making decisions about where and how to work in the city, but a form of critical making is required to “hack” the platform if we are to see a fuller image of how

the platform embeds itself within the city. By taking a creative and participatory approach to the question of methods, this project allowed all participants (riders, students, and studio leaders) to co-generate a set of visualisations. These visualisations brought to life the hidden and otherwise inaccessible trails of rides, creating a set of maps that allows us some insight into the question of what a platform “does” in a city.

As we see in the street-level data, Deliveroo privileges streets with an abundance of restaurants, which is perhaps not surprising. Yet we can also see where the platform maps onto existing consumption patterns of the city, tracing a terrain already established by flows of capital. In doing so, this delivery work crowds already busy city thoroughfares. Deliveroo’s mobilisation of riders increases bike traffic on key roads and puts pressure on already busy streets. Key arteries in the city, such as the Grassmarket, the Bridges, Middle Meadow Walk, and Princes Street, become the primary workplace for riders. Given that these roads are vital city passages that are heavy with car and pedestrian traffic, riders add to the congestion and must manage the hazards such congestion creates. Furthermore, while some streets become key routes for riders, there is much of the city that remains unmapped by Deliveroo, raising important questions about who is served by this platform and who is not. As discussions around platforms increasingly overlap with debates about the future of civic infrastructure, such disparities produced by consumer-based services will need more attention. Furthermore, the centralisation of Deliveroo in Edinburgh raises questions about the accessibility of jobs created by the platform. While many of the riders we interviewed discuss working close to home, we can also ask questions about how it is becoming harder to work via this platform, given the aggregation of work and workers in such a tight geographic area. More research is required here to explicitly examine new forms of inequality that may be emerging via the geography of platforms in the city.

As seen in the interview data, riders actively tailor their work to areas in the city that are familiar to them. While the algorithm may attempt to push riders out of their comfort zones and into unknown neighborhoods, riders try to temper these demands by sticking close to home or choosing to work only in particular neighborhoods. They do this in order to “feel” safe, reduce work-related risks, and remain vigilant against road accidents. Jonathan, for example, has needed to learn how to ride in Edinburgh and manage the aggressive street traffic. Furthermore, riders rely on their own knowledge of the city to compensate for Deliveroo’s app map, which might not be accurate or complete. In this way, workers’ knowledge escapes the control of the algorithm, but it also helps train the proprietary system to learn more efficient and effective routes.

Overall, between our data visualisations and interviews, we begin to see that Deliveroo replicates old narratives of Edinburgh as a city divided between “north” and “south”

sides as well as divisively marked by its geography. Given the location of a rather dangerous tram track that riders try to avoid, below marked in red on Fig. 5, we can see how cyclists privilege the south side of Edinburgh, while the northern New Town, with its steep hills and cobblestones, is ceded to those who can deliver by motor scooter, motorcycle, or car.

Figure 5: Deliveroo rider trajectories in central Edinburgh against the background of a satellite image of the city. The red line marks off a significant divide between “north” and “south” neighbourhoods in terms of rider presence, and is coincident with the tram line running along Princes Street.

Conclusion

When Deliveroo launched in Edinburgh in 2015, the company was concerned that the city’s topology and weather conditions would be a deterrent to onboarding enough riders to make their algorithmic system viable. Those fears have not been realised: the company now claims to employ over six hundred riders in Edinburgh alone (BBC News 2018). Furthermore, as we have suggested, a key mission for on-demand platforms such as Deliveroo is to “flatten” or equalise urban space in its efforts to solve the

problem of coordinated logistics. Our work suggests that one way Deliveroo has thrived in Edinburgh is by centralising riders on the southern side of the city, which is more easily navigated by cyclists and student workers who are familiar with the city terrain.

While we can see that some riders do attempt to maintain control over their work locations, overall, the platform's working conditions are obscured from all Deliveroo riders. Despite producing rich and powerful data points for the platform, riders nonetheless do not have access to the majority of this data, nor are they legally entitled to such access (Li, Gregory, and Gallagher 2020). Our work not only raises questions about how riders can gain insight into the organisation of their labour but also about which tools and methods may currently exist that allow workers to turn the control logics, metrics, and surveillance back onto the platform itself. We are suggesting here that in the case of Deliveroo, anonymised GPS data may allow riders to "look under the hood" of the platform as well as begin to imagine and create new interventions and forms of digital and data inquiry. Such forms of data inquiry might allow riders to make better and more informed decisions about when and how to work, help to keep riders safe, or encourage new forms of collective action.

Furthermore, as scholars are currently theorising the indeterminate relationships between platforms and the urban environment, our work invites further inquiry into methods and modes of research that might illustrate those conjectures, contingencies, and glitches that temper the ability of platforms to fully dominate social, urban, economic space. While such theory invokes a politics of resistance, data inquiry and the empirics of urban hacking can help make tangible the messy and irreducible social life of platforms. In terms of labour, such empirics can and do inspire deeper worker inquiries and organising. Moreover, at a moment when platforms are increasingly vying for economic and political power in urban settings, such empirics can also inspire a renewal of civic interest in the local and the lived environment. Platforms are not beyond our scrutiny, but as we suggest here, new methods are needed – as well as available to us – if we are to put weight to our investigations.

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