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Governing work through personal data: The case of Uber drivers in Geneva

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Abstract

This article presents an ethnographic account of the advocacy initiative, conducted by NGO PersonalData.IO and the company Hestia.ai, that seeks to empower gig workers by helping them regain access to their personal data through data access rights, using the European Union General Data Protection Regulation. It is based on a case study of Uber drivers in Geneva that has a worldwide relevance for the gig economy. Previously self-employed, drivers are now classified as employees and their working time and earnings must be calculated according to local labour laws. We contribute to debates on algorithmic management in ride-hailing platforms by focusing on participatory methods of accountability through personal data, from an infrastructural perspective. First, we focus on the nexus between personal data protection and algorithmic management to understand the domination of ride-hailing platforms over the workers' means of production, *i.e.*, their personal data. We provide empirical transparency on the data structures of Uber for the sake of algorithmic accountability. These structures are utilised for their surge pricing algorithms and ultimately govern the workforce. Second, within a collective process of governance, we built participatory tools and methods for empowering gig workers and data scientists. These are means for calculating earnings and working that made explicit a new social meaning of work, *i.e.*, "lost time between rides".

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1. Introduction: Governing workforce and work accountability through personal data

This paper discusses the collection of personal data by the Uber app and the social meaning of working time constructed upon it by drivers from an infrastructural perspective. It is a pioneer empirical study of algorithmic accountability for understanding the data structures of Uber's surge pricing algorithms, which allow computational decisions. These decisions are guiding drivers' working practices through a perceived algorithmic management that puts at stake how to calculate working time according to local labour laws. We focus on a case study of Uber drivers in Geneva, Switzerland, who exercised their data access rights within sociotechnical and political negotiations, driven by a practical goal: to account for working time and claim the benefits, in terms of labour rights, that drivers have so far been denied.

For algorithms to operate, gig workers are "represented" into "digital models" resulting from the definition of data collection processes by platform owners, *e.g.*, Uber, Deliveroo, Wolt, Lyft; these techniques allow these companies to automate "governance at a distance" (Eyert, *et al.*, 2022). Digital models are constructed via "data structures, containing variables and data points" (Eyert, *et al.*, 2022) that algorithms process to trace workers' behaviour and operate a dynamic pricing for the service provided. These "quantification conventions" are unilaterally defined by platforms (Eyert, *et al.*, 2022), which makes it difficult for workers to "calculate their earnings and have a secure financial future" (van Doorn, 2020). In the study of the algorithms utilised by ride-hailing platforms, data is treated as a secondary issue, "without considering any specification of types and practices for defining it" (Eyert, *et al.*, 2022), although studying data is crucial for understanding the way algorithmic management operates for organising work and providing an insight into how algorithms may be regulated in the future. "Algorithmic regulation" refers to two questions: "What are the algorithms regulating and how to regulate algorithms" (Bellanova and de Goede, 2022). The latter refers to policy purposes. We focus on the former, referring to any actant, task, service or social actor, such as workers, that are being regulated via algorithms. This is linked to the literature debate on "algorithmic management", meaning that platforms in the gig economy are replacing managerial functions that were previously delegated to humans within the automated processes of technological devices (Lee, *et al.*, 2015), such as "matching the supply and demand, coordinating and controlling workers" (Möhlmann, *et al.*, 2021). Indeed, Uber's surge pricing algorithms use data collected in real-time to learn about the market and fix the price of a ride in a fluctuant manner (Eyert, *et al.*, 2022). Based on drivers' experiences, Rosenblat and Stark (2016) describe how "drivers make themselves available without receiving rides, the fare base per kilometre is low and Uber promises high earnings under certain conditions of productivity that are unclear". Therefore, workers "depend on the way calculative processes of algorithms assign the price of the service" (van Doorn, 2020).

Algorithms have gained attention in media and scientific literature as the "new boss in gig work platforms" (Aloisi and De Stefano, 2022), underpinning the neoliberal rhetoric of ride-hailing platforms where platforms consider themselves as "neutral technological intermediaries" and drivers as "independent contractors", not employees (Rosenblat and Stark, 2016). The agency of data, (*i.e.*, how data acts in relation to something/someone, is marked in the literature as relevant for "feeding management practices in platforms that workers seek to decrypt with their own means" (Stark and Pais, 2020). However, data agency has not been studied empirically from the perspective of the application of personal data protection. In the gig economy, "platforms are owners of the data that workers produce, over which workers have little visibility and profitability" (Pedroni, 2019). While Uber collects workers' data for legitimate purposes, (*i.e.*, for the service to function, the data is personal and "relates to workers' privacy" (Arora and Stevens, 2019) under the European Union General Data Protection Regulation (GDPR) [1]. Therefore, a platform (*i.e.*, data controller) has the explicit requirement to "explain the logic, significance and consequences of the algorithms deployed for workers" ((*i.e.*, data subjects) (Li and Toh,

2023), as well as the “legitimacy of data types that are collected” (Eyert, *et al.*, 2022).

Thouvenin and Tamò-Larrieux (2021) propose &lquo;a balance between stakeholders in the gig economy based on data access rights in the GDPR”. These data access rights allow data subjects to recover a copy of their personal data that has been processed by, and under the company’s full authority, and could “correct information asymmetries” (Li and Toh, 2023). Although “these rights are not designed to initiate data flows” (Li and Toh, 2023) between social actors, an “adequate free flow of data” (Thouvenin and Tamò-Larrieux, 2021) could be achieved for economic welfare while protecting the interests of platform users, who have above all fundamental privacy and personal data protection rights. To our knowledge, there are no empirical studies characterising the specific data structures that drivers can retrieve through data access rights for counter asymmetries.

Overall, the gig economy is characterised by “uncertainty” (Stark and Pais, 2021) and “confounds the issue of ‘choice’, which sits at the heart of self-employment” (Gregory, 2021), in opposition to regulated labour conditions. Uncertainty is partly due to the system’s “sociomaterial opacity”. “Sociomaterial opacity arises through the concentration of massive data sets [...] by organisations, through centralised decisions about [variable] selection and categorisations, or through the inaccessibility of closed-source algorithms [...] which challenges the practices of ‘accountability’” [2]. As a consequence, the scientific literature “lacks a systematic analysis of data types that are linked to the objects they intend to represent for providing transparency” (Eyert, *et al.*, 2022). In the European Union, ”accountability is put forward as a top-down policy“ (Aloisi and De Stefano, 2022), now advertised as a transparency value in companies [3]. From a bottom-up perspective, “riders [4] do not understand how the algorithm organises or dispatches work, and thus they cannot determine if and when their work will be ‘worth it’ to them” (Gregory, 2021). Workers have to find their “means to understand how they are tracked by the app, how their behaviour influences the decisions made by the algorithms, and how to game it” (van Doorn and Chen, 2021). One of the few studies (van Doorn, 2020) contributing to the workers’ accountability of their earnings shows that platforms have a dominating “calculative power”. Some Deliveroo riders used reverse engineering methods, *i.e.*, an external tool and software to register their earnings and decrypt the platform’s calculations, as platforms do not explicitly state the service fee formula (van Doorn, 2020). However, van Doorn (2020) demonstrated that, without having the proper access to data and technical skills, workers found themselves without calculative power to understand the relation between establishing a service fee with dynamic pricing algorithms and individually accounting for a fair wage to calculate their future income. Consequently, given the challenges in proving how working conditions are dependent on algorithmic systems, “workers are not able to negotiate with the institutions that support them” (van Doorn, 2020).

As a result, from the platform’s perspective, drivers’ personal data can be used to govern the workforce and to create a dependency on the platform, which has a direct effect on the workers’ earnings and time (availability to work, and actual work at fluctuant rates). The governance capacity of the workers is limited as they have no transparency on what data is processed, for which calculation purposes, and to the benefit of whom. There is a gap in the literature concerning research on data processed by Uber’s algorithms that trace the organisation of workers’ time for calculability within the specific labour law and jurisdiction where the app is being used. The originality of our research lies in novel participatory methods of algorithmic accountability for empowering communities affected by algorithmic management by unfolding the data nexus between data access rights and labour rights — a nexus that has been underexplored empirically within the process of constructing a collective meaning of working time in the gig economy.

1.1. Claiming labour rights as formal employees: The case of Uber drivers in Geneva

Gig workers’ wages are not guaranteed as “there is usually no agreed working hours included in the contract” (Seo, *et al.*, 2022). However, governments are classifying worldwide platforms like Uber as a transportation company and drivers as employees according to the individual state’s labour law, in 2015 in the United States (Rosenblat and Stark, 2016), and more recently in the U.K. [5], Spain [6] and France [7]. Uber drivers are individually filing litigations claiming their labour rights. We focus on the Genevan case study. The Swiss Federal Court of Justice of Geneva upheld a ruling in 2019 for the driving service Uber [8] where the Court recognises the platform as an employer with legal obligations to its employees. The state service ordered Uber B.V. (Dutch company) and Uber CH (Zurich headquarters) to comply with its obligations as a transport company operator, particularly the obligations related to the social protection of drivers and to the working conditions in use in their sector of activity, as well as to comply with the practices referred to in the law as “taxis and transport cars with driver”, in French “loi sur les taxis et les voitures de transport avec chauffeur” (LTVTC) [9]. The latter regulates, among other elements, working hours and resting time for professional drivers.

In 2022, after Switzerland’s Federal Court decision on Uber, the following question emerged: *In what way is it possible to retrospectively calculate Uber drivers’ earnings and working time when they did not have a formal contract with a fixed schedule?* Drivers were free to work as many hours as they wanted as independent contractors, but now the working time calculation is required to verify that labour law was, and will be, respected. For that purpose, the Geneva’s Department of Economy and Employment (DEE) has created two technical commissions with two trade unions (SIT [10], Unia [11]) and one driver representative for negotiations with Uber. The commissions have to agree on: i) the method of calculation for back payments to ensure that minimum wage was applied in the past, ii) the new working conditions guaranteeing the future respect of labour law [12]. Our collectivity (PersonalData.IO, Hestia.ai and drivers) was involved in the former, from which two research questions arise:

> *RQ1*: How can personal data be used for calculating drivers’ earnings and working time according to labour law?
>
> *RQ2*: In what ways may the exercise of data access rights (GDPR) by drivers help to govern work and restructure power and information asymmetries with Uber?

To answer, we will use “data access rights for research” (see Ausloos and Veille, 2020) following the “digipower methodology” (Pidoux, *et al.*, 2022; Bowyer, *et al.*, 2022) developed by Hestia.ai and the NGO PersonalData.IO. This methodology consists of i) assisting Uber drivers to exercise their data access rights for recovering their personal data and ii) producing knowledge with the concerned community, enabling them to make sense of their data. Our goal is twofold. First, to resituate drivers’ personal data within the infrastructure that produces it, and within the network that wants to govern it for different purposes: to regulate platforms, to regulate work, to account for earnings and working time for claiming back labour rights. Our second goal is to make explicit the different meanings social groups give to personal data for calculation purposes once they are empowered.

In the following sections, we introduce our theoretical framework from infrastructure studies. Section 3 presents the data collection methods. In section 4, on results, we discuss the type of personal data that Uber drivers in Geneva have obtained when using their data access rights and what is useful for calculating earnings and working time (*RQ1*), in particular geolocation. In subsection 4.1 we map the actants involved in the infrastructure to analyse the process of governing work through different social meanings and data access rights (*RQ2*). In section 5 we discuss the participatory process of empowering social actors around a tool, for visualising and analysing personal data, which contributed to quantifying a new working time for drivers called “lost time between rides”. Finally, we analyse the construction of social meanings of working time among different actors for data and work governance and conclude with perspectives of using data access rights for algorithmic accountability, in other platforms of the gig economy.

2. Theoretical framework: Infrastructures to govern or to be governed

To answer our research questions, we develop an infrastructural perspective to analyse data-based technological systems within their “wider socio-material and juridical context” as proposed by Bellanova and de Goede (2022). For Bellanova and de Goede, the data structuring process is key to examining infrastructures. “Data structuring, [is] understood as the work required to make data materialise, and render them mobile, shareable, transportable, and ultimately actionable” (Bellanova and de Goede, 2022). A more precise examination of how Uber’s “datasets are generated, curated, and selected” (Bellanova and de Goede, 2022) is required, as this is linked to the way software programs “function as a tool of algorithmic governance, in the sense that they produce and aggregate data to govern populations”, like drivers (Bellanova and de Goede, 2022). Therefore, we take

the standpoint of data structures feeding algorithmic decisions within the infrastructure that makes them actionable: we analyse Uber's practices of earnings and working time calculations in claims concerning labour rights, under the jurisdiction of Geneva. Infrastructure studies [13] provide a theoretical framework for understanding the relations between actants (human and non-human actors), *e.g.*, algorithmic systems, input data, workers, labour law, "within a set of distributed sociotechnical and institutional activities" (Bowker, *et al.*, 2010).

The massive worldwide adoption of Uber's corporate platform, and its ubiquity in our daily life, made possible what has been called the "infrastructuralisation of platforms" (Plantin, *et al.*, 2018). Indeed, one can define Uber as a "global information infrastructure" (Bowker, *et al.*, 2010) in the gig economy that is fuelled by "digital labour" (Gregory, 2021) at the cost of both workers' and institutions' stability with consequences for national economic, political and social systems (*e.g.*, tax avoidance [14], violation of lobbying policies [15] and work precarity [16]). Such infrastructures have also been qualified as "information infrastructures" which are "vast sets of equipment, protocols, standards offering digital services within distributed and connected networks such as the Internet. They operate in organisational relations and can become global when their scale allows exchanging for instance data inside and outside national frontiers" (Bowker, *et al.*, 2010); such is the case of Uber, developed from the United States and deployed in different countries. "The information infrastructures' development, usage and maintenance are usually taken for granted and involve invisible workers. Because of their invisibility, their consequences are difficult to trace until a breakdown" (Bowker, *et al.*, 2010).

Trevor Pinch's 'social construction of technology' (SCOT) approach contributes more extensively to the understanding of infrastructures, based on their social meaning: "how and under what circumstances non-humans and their impact are made visible" by humans (Pinch, 2010). The latter has a stronger emphasis on infrastructures' social meanings than Star and Bowker's (2000) approach, which contributes to making the sociomateriality of infrastructures both visible and accountable. Nevertheless, as noted by Pinch (2010), technologies do not exist in a vacuum, detached from politics and the assemblages of institutions, culture, and the meanings of the exact properties that social groups enact. It is these social groups and their meanings that decide on what to maintain or change in the infrastructure. The main premise of SCOT is that "an artefact's development is shaped by the 'interpretative flexibility' that 'relevant social groups' produce over time" [17] — that is to say that different meanings are produced by actors and attributed to a technology until a meaning achieves a stabilisation. This infrastructural perspective (Pinch, 2010; Bowker, *et al.*, 2010) allows us to examine the negotiations in Geneva's technical commissions through an empirical lens: The way workers' personal data becomes meaningful to social actors (*i.e.*, drivers, the state, lawyers, unionists, policy-makers, activists) within a global information infrastructure such as Uber.

3. Participatory methods of citizen social science

This study consists of a "reflexive ethnography" (Attia and Edge, 2017), that enacts a "politics of care" — as described by Stiefel (2018) — assuming the researchers' engagement in the field to be affected by their activities in the social world, that we study and build at the same time. The three co-authors are members of the Geneva-based NGO PersonalData.IO; our "positionality" (Haraway, 1988) — that is to say, our experiences embedded in a specific sociopolitical world — has shaped this work. PersonalData.IO has advocated since 2017 for respecting data access rights and for obtaining more transparency from platforms. Data access rights allow any individual to obtain a copy of their data from any service provider that collects personal information based on the GDPR. The authors of this study were the first ones assisting drivers James Farrar in the U.K. [18] and Brahim Ben Ali in France [19] in pursuing Uber in initiating procedures that eventually led to judgments in the U.K. and the Netherlands. Our advocacy actions continued in Geneva, and later at the collective level in 2022 thanks to the community leader Aria Jabbarpour from the association VCT-Genève. We collected one Uber driver's data sample for this study to answer our first research question: *How can personal data be used for calculating drivers' earnings and working time according to labour law?* The first results section presents the structure of the driver's collected datasets, anonymised, without touching upon his personal data. PersonalData.IO activities have been deployed in cooperation with Hestia.ai (the company of the second author), which provides technical architectures for data governance. We developed participatory activities in our methodology where we engage in scientific practices thanks to our academic background and as activists, together with the public. The goal is to re-formulate research questions on data and to develop tools that require low technical skills for analysing data with civil society. These participatory practices of "citizen social science" (Albert, *et al.*, 2021) allow the production of scientific knowledge, connected to the concerns of the public, while building new relationships between academy and social actors that are not necessarily professional scientists (Göbel, *et al.*, 2019). More concretely, we organised two public events and 17 weekly "digital residencies" in Geneva (at FacLab, Campus Battelle and near Geneva airport) between 21 November 2022 and 27 January 2023, to assist drivers in recovering their personal data, which resulted in 123 drivers requesting their data. To our knowledge, thanks to the further analysis that we helped to conduct, at least 30 drivers have successfully recovered personal data from Uber. Our observations during the residencies and the process of analysing further datasets with 30 drivers comprise our second data sample, for the purpose of answering the second research question: *In what ways may the exercise of data access rights (GDPR) by drivers help to govern work and restructure power and information asymmetries with Uber?* The second results section presents a tool developed for drivers to discuss working time during an empowerment and governance process. We do not present their personal data, nor the results of their analysis.

4. Results: Achieving transparency over Uber's algorithms through exercising data access rights

To answer *RQ1 — "How can personal data be used for calculating drivers' earnings and working time according to labour law?"* — we present the "data structures" (Eyert, *et al.*, 2022) of Uber's algorithms thanks to drivers' actions of exercising individually their data access rights. The data they obtained makes transparent the vast amount of personal data Uber collects about drivers. Now under the drivers' ownership this data helps them to negotiate what could enter the formula of calculating a minimum wage in Geneva. While data access rights depend on Uber's liability, *i.e.*, trusting in what the company says it has as drivers' personal data, data protection regulations are a tool to enforce accountability, thereby ensuring that Uber is providing full and correct details of the information they are processing. Through this tool, as we experienced, errors can be identified across drivers and time, and used to contest what Uber has returned as data.

In Geneva, only a few drivers keep detailed accounts outside of the app. For their tax declaration, drivers take screenshots (Figure 1) of their weekly earnings displayed in the app (not including insurance, fuel and other expenses). Few drivers enter the data displayed in the interface into hand-written notebooks or MS Excel files (Table 1) on their computers. This is a rare practice. We worked with a driver who had a precise accounting of his working time. The data is organised per month and per year, deducing Uber's commission and calculating the drivers' working hours. Trade unions assist drivers in performing their calculations and argue that they lack resources to accurately verify earnings and working time. Consequently, drivers depend on what is displayed in the interface, and what Uber claims should be paid to its drivers. In the Geneva context, PersonalData.Io posited that personal data can be used for (i) precise calculation methods, and (ii) deciding collectively which variables to enter in the calculation in the first place. It is not our purpose to discover the formula for calculating a fair wage for Uber drivers, which is still an on-going task for the actors involved. Prior to our actions, data access rights and personal data as an empowerment artefact did not have any meaning to other social groups within the context of labour rights.

Figure 1: Print screen of weekly earnings' total in the app; graphical bars indicating the fluctuation of daily revenues are also shown but were deleted for anonymity.

Table 1: MS Excel file of a driver for annual accounting.			
	Year		
	Gross income — Uber commission deducted in CHF	Total hours worked	Gross income/hours worked in CHF
Month			

We identified three immediate methods provided by Uber to drivers for accessing their personal data: mobile app, Web-app dashboard and Subject Access Request (SAR) via a download portal in the mobile app. Drivers and unions were only familiar with the first method, which is the direct data they can access from the app's graphical interface.

First, on the mobile app, drivers have daily and weekly statistics where they receive detailed information about every ride (Figure 2). The calculation of a service fee by Uber in Geneva contains the following "variables and quantification conventions" (Eyert, *et al.*, 2022): a minimum base fare (*i.e.*, pick-up fee) per ride added to the price per kilometre, multiplied by the total number of kilometres between the pickup geolocation of the client and the dropoff geolocation of the client, added to the price per minute multiplied by the total time spent driven during the ride, added to the deduction of different taxes (Uber's commission and other taxes that remain unclear for drivers). Finally, the service fee (outside the base fare) for the ride can be multiplied by a surge charge, the option values of which (*e.g.*, 1,5x, 2.2x) are fixed by Uber but can be selected by the driver. After deductions, tolls might be reimbursed, tips left by the clients are added and there is a supplement if the destination of the ride was the airport. The fixed amounts in Uber vary throughout time and they are not the same in other cities, as has also been observed in the United States (Rosenblat and Stark, 2016). Data available in the first method cannot be directly exported by the drivers for calculations. Drivers give a valuable meaning to this data for verifying earnings and the profitability of individual rides accepted, but this information did not provide a valuable source for trade unions to verify working hours in labour law.

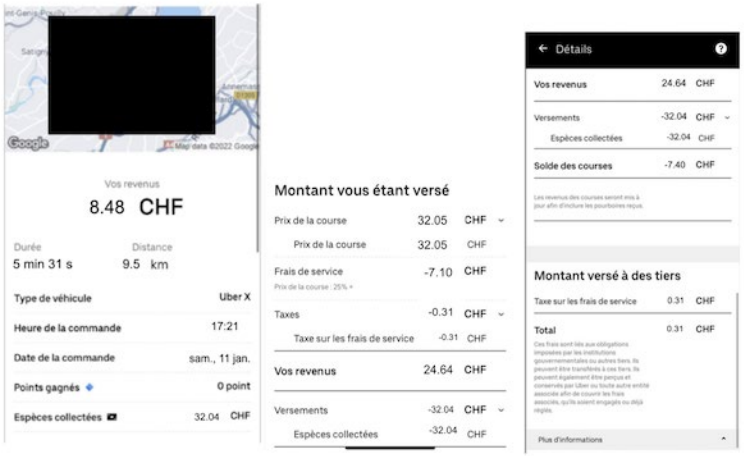


Figure 2: Print screen of the details of a single ride in the app.

The second method for drivers to access their personal data is a Web-app dashboard. This dashboard provides more data than the former method, in particular downloadable PDF files with each ride receipt generated by Uber on behalf of the driver, and daily and weekly statistics, which also provide the driver's connection time (Figure 3). There is also a weekly aggregate breakdown of the driver's revenues (Figure 4). Unlike the mobile app, the data in the Web-app is not provided for individual rides.

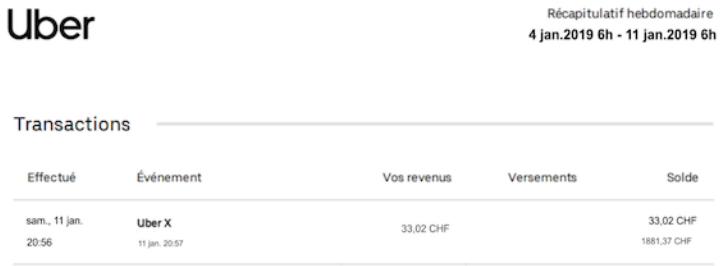
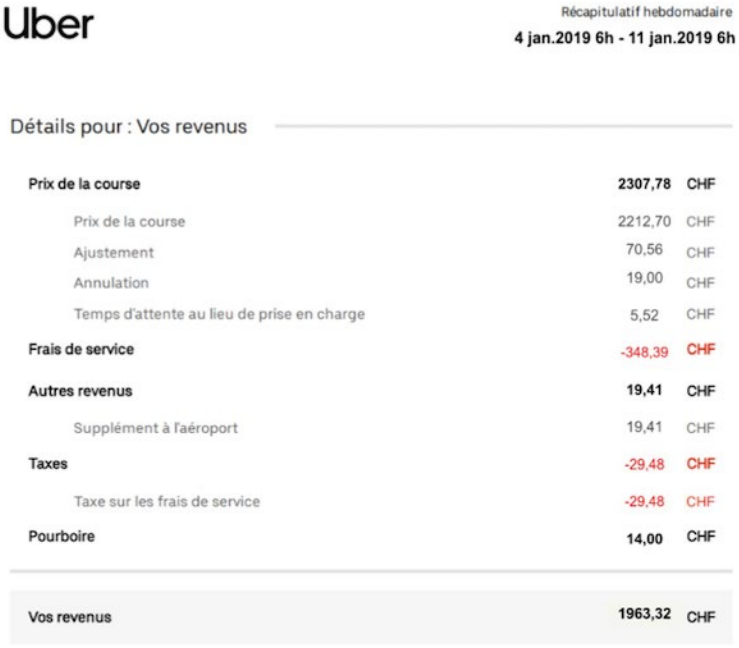


Figure 3: A single ride summarised in the weekly statement from Uber's Web-app.



Uber

Récapitulatif hebdomadaire
4 jan.2019 6h - 11 jan.2019 6h

Détails pour : Vos revenus

Prix de la course	**2307,78**	**CHF**
Prix de la course	2212,70	CHF
Ajustement	70,56	CHF
Annulation	19,00	CHF
Temps d'attente au lieu de prise en charge	5,52	CHF
Frais de service	-348,39	CHF
Autres revenus	**19,41**	**CHF**
Supplément à l'aéroport	19,41	CHF
Taxes	-29,48	CHF
Taxe sur les frais de service	-29,48	CHF
Pourboire	**14,00**	**CHF**
Vos revenus	**1963,32**	**CHF**

Figure 4: Detailed breakdown of a driver's weekly revenue from a PDF retrieved from the Uber Web app, including taxes, service fee and tips.

The third method is a data download portal in the mobile app, which Uber uses to automatise a limited form of SAR. This third method lacks the data that a SAR, directly sent by the driver to Uber's data protection officer, may contain. The latter is the most effective method for relieving information asymmetry, where specific personal data types can be requested as additional proof to contest Uber's arguments. We assisted drivers in making an extended SAR. The first Uber driver in Geneva assisted by the authors of this study received the results of a SAR containing data ranging from 2 November 2017 to 20 September 2020. This file was issued as a PDF containing 464 pages with several tables; a technical member of the digital residency had to turn the PDF into a csv file in order to analyse the data with the driver. Overall, the format and quantity of the data constrain the "calculative power" (van Doorn, 2020) of the drivers, but also of any researcher and authority seeking to audit a gig worker's platform. At best, the drivers have the key form of expertise to gather more data and interpret it with their experiences in the field using the app through time.

Making explicit these three methods is a main methodological finding itself for drivers and researchers. We now discuss key qualitative findings that enable working time to be quantified by comparing the app, Web-app, and SAR for different social groups. The findings also provide insight into a chronological comparison that we drew between one SAR in 2020 and a second in August 2022, showing the evolution of data structures and their limitations when attempting to trace back working time.

The data obtained from the SAR download portal in August 2022 contains five folders — "Account and Profile", "Driver", "Eats", "Regional Information" and "Rider" — with multiple MS Excel files, and is more comprehensive than the SAR accessed in 2020. Less data is missing, and the data types that are not available in the app or Web site are included, but others are excluded. The new data provided include descriptions of the types of payments being made between Uber and the driver, as well as descriptions of the different data Uber uses to trace a driver's actions at a granular level, *e.g.*, tapping the screen with their finger. The NGO PersonalData.IO found meaning in the data for calculating connected time as a form of digital labour that the other social groups ignored at this stage, as these other social groups were focusing on total kilometres driven.

In the file "driver_lifetime_trips-0.csv", one of the most important data types for drivers is the local base fare, as they claim this is defined in an arbitrary and fluctuant way by Uber. Data points are missing with no explanation. Local base fare is reported but is missing for 1,797 of 5,844 rides. This file is the only record of the local base fare obtained by the driver outside of sporadic e-mail messages from Uber (Figure 5), and important for ensuring that Uber keeps its promises to drivers about rates in specific locations. Here we show that for effective algorithmic "regulation" (Eyert, *et al.*, 2022), double sources of data are required.

A partir du [redacted] 2018, les prix augmenteront en moyenne de 10% à [redacted] Genève sur UberX.

	Évolution de la grille tarifaire UberX à Genève et [redacted]
Course minimum	Inchangé
Prise en charge	2 CHF (ancien) > 3 CHF (nouveau)
Prix par KM	1.4 CHF/km (ancien) > 2 CHF (nouveau)
Frais de service	Inchangé
Frais d'annulation	Inchangé

Figure 5: E-mail message sent by Uber to driver presenting changes in the base fare.

Additionally, in the data download portal the surge multiplier is not consistent with the way it is presented in the mobile app. For some rides in the data file the surge multiplier is also missing. The file "driver_app_analytics.csv" (Table 2) contains geolocation and records of driver interactions with the Uber app, which could potentially be used to calculate the driver's time online, driving and waiting time between trips. However, this file only contains two months of data, as opposed to the time span of several years for the data on individual trips in the mobile app. From the standpoint of Uber's data protection officer, providing more geolocation data to drivers has to be justified as it carries privacy risks for passengers whose geolocation is linked. This was a main conflict between the meaning of personal data for data protection and labour law. For the state, trade unions and drivers, the data constitutes working time. For Uber, it is a privacy risk.

Table 2: Data structure of file "driver_app_analytics.csv", data types are separated by comma, each representing a column in the file.
Analytics Event Name, City, Cellular Carrier, Carrier MCC, Carrier MNC, IP Address, Device Language, Device Model, Device OS, Device OS Version, Is Driver Online?, Driver Status, Application Version, Event Time (UTC), Latitude, Longitude, Speed (GPS), Analytics Event Type.

Overall, the data and files accessed provide little "sociotechnical meaning" (Pinch, 2010) for drivers to understand the data's "classification" (Bowker and Star, 2000) within Uber's system. For instance, the data type "Analytics Event Type" has four unexplained data values: "custom", "impression", "lifecycle", "type". In another file "driver_payments-0.csv" (Table 3), the calculation of the driver's pay is not explained and values are missing for some rides. More recently, incomplete guidance notes were included. While formulas can be inferred, without explicit meanings from Uber, any driver seeking to calculate data about their finances has to operate on assumptions. Table 3 shows that the "data models" (Eyert, *et al.*, 2022) representing drivers' work are defined through granular classifications of the transactions between the platform, the client and the driver. These classifications allow Uber's algorithms to operate, as has been more broadly shown with artificial intelligence (Bechmann and Bowker, 2019), but are hardly actionable for drivers' interests. For instance, the data in the classification "transport.toll", may be useful in ensuring compliance in areas where Uber offers service refunds. For drivers it is not easy to claim tolls as expenses because of the procedure imposed by Uber via their support software. However, the majority of classifications remain incomprehensible to the driver after accessing their data, as there are variations from one ride to another and the classifications differ from what was shown in the app while working.

Local Timestamp	Category	Classification	Local Amount	City Id	Currency Code
Year-month-day hour:min:sec	driver_payment_fares	transport.fare.base			
	upfront_adjustment	transport.fare.coupled_ufp_adj			
	driver_payment_fares	transport.fare.distance			
	commission	intermediary.commission			
	tax	transport.tax.vat			
	tax	intermediary.commission.tax.vat			
	driver_payment_fares	transport.fare.time			
	driver_payment_fares	transport.fare.surge			
	cash_collected	transport.fare.cash.collected			
	rider_fares	transport.fare.rounding_uber			
	driver_payment_tolls	transport.toll			

Table 3: Data structure of file “driver_payments-0.csv”.

The process of collecting data from Uber’s three methods is an iterative one. Each method provides drivers with a partial overview of the data that Uber holds about them. By comparing and contrasting data structures over time and in relation to the knowledge of drivers, we identified that time-stamped geolocation (*i.e.*, year, month, day, hours, min., sec., latitude and longitude) is the most valuable data type for the calculations. Indeed, we had to converge with the social meaning of working time in Uber’s algorithms that drivers integrated: working time taken to complete a ride depends on the distance driven in a given geographical area. However, we had to support drivers by writing letters addressed to Uber’s data protection officer where we leveraged the data protection regulation for obtaining more extensive geolocation data, as it was provided for a limited period and not for the whole working period of the driver. In order to reuse personal data for distance and time calculations, we had to perform various preliminary tasks. For instance we had to harmonise values semantically, *e.g.*, perform distance units and time zone conversions, or deduct missing data points (*e.g.*, surge multiplier). This data processing work could not have been achieved by the drivers on their own, nor by the State, trade unions or lawyers. If infrastructures can be studied during a “breakdown” or “inversion”, as with the current employer-employee relationship’s contestation against Uber by “unfolding political, ethical and social changes in the making” (Bowker, *et al.*, 2010), our study questions the financial and social costs of repairing such breakdowns, and the values and risks of allowing these companies to establish locally.

Without directly studying the relationship between personal data and work accountability, Rosenblat and Stark (2016) refer to data for addressing conflict resolution in payments between Uber and drivers, showing that data is fully under the platform’s ownership. “Uber claims that it has the data to adjudicate disputes between passengers and drivers, or [when there are] smaller concerns such as payment/wage disputes” (Rosenblat and Stark, 2016). Drivers, on the other hand, claim “having to gather their own data to prevent wages from being retracted” with “manual or electronic logs” [20]. In their study, a driver is quoted as saying: “Uber had cut the pay in like half because the guy claimed I took him on an inefficient route, so I sent Uber the footage of the entire trip” [21]. This driver had to record the trip to provide Uber with external proof about what is accounted for within the app. Indeed, drivers find their means of accountability outside the app, despite the accountability being related to the data inside of the app. Drivers make claims related to accountability through Uber via their support ticketing system. They find themselves “with unequal access to calculative power” (van Doorn, 2020). However, we show that drivers have the possibility of regaining power by leveraging their data access rights, which can provide a unique view on their working time, at individual and collective levels. Critically, drivers and trade unions are confronted with a problem of ‘scalability’ as data access rights are individual rights and do not know how to process aggregated data. They have to account for all the rides that drivers have made during the whole period of time they have worked at Uber, considering that minimum wage has to be paid retroactively since 2019 in Geneva, for achieving a collective bargaining that somehow benefits the majority.

Our results show that drivers have three dispersed and incomplete methods of accessing their data (data that had been previously been unknown to them), that they were not aware of their data access rights and that when they exercised them they obtained incomprehensive and incomplete information that required verification, comparing multiple sources of data and sophisticated technical means to facilitate analysis. This problem affects all other parties involved in the negotiations: unions, the State and lawyers, together with drivers. We identified geolocation data as the most useful data for calculations, but the flaws in Uber’s transparency when exercising data access rights pose a second problem of ‘verifiability’. Drivers and passengers are accountable to Uber through continuous data collection processes via their mobile phones. However, Uber is not accountable to anyone. We confirm the asymmetry highlighted by Rosenblat and Stark (2016) at the transactional level: Uber holds drivers accountable for their routes. More critically, if drivers do not verify Uber’s calculations and do not use external expertise, the State holds Uber fully accountable for drivers’ earnings and working time and will only rely on what Uber presents as calculations. As explained in the following section, this was a main request to Uber — to provide drivers’ working history — and the main source of information used to account for working time during the negotiations.

4.1. Unfolding the actants’ relations when claiming labour rights

In this section, we attempt to answer *RQ2 — In what ways may the exercise of data access rights (GDPR) by drivers help to govern work and restructure power and information asymmetries with Uber?* We show which actants and assemblages were required for governing work and data in the context of Geneva. The actants mapped (Figure 6) [22] discussed collectively, or in silos, how to calculate earnings and working time by means of exercising data access rights. This situation was possible when the State (actant 1) of Geneva legally classified Uber as a transportation company, and drivers (actant 2) as employees to make Uber comply with the State’s standards of labour rights (juridical assemblage), in particular minimum wage. It was a first stage where the State brought the traditional meaning of working time, already standardised in law, to Uber’s operations.

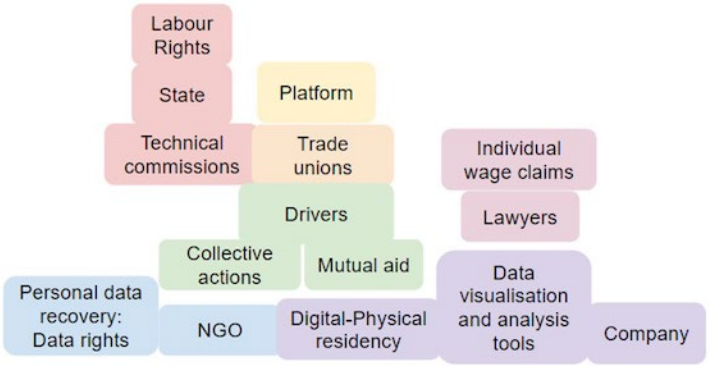


Figure 6: Mapping the network of actants during Geneva State negotiations.

The organisation established via the technical commissions (sociopolitical assemblage) in Geneva — composed of one drivers' representative, two trade unions and the platform/company (actants 3, 4, 5) — allowed the State to request a copy of the data of three drivers from Uber, for the purpose of auditing their working time. After receiving the data as MS Excel files, it became apparent that the members of the technical commissions were not able to read them. Some of the readable data transmitted was cumulative, *e.g.*, total kilometres driven per month, which drivers contested as it did not reflect their own accountability outside the app. The aggregated data did not reflect the actual path driven per ride, which presented a major issue. Moreover, trade unions and lawyers did not know how to verify the data provided with respect to the drivers' tax declaration or other means of accounting. In parallel, we organised two public events where we explained how to exercise data access rights individually, showing that this provides a unique source of verification of what Uber is presenting to the State. Members of the technical commission, who were present to learn about data, started to understand the utility of data rights (juridical assemblage) for claiming labour rights but did not support our activities further. Then, members of The NGO PersonalData.IO and the company Hestia.ai (actants 6, 7) organised digital residencies with computers in a physical space (sociotechnical assemblage), to receive drivers during their breaks. Increasingly, drivers began attending the residencies, creating videos and gathering print screens to share tutorials enabling other drivers to exercise their data access rights for mutual aid (sociotechnical assemblage). Hence, a sense of community was created for collective actions between drivers (sociopolitical assemblage), through data. In general, "platforms do not facilitate horizontal communication (between workers), thus limiting the associational power of workers" (Graham and Anwar, 2019). We enacted such associational power with Uber drivers to gain calculative power collectively, which allowed progressively the convergence of a new social meaning of data around tools.

During these digital-physical residences, we used the digipower.academy [23] tools developed for visualising and analysing the data recovered from Uber (actant 8) through individual data access rights. The experiences of drivers in the field helped to decipher missing unit labels in the data returned by Uber, and led to the development of new data visualisations by focusing on one data type: time-stamped geolocation. This was the most granular data provided by Uber and allowed drivers to see the organisation of their work in time and space. Time-stamped geolocation was used to answer one main question that emerged from discussions: Where can we see the time spent driving to pick up clients and spent waiting for Uber to assign us rides? In the app interface, Uber displays the calculated distance and time to pick up a passenger when drivers accept a ride. Additional data and calculations are "invisibilised", *i.e.*, the data is collected but is not made visible in the interface. As stated by Pinch (2010), the "social meaning of materiality constructs our common world and can also create barriers". Uber's interface invisibilisation of drivers' full geolocation is a main material and financial barrier to both drivers and the State. For instance, when drivers are connected in the app while waiting for a ride, this data is returned through data access rights but drivers do not see it in their interface. During the negotiations, the initial proposition of Uber's meaning of working time was to consider only when workers are driving with the passenger in the car; this, however, was contested by trade unions and drivers. To the latter, working time includes driving without a passenger, when approaching the passenger location. This working time meaning was later accepted by the technical commission. However, drivers expressed a wish to expand this social meaning as they claim to spend longer hours at work that Uber does not recognise. From the moment they open the app, they are connected and have to remain available so that Uber's algorithms assign them a new passenger. The drivers' expanded meaning of working time was defined with PersonalData.IO and Hestia.ai as "lost time between rides", and is illustrated by the following conversation between the first author and a driver.

> *Driver*: Data is important because as a driver you don't realise the time you spend in the application, the time when you connect to the app and the moment when we do the first trip. Because there are two types of drivers: there is the driver who connects, leaves home and goes marauding, for example a driver in the suburbs goes downtown and goes driving until they receive their first trip. And there is the driver who stays at home until receiving THE interesting trip, but in the meantime the driver can receive trips without accepting them. For all that, we have no visibility.
>
> *First author*: When does a driving trip start for a driver?
>
> *Driver*: On the app, from the moment you are connected and you receive an interesting trip. In my case, for two, three hours I may have had two or three requests but I accepted none of them because I was waiting for THE trip. However, this is three hours that I spend doing nothing, while still being available to the application.
>
> *First author*: How do you account for this time as a driver?
>
> *Driver*: I have nothing, because when we look on the app, the app gives us data, but these are estimates, approximations, because when we look at the order request, the moment we receive the order and the moment we pick up a client does not correspond to reality, just like the driving time. The driving time on the app does not correspond to the actual time that a trip takes, in reality.

While Uber hides this time in the interface, drivers want it to be visible, in order to make it valuable for negotiations. As a result, Hestia.ai implemented in https://digipower.academy/experience/uber-driver the calculation

of time between the time-stamped geolocation point where drivers dropped a passenger, and the next time-stamped geolocation point where they went to pick up a new passenger (Figure 7) to make visible the minutes spent without passengers, when a driver is connected and remains available, often also driving towards areas of (supposed) high demands of rides. Drivers are now using these calculations to make individual wage claims (juridico-financial assemblage) in court, with the support of their lawyers (actant 9), outside the technical commissions.

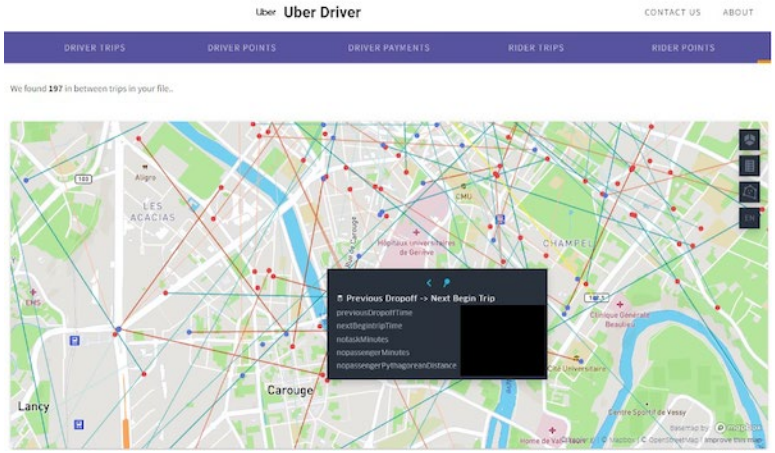


Figure 7: Calculation of working time between a client's drop-off time stamped geolocation and next begin-trip.

5. Discussion: Empowering actors with new sociotechnical and political artefacts

When regulating a platform and applying labour law for work governance and empowering drivers, there is a sociotechnical and political tension to consider: what legally counts as work versus how work is traced digitally. As it is not a 'traditional' company, Uber is using data structures for a powerful algorithmic-mediated transportation service, which gives them dominating technological means to "obfuscate" (Bijker, 2015) what counts as working time. Uber presumes drivers have autonomous responsibility for working even though they do not have the technical means to govern their work, nor have they previously had labour law protection and awareness of their data rights. Their only resource, then, is to contest individual journeys for which they are paid; for which they would need to take the time to check Uber's calculations under a dominating algorithmic management. Furthermore, there is a major issue for the State's economy: there is a double source of income that is taxable — the company's gain and the independent workers' income — that cannot be verified by the State because all transactions happen out of sight, outside legal standards. In other words, the State cannot know if what Uber has claimed to collect is accurate, nor what the independent workers declare is taxable as 'work'. As a consequence, tax fraud can be exacerbated when accountability happens within the operations of an opaque platform.

The use of personal data protection is a way to mitigate Uber's dominating power over workers and the State for defining working time. However, our results show that drivers have three dispersed and incomplete methods for exercising their data access rights. Consequently, for achieving data and work governance, drivers are confronted with issues of data "accessibility" and "readability" (Li and Toh, 2023). Furthermore, we posit that having the proper tools is not enough "to be aware of the reliability of sources" (Fjeld, *et al.*, 2015). Domain-expert knowledge, in data science as well as in professional driving, is necessary to verify if the data provided is complete and accurate. Moreover, when accountability is under the full control of Uber, the latter has a centralised authority for data liability that should be redistributed towards the social actors concerned for ensuring data ownership. From our activities, we identify one major element of governance in the making: verifiability — that is, showing that Uber holds power when one cannot verify the data, even when it is provided with claims of transparency. This means that transparency does not ensure accountability. In our research, we have seen that Uber established a dominant power relationship over the State and drivers, as Uber holds all of the data of their workers (and clients). This fact allows them to control the labour and transportation markets in Geneva, as well as blocking possibilities of algorithmic accountability, in particular working time calculation.

In Geneva, Uber's power domination was destabilised first, when the State enforced its labour law and classified Uber drivers as employees and Uber as a transportation company. Then, it became necessary for the State to obtain a copy of drivers' data to be able to verify how work is accounted for by the app before being able to define working time and establish calculation methods for payback. In that sense, data became an important resource for the State to regain power and ensure working conditions. However, without the proper means to verify it, the negotiations were insufficient to defend the drivers' rights in full. The collaborative relations between organised entities became a counterpower, where data access rights acted as one means among many others, creating the circumstances to make data meaningful, liable and finally valuable for calculation at scale.

A second element to destabilise Uber's power domination was the social process of reviewing working time definition. Our results show that the meaning of data, as a technological artefact, is flexible in its interpretation and can gain a redefinition through geolocation although unions and the State seek to standardise it within a more traditional concept of working time in labour law. Social groups that are presumed to lack the necessary knowledge to understand a technology, such as gig workers, develop their own interpretations and practical understandings of technology. Their meanings are key for data governance and complementary to other actors like data scientists, trade unions, lawyers and the State that lack the knowledge about the practices of drivers who are interacting daily with Uber's algorithms. It is the drivers' practical and flexible interpretation of data that allowed us to build relevant tools within a participatory research aimed at creating a collective power. The initial aim of the digipower.academy tool was to upskill gig workers in data literacy. However, it became apparent that upskilling was not a requirement. Drivers already knew a lot about data when defined as 'working time', without referring to it technically as 'personal data', as we did. Instead, they needed a technical capacity to put in action their power. For us, to make the tool and the data socially relevant as an artefact, a common sociopolitical and financial meaning of personal data was required, in a situation where data was "politicised" [24] and directly affected the community's social concerns: revenues, distance of the ride, working time spent driving, approaching a passenger or connected in the app. Therefore, it is relevant to empower actors with artefacts for

the common good, which require complementary expertise and continuous revision if they are to be embedded in society. Data processing tools have to be "sustainable" (Fjeld, *et al.*, 2015). In our case, this means tools require maintenance within a sociotechnical and juridical infrastructure that supports multiple social groups to have an egalitarian access to calculative power. Tools must be updated with the meanings of social actors from different standpoints in order to have power to negotiate. While Digipower Academy existed before the negotiations, making it actionable for collectively discussing data, was only possible once the State applied regulations to Uber, which raised the issue of calculating working time. Then we developed the tool further according to the drivers' experiences with new features and visualisations according to their definition of working time that are still serving trade unions and drivers. However, the residencies we organised and the technical development were all built upon volunteer work that did not receive any local support.

6. Conclusion: Sociotechnical meanings of working time and perspectives

The "interpretative flexibility" (Bijker, 2015) of data, as an artefact enacted by data access rights can be highlighted across multiple social groups in the case of Uber drivers in Geneva. Through personal data protection, we gave transparency over Uber's system and data, which was previously invisibilised by Uber to other social groups. Initially, PersonalData.IO's actions aimed at highlighting the value of geolocation data for calculating working time in a granular and precise way but this did not mean anything socially to the State, the trade unions nor the drivers. At the technical commission organised by the State, those social groups were mainly verifying drivers' tax declaration and looking for total hours worked and kilometres driven to control minimum wage compliance. Personal data protection was not meaningful for labour law until PersonalData.IO, Hestia.ai, and the drivers engaged in parallel participatory activities to recover their data from Uber. When drivers were exercising data access rights individually, geolocation data was made visible and useful for work governance but not actionable for other social groups outside Uber. Without a technical meaning provided by Uber, and without the means to extract it, the personal data is hardly reusable by the actors that own it themselves under privacy rights. Therefore, PersonalData.IO, Hestia.ai and the drivers, who involved their lawyers, carried out a collective data analysis and managed to connect the social meaning of personal data to the drivers' experiences. Revenues and working time were more precisely calculated with respect to drivers' practices and labour law (*e.g.*, working full-time, part-time, night shifts, working weekends and holidays). This way geolocation data was technically meaningful to compute and visualise the necessary calculation of working time according to geographical distances in a precise manner, including time connected in the app and approaching a passenger. We also displayed one working time valuable to drivers that is not recognised by Uber, *i.e.*, lost time between rides. Personal data became then sociotechnically meaningful and powerful for working time calculations to be integrated into the negotiations.

When examining the social meanings of infrastructures, Pinch [25] highlights that "most new infrastructure is built upon older preexisting infrastructure". Moreover, "new infrastructures can establish an old meaning of technologies" [26]. We show a more nuanced sociotechnical and political construction of personal data with the case of Uber. New information infrastructures that include surge pricing algorithms can be built outside preexisting infrastructures like taxi networks and regulation, which can destabilise old meanings of transportation and work. In Geneva, it was possible to regulate new infrastructures by applying the old meaning of a set of conventions related to work law, professional driving know-how, transportation regulation and collective bargaining. Hence, the meanings of working time, as understood by institutions, are attempted to fit into new technologies with algorithmic management that track geolocation through mobile phones. Indeed, Geneva's institutionalised meaning of minimum wage, after classifying drivers as employees, was introduced into Uber's algorithmic calculations of working time, in order to regulate Uber as a company. However, there is a tension between the classification of drivers' work by the State and the classifications of Uber within data structures. This tension poses challenges for social groups seeking to calculate working time using data, without the technical meanings nor means for processing geolocation. In contrast to other social groups involved in the negotiations, drivers have more calculative power due to their data access rights, and more associational power due to their network outside unions if they are technically and financially empowered. These are actors at the intersection of their expertise in the field and the adoption of the technology in daily practices, and given they benefit from their position within a community of professional drivers and a juridical frame for protection, the drivers themselves are in the best position to construct the meanings of their working time that best define their individual and collective realities.

This case study provides valuable insights into the gig economy. These insights are the first steps towards understanding algorithmic systems' decisions in digitalised work organisation. In future research, personal data can be aggregated between drivers (or other types of gig workers), and between workers and their clients, could provide a unique view on the functioning of surge pricing algorithmic systems where data can be verified with tools and the social meanings that directly affect the community. In a situation where earnings and working time calculation depends on a platform/company's liability in the data collection process, our analysis showed that it is possible to offer transparency to practices that Uber had invisibilised, as well as verifiability to Uber's meaning of work. Our collectivity, and in particular the drivers' professional expertise and knowledge about the way in which algorithms operate while they are using the app were key to make sense of Uber's data and improve empowering tools that now offer scalability for aggregated calculations across drivers. Data liability should not be left to the platform alone; instead, a robust audit requires multiple sources and the expertise of various social groups aimed at data verifiability. Hence, this ethnographic account of our activities provides a novel view of algorithmic accountability for working time, and a participatory research method of empowerment for infrastructure studies. FM

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Notes

1. GDPR is actionable by Swiss drivers as the app-related subsidiary (Uber BV) is a Dutch company (GDPR Art 3.1; see https://gdpr-info.eu/art-3-gdpr/).

2. Eyert, *et al.*, 2022, p. 35.

3. See "Wolt's blog" at https://blog.wolt.com/hq/2023/05/26/unveiling-the-second-edition-of-the-wolt-algorithmic-transparency-report/, accessed 13 July 2023.

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5. Mary-Ann Russon, 2021, "Uber drivers are workers not self-employed, Supreme Court rules," *BBC News* (19 February), at https://www.bbc.com/news/business-56123668.

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10. Trade Union in Geneva. In French, SIT — Syndicat interprofessionnel de travailleuses et travailleurs.

11. Swiss Trade Union Confederation with headquarters in Geneva.

12. République et canton de Genève, 2022. “Fabienne Fischer, Uber et les syndicats se mettent d’accord sur un calendrier de négociations” (29 July), at https://www.ge.ch/document/fabienne-fischer-uber-syndicats-se-mettent-accord-calendrier-negociations.

13. Bowker and Star, 2000, p. 377.

14. European Parliament, 2021. “Uber avoids tax by channelling funds through the Netherlands” (10 February), at https://www.europarl.europa.eu/doceo/document/E-9-2021-000844_EN.html.

15. Wikipedia, 2024. “Controversies involving Uber,” at https://en.wikipedia.org/wiki/Controversies_involving_Uber#2022_leak_documenting_misdeeds, accessed 14 July 2023.

16. See Bernard (2023).

17. Bijker, 2015, p. 137.

18. Kevin Rawlinson, 2023. “Former Uber driver wins payout of £20,000 owed for more than seven years,” *Guardian* (12 July), at https://www.theguardian.com/technology/2023/jul/12/former-uber-driver-wins-payout-of-20000-owed-for-more-than-seven-years.

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21. *Ibid.*

22. Actants and assemblages in Figure 6 are presented in the text in parenthesis.

23. Digipower Academy, at https://digipower.academy/, accessed 6 March 2023.

24. Bijker, 2015, p. 139.

25. Pinch, 2010, p. 87.

26. *Ibid.*

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