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Your order, their labor: An exploration of algorithms and laboring on food delivery platforms in China

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This study examines the use of "algorithms in everyday labor" to explore the labor conditions of three Chinese food delivery platforms: Baidu Deliveries, Eleme, and Meituan. In particular, it examines how delivery workers make sense of these algorithms through the parameters of temporality, affect, and gamification. The study also demonstrates that in working for food delivery platforms, couriers are not simply passive entities that are subjected to a digital "panopticon." Instead, they create their own "organic algorithms" to manage and, in some cases, even subvert the system. The results of the approach used in this study demonstrate that digital labor has become both more accessible and more precarious in contemporary China. Based on these results, the notion of "algorithmic making and remaking" is suggested as a topic in future research on technology and digital labor.

Keywords: delivery workers; food delivery platform; algorithms; labor

Introduction

At lunch hour, Hongzhuangyuan (宏状元) (a popular chain restaurant with locations all over Beijing) can be very crowded. In addition to other customers eating there, several people wearing multi-colored work clothes and helmets continually come and go. These people are food delivery workers who collect food, tighten the plastic bags, tap on their phones, jump on electric motorbikes, and disappear in a rush. This image is a general representation of the workers in China's takeaway industry.

The global emergence of the "sharing," "gig," or "on-demand" economy has attracted increasing scholarly interest in how intermediary platforms build, connect, and reconstruct the social relations among consumers, laborers, and companies (Gillespie, 2010; Glöss et al., 2016; Malin & Chandler, 2016; Rosenblat & Stark, 2016; Schäfer & Van Es, 2017). Food delivery services have experienced a monumental increase in response to the surge in on-demand economic activity in China. In July 2018, the number of users of online meal ordering services had reached 300 million, and the market including 1,300 cities, which generated a revenue of US $37 million (China Internet Network Information Center, 2018). However, the food delivery market in China is currently going through a period of instability. As IT giants, such as Alibaba, Tencent, and Baidu join and compete for a market share, the huge investment in the market and in human capital have driven many food platforms into bankruptcy. According to Newseed, more

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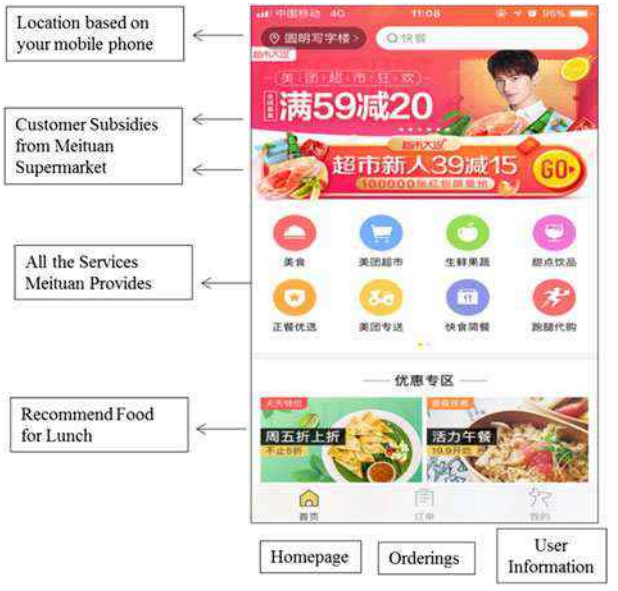

Figure 1. A Screenshot of Meituan Waiwai's User Interface.

than 20 food-ordering platforms in China have shut down their businesses (Newseed, 2016). In August 2017, Baidu Deliveries, which had been the third largest market operator, was sold to Ele.me after it failed to gain an adequate share of the market. Therefore, in effect, the market has become a duopoly. Eleme is backed by the E-commerce giants Alibaba and Meituan Dianping, whose main investor is Alibaba's rival, Tencent. The application designs and services provided by the three platforms are quite similar (see Figure 1). The platforms allow users to order restaurant food, supermarket products, vegetables and fruits, desserts, as well as cake and flower deliveries. To attract more customers, platform players often subsidize them by providing various promotions.

Since 2015, because of the decreased labor costs and the highly concentrated population in China, O2O (online to offline) food delivery platforms have proliferated. There are no official statistics about the total number of delivery workers, but based on a report by Phoenix Television, it exceeds three million people, including the delivery workers in the big Chinese cities, where migrant workers constitute the majority of the delivery "army". To ensure their market share, food delivery companies compete fiercely in hiring couriers by offering higher bonuses when they deliver more orders (Table 1). Delivery workers are distinct from other digital workers because of their embeddedness in the digitalized platforms. Mobile adoption and application usage are essential prerequisites for their employment because they are integral to the entire labor process, including work assignments, performance, and evaluations.

Previous research on technology and labor has documented that the emergence of the on-demand economy has been accompanied by the increasingly individualized control of entrepreneurism and algorithms (e.g., Rosenblat & Stark, 2016; van Doorn, 2017). In the present study, the analysis of the labor practices of delivery workers was based on the concept of "algorithmic management," which refers to "software algorithms that assume managerial functions and surrounding

Table 1. Seven levels of the knight in Baidu deliveries.

Level of the Knights	Subsidies for Each Order	Accumulated Points
Divine Knight (神骑士)	1.5 RMB (approx. 0.23 UDS)	6,000
Sacred Knight (圣骑士)	1.2 RMB (approx. 0.18 UDS)	4,100
Diamond Knight (钻石骑士)	1.0 RMB (approx. 0.15 UDS)	2,800
Black Golden Knight (黑金骑士)	0.8 RMB (approx. 0.12 UDS)	1,800
Golden Knight (黄金骑士)	0.5 RMB (approx. 0.076UDS)	900
Sliver Knight (白银骑士)	0.3 RMB (approx. 0.045 UDS)	400
Ordinary Knight (普通骑士)	0.1 RMB (approx. 0.015 UDS)	NA

institutional devices that support algorithms in practice" (Lee et al., 2015, p. 1603). By situating new ridesharing services, such as Uber and Lyft, Lee et al. demonstrated the importance of encouraging human-centered algorithms by analyzing the ways in which algorithmic designs that involve non-human entities do not consider drivers' feelings of inequity. Based on Lee et al.'s (2015) findings, this study was aimed to extend and conceptualize algorithms as both human and non-human as well as technical and social. Based on the results, the author argues for the reconceptualization of algorithms as "algorithms in everyday labor," calling for a broad and inclusive definition of social engagement and economic activities.

This study also provides a critique of platform algorithms by examining how delivery workers make sense of algorithms through parameters, such as temporality, affects, and gamification. Based on the results, the study demonstrates that couriers in food delivery platforms are not simply passive entities that are subject to a digital "panopticon" (Foucault, 2012). Instead, the findings show that these platform laborers have generated alternative ways of using and making sense of algorithms. By examining the making and remaking of algorithms between platforms and delivery workers, this study contributes to the ongoing discussion of the use of algorithms in the platform economy.

Situating Algorithms and Labor in the Platform Economy

There has been some debate regarding how algorithms should be defined. Social scientists have approached algorithms by going beyond constraints of computer science to apply them to social and cultural systems (e.g., Beer, 2017; Gillespie, 2014; Lee et al., 2015; Seaver, 2017). Gillespie (2014) regarded algorithms as a particular "knowledge logic" that was "built on specific presumptions about what knowledge is and how one should identify its most relevant components" (p. 168). Seaver (2017) argued for "algorithms as culture," stating that algorithms should be "constituted not only by rational procedures, but by institutions, people, intersecting contexts, and the rough-and-ready sense-making that obtains in ordinary cultural life" (p. 10). Seaver (2017) established algorithms as "composed of collective human practices" (p. 5) and recommended that researchers explored algorithms ethnographically. Drawing on this previous research, this study is based on the argument that algorithms are a process that includes the assemblages of both human and non-human agents in social and technical contexts, where they meet, interact, and conflict with each other. In the following analysis, therefore, algorithms are examined using a social science approach in which the "algorithm" is assumed to be a multi-layer concept that includes heterogeneous and dynamic

sociotechnical practices (Beer, 2017). In using this approach, the algorithm is situated in the inter-connected social network of the on-demand economy, which is constituted by different parties and has multi-layered sociotechnical implications.

The study of algorithms has gained momentum, leading to multiple layers of inquiry. One approach that is currently used in studies of algorithms focuses on the social power of algorithms, such as how they shape decision-making and governance (Yeung, 2017). Other studies have found that they have agentic power and can be agonistic (Amoore, 2013; Kennedy, Poell, & van Dijk, 2015) and that they maintain structural power relations through classifying, ranking, and predicting (Mager, 2012; Rieder, 2017). Another approach has been to examine algorithms through the perspective of everyday life (Kitchin & Dodge, 2011). Distinct from studies relating to social power, these studies developed political-economic critiques to understand not only how algorithms shape organizational, institutional, commercial, and governmental decisions but also how algorithms are experienced, imagined, and even reshaped through "everyday lived experience" (Beer, 2017, p. 6). Willson (2017) demonstrated that algorithms are increasingly engaged in the delegation of roles in performing and enabling everyday practices. Willson (2017) also provided different "ways of seeing" (p. 146) algorithms, especially with regard to how human users may use technologies to enact their daily practices or apply specific assumptions. Bucher (2017) argued for the notion of "algorithmic imaginary" (p. 42) in articulating the interactive relations between users and the Facebook platforms. Bucher argued that Facebook users' perceptions of algorithms and their functions play a critical role in shaping and constructing the algorithms themselves.

Following the latter approach, this study was aimed to explore the relations between algorithms and labor. It begins with a bottom-up argument for the reconsideration of the making and remaking of algorithms in understanding work politics in the case of platform delivery workers in China. Because algorithms can be enacted and understood through multiple perspectives (Seaver, 2017), this study considers "algorithms in everyday labor" with specific regard to delivery workers' experiences of algorithm-mediated labor. This approach is used to open the black box of algorithms by documenting the everyday labor practices of delivery workers. In this bottom-up approach, individual laborers are viewed not as subordinates but as people whose feelings, emotions, and experiences of algorithms are significant, raising questions about understanding agency and power in the complex interactions of humans with technology (Lupton, 2014). The "algorithms in everyday labor" approach focuses on personal stories and experiences to see "how algorithm processes are experienced and reacted to at the level of everyday experience" (Beer, 2017, p. 6). As mentioned previously, algorithms should be used beyond corporate secrecy and technological constraints (Dourish, 2016), and they should be embedded in multiple social systems that are constituted by varied engagements and practices. In the present study, the concept of "the making and remaking of algorithms" is employed to reveal the dynamics and manifestation of labor politics that occurs in the current platform economy. The concept refers to the making and remaking of algorithms as they are continually refined by feedback from the platform laborers and the social landscape. This study is aimed to explain, on one hand, the reasons that digital labor has become both more accessible and more precarious in the contemporary platform economy and, on the other

hand, how it is possible to break the "algorithm halo" by applying it to the context digital labor politics.

In the following empirical analysis, "the making and remaking of algorithms" is operationalized in three steps. First, the perceptions of platform work as being flexible and entrepreneurial conflicts with the delivery workers' everyday experiences of labor are documented. Second, how individuals make sense of algorithms through real-time work experience and digital platforms is explained. Third, how individuals may go beyond platform algorithms and reconstruct alternative "labor algorithms" is explored.

Research Questions and Methods

Since 2015, Baidu Deliveries has developed artificial intelligence logistics (AIL), aiming to build the first AI ordering dispatch system and online food-ordering platform. Meituan and Eleme closely followed Baidu by establishing their own automated online food dispatching systems in 2016 (Tencent News, People.com.cn). Since then, the three delivery platform giants, which generate millions of food orders every day, have relied on a remote, electronic, and highly automated algorithmic system. As technologies, such as automation, virtual reality, and artificial intelligence, in the on-demand economy have flourished, there has been a trend toward emphasizing the technical, programmable, and sometimes inaccessible characteristics of algorithms. This stream of scholarship may help in understanding the power of technical infrastructure. However, such studies have usually ignored the human labor that is involved in the platform economy. It is imperative to realize that the previous research on the ways in which technology is reshaping the future of work is characterized by a general "lack of engagement with gig workers whose lives and livelihoods are directly affected by changes underway" (van Doorn, 2017, p. 908). In China, the millions of digital workers involved in the platform economy remain invisible to the majority of the population. Therefore, there is a clear need for studies from perspectives based on the everyday life of laborers.

Previous technology and labor studies developed critiques of platform capitalism by showing how digital workers become "algorithmic laborers" (Rosenblat and Stark, 2016) when their work practices and performances are controlled by algorithms (e.g., van Doorn, 2017; Rosenblat and Stark, 2016). If the understanding of the structure of platform capitalism is reversed, and all its constituencies are considered, a core question is raised: what does the algorithm mean to platform workers? To address this question, the following questions are posed: What are the laboring conditions of delivery workers on food delivery platforms and how do they experience and make sense of the algorithms? What can be learned from delivery workers' sense-making of algorithms?

In this study, the work practices of food delivery workers were examined in a case study of three large online food-ordering platforms in China: Meituan, Eleme, and Baidu Deliveries. An ethnographic fieldwork approach was used to scrutinize the performance of the delivery workers and how they made sense of the algorithms used in their work. In this qualitative study, the online food delivery workers were observed in both physical and digital spaces based on their use of "algorithms in everyday labor." The data were collected in interviews,

participant observations, and online ethnography. Because algorithms can be applied and apprehended through a wide range of methods used by different constituencies, this study is based on the assumption that ethnography is an appropriate research method. It can be used to examine the interrelations between humans and nonhumans, "the local production of abstract representation" (Seaver, 2017, p.6), the sense-making of algorithmic operations, and the diverse engagements within the sociotechnical ecosystem (van Doorn, 2017) from an interactive and constructive perspective.

The ethnographic fieldwork was conducted from March 2017 to August 2018. It was conducted in Beijing, which has the largest number of delivery workers in China. Forty-five in-depth, semi-structured interviews were conducted with food delivery workers from the three platforms (43 males, 2 females; 36 full-time, 9 part-time; average age 23 years; average work hours 12.4 per day). Because of the hectic schedules of the food delivery workers, the author tried to follow their work routines and conduct the interviews where it was possible to do so. Most of the interviews were performed either in restaurants or on the street while the workers were waiting for orders. The duration of the interviews was from 60 to 90 minutes. In each interview, the researcher began by telling the delivery workers the purpose of the study and ensuring them that the interview data would be confidential. Informed consent was obtained from participants before the interviews. All interviews were conducted in Chinese and then translated into English by the author.

During the fieldwork, the author visited the delivery workers in their gathering places such as *zhandian* (small stations), restaurants, and street corners every week. At first, it was not easy for a female researcher to be accepted in this highly male-dominated industry. Some delivery workers regarded the author as an inspector from the company, so they tried to maintain their distance. However, as the fieldwork continued, the author joined their chatting and played mobile games with the workers. Gradually, the author became friends with some of them, who later agreed to let her accompany them on everyday work schedules, observe how they took orders, collected the food, and made deliveries. The author also visited some of the delivery workers' living places and documented their life stories. In addition, the author conducted interviews with the Chief Strategy Officer (CSO), the R&D department leader, and the Human Resource Vice President (HRVP) of Baidu Deliveries. All the interviews were transcribed by the author and her team. The coding software NVivo was used to identify the following three patterns of delivery labor.

Becoming a "Knight": Three Modes of Algorithmic Laboring

Temporality

Temporality has become an important source of value in the on-demand economy, especially on food delivery platforms where catering to customers' immediate needs is the priority. Platform algorithms have played an important role in mediating delivery workers' work times. On one hand, the platform constantly calculates and revises their delivery time; on the other hand, the automatic dispatching system generates the "platform adhesion" by the delivery workers. This term refers to a situation in which platform couriers are prevented from participation in time control while relying on the platforms during the work process. Xiao Ji was the

first delivery worker that I interviewed in my fieldwork. During the interview, he expressed the following:

> "When I first worked for Baidu, the delivery time for each of the orders was 45 minutes, but nowadays it has been reduced to 29 minutes! It's crazy. When you see your mobile, it shows you have just a few minutes left, you have to run."

Because speed and efficiency were emphasized on the platforms, the delivery workers were usually under great pressure to deliver orders to customers quickly. Moreover, during rush hours, the workers had to compete against the limited delivery time set by the platforms. The application installed on the delivery workers' mobile phones periodically collected and accumulated data on the delivery time for the purpose of predicting, managing, and rearranging the delivery times increasingly precisely. However, the algorithmic design of timing the delivery workers' labor did not include their emotional work. During the interviews, competing with time was one of the most prevalent issues mentioned by the couriers. Because they are regarded as highly replaceable, delivery workers also have difficulty bargaining the value of their labor for the platforms. As the AI system becomes smarter, the platform tries to shorten the delivery time in order to optimize the labor resources and leverage the extra value generated by the delivery workers. Li Feng was angry about the way Meituan calculated the delivery distance and time:

> "When estimating the delivery time, it (the algorithm) predicts the time length based on the linear distance. This is not true! It is not the case when we deliver the food. It has many windings. And we also need to wait for the traffic light. … Yesterday I delivered one order that was claimed as 5 kilometers by the system; however, I rode almost 7 kilometers. The system regards us as helicopters, but we are not."

The cut-off time has led to a dramatic spike in the number of traffic accidents experienced by the delivery workers. Many delivery workers chose not to follow the traffic rules when they were running out of delivery time. However, taking shortcuts or veering onto the wrong side of the road frequently resulted in tragedy. In the first half of 2017, 76 casualties of traffic accidents in China were delivery workers, half of whom worked for Eleme and Meituan (The Paper, 2017). According to the *Sina News* (http://news.sina.com.cn/), there are casualties of delivery workers every 2.5 days in Shanghai (Sina News, 2017). In Nanking, there are 18 traffic accidents involving delivery staff every day.

The process of platformization has enabled algorithmic systems to dispatch orders and manage deliveries, so delivery workers have lost control over their work time. Although corporations, such as Meituan, Eleme, and Baidu, promise flexible schedules and good payment when they recruit deliver workers, based on actual experiences of Li Feng, such inducements "cannot be taken seriously." Their everyday labor is entirely dependent on the AI ordering and dispatch system, which is usually perceived as elusive and black-boxed (Greenfield, 2017). As full-time workers, they are required to comply with the compulsory eight-hour day; however, most of them choose to work longer hours to get more orders. Li Feng disclosed, "If the system does not assign you enough orders in rush hours, you have to wait for more (orders), otherwise, you cannot make ends meet."

Figure 2. Order status in the application used by Baidu Deliveries.

Because their income is based on the number of orders, the delivery workers rely heavily on the platforms. Consequently, "platform adhesion" has made them venture laborers who have lost control of their work time (Neff, 2012). Compared with manufacturing, where production and reproduction are strictly scheduled, platform laborers experience a blurred demarcation between work and leisure time. Workers spend most of their work time playing mobile games, smoking, or chatting on the street corner as they wait for orders. Moreover, they are on standby and must be prepared to work at any time. Some even receive alerts when they are in the bathroom. Sharma (2014) termed this time hierarchy "power chronography," where laborers' work schedules are beyond their control and tied to the temporary needs of customers. The lack of a demarcation between work and leisure is consistent with Gregg's (2013) concept of "work intimacy," in which people's work time is omnipresent because of the Internet and the penetration of digital media. For delivery workers, "platform adhesion" is an even worse work condition because the platform algorithms not only occupy the reproduction time of the delivery workers but also prevent them from controlling their work times.

Affect and emotional labor

Because the food delivery platforms are strongly oriented to their customers, the delivery workers have to perform various kinds of emotional labor (Hochschild, 2003) under the algorithmic governance of the platforms:

> "We are told a lot of musts and must nots. For example, when delivering the food, we are not allowed to enter the customer's room, to receive any tips, or to ask for a

> good comment. We have to smile, knock at the door, and hand over the change with both hands."

According to Hochschild (1979), emotional labor refers to the act of expressing socially desired emotions during service transactions. In this study, emotional labor refers to the emotional regulation and performance of delivery workers when they are dealing with customers. Hence, the delivery is a kind of social performance centered on customers. Consequently, this performance contributes to the generation of a customer-oriented culture (van Doorn, 2014) as service providers optimize themselves to make customers satisfied and confront the situation of being marginalized. Some interviewees also mentioned that they had to consistently make phone calls, set times, and wait outdoors when a customer was not home. They sometimes had to apologize even if they were not responsible for an unexpected delay. According to the delivery workers, the implicit assumption is "to make the customer satisfied and get a five-star comment." The comments and ratings by the customer are directly related to the delivery workers' salaries and promotion. For example, the final incomes of Baidu delivery workers on the platforms are based on customer ratings. The ratings, which are generated by the customers' food-ordering application are on a scale from 1 to 5 where 1 means the least preferred experience and 5 means the most preferred experience.

The supreme rights of customers (Hanser, 2007), according to many interviewees, are "not a fair trade." Figure 2 shows the screenshot of a customer order on the Baidu platform. The application displays every step of the food delivery process to the customer after the order is received. It also shows the mobile phone numbers of the delivery workers to facilitate the customers' communication with them. Customers are also entitled to "cancel the order" or "rush the food" (*cuidan*, 催单) at any time during the ordering process. Some delivery workers complained that they were not on an equal level regarding communication. For example, Zhu said: "They (customers) can see everything, all the processes, but we do not know who they are. And when there is a problem, we cannot just cancel the delivery like they do." Zhu also shared his experience of an order being cancelled:

> "Yesterday, I got two orders to deliver from the same restaurant. One is about 1.5 kilometers, 45 minutes left; the other is about 3 kilometers, 20 minutes left. To make sure deliver both orders in time, I went to the order that had a longer distance first. But the customer with the shorter distance watched my GPS pass-by without delivering his meal. He seemed angry, so he cancelled the order and complained about it to the platform. … They just do not understand you have so many orders to deliver at the same time that you have to find a better way."

On online food order platforms, the evaluations performed by algorithms are legitimized based on the encoded assumptions of who "matters and who does not" (Rosenblat and Stark, 2016). This finding is in line with Hanser's (2007) definition of "distinction work." In Hanser's study, the interactive service work performed in Chinese department stores showed unequal power relations between the workers and the shoppers. In the algorithmic design of the food-delivery applications, there is a logic of "customer supremacy," which explains the marginalization of delivery workers. In the platform delivery system, this logic is legitimized by providing customers with the power to access the delivery map, rush the order, rate the delivery

Table 2. Subsidies for special needs in Meituan Waimai.

Special Kinds of Subsidies	Requirements	Amount of Subsidy for One Order
Delivery Distance	More than 3 kilometers	2 RMB (approx. 0.30 USD)
Night Shift	21:00-24:00	2 RMB (approx. 0.30 USD)
	24:00-3:00	3 RMB (approx. 0.46 USD)
Big Order	The cost of the order is above 80 RMB (approx. 12.16 USD)	2 RMB (approx. 0.30 USD)
	The cost of the order is above 200 RMB (approx. 30.40 USD)	5 RMB (approx. 0.76 USD)
	The cost of the order is above 500 RMB (approx. 76.01 USD)	10 RMB (approx. 1.50 USD)
	The cost of the order is above 1,000 RMB (approx. 152.04 USD)	15 RMB (approx. 2.28 USD)

workers, and make complaints. For delivery workers, this "customer supremacy" is another kind of algorithmic control where they must confront the "information asymmetries" (Rosenblat and Stark, 2016) and "access asymmetries" during their labor process. Distinct from the drivers in Uber or Didi, who can make ratings for their customers, delivery workers cannot access customers' phone numbers before they start the delivery nor can they rate their customers. According to Bowker and Star (2000), "the software that immanently conducts operations of collection, organization and prediction might be seen as the 'frozen organizational and policy discourse' that circulates as a means of legitimizing inequality" (p. 135). As platforms have programmed and engineered workers to be servile laborers, these delivery workers have to generate affective values, such as explaining, coordinating, and communicating during their work practices.

Gamification

A key characteristic of takeaway platforms is that software algorithms have taken the place of human managers in human resource management and performance reviews (Lee et al., 2015). This replacement was achieved by constructing and legitimizing complicated evaluation and rating systems, which constantly monitor the working practices of delivery workers. Many delivery workers perceived themselves to be involved in an algorithmic "game" of categorization and calculation designed by the platform.

The overall game strategy of the food delivery platforms in this study is based on a "scalable management technique" (van Doorn, 2017, p. 903), or "categorization." In this technique, the delivery workers are categorized into different levels based on, but not limited to, the number of their finished orders, traveling distance, duration of work time, and work performance reviews, such as ratings and comments by customers. The total income of the delivery workers is a combination of the minimum wage (*jiben gongzi*, 基本工资) and bonuses. Baidu Deliveries provides a useful example. The basic wage for delivery workers per month is 3,000 RMB (approximately 457 USD). The bonuses are based on the

delivery worker's level of "knight" as well as the number of orders he or she delivered in that month. Each level denotes a different amount of bonus. The Ordinary Knight's bonus can be as low as 0.015 USD per delivery, and the Divine Knight's bonus is 0.23 US dollars for each delivery (see Table 1). The accumulated points are the key element in upgrading to higher levels. Points are based on customers' ratings, which will be elaborated in the following section.

To boost their delivery business, the platforms encourage their delivery workers to deliver as many orders as possible within a limited time. According to Xiao Xu, "they want us to work around the clock. In order to save the time waiting for the lift, I kept climbing the stairs and my knees almost killed me." When I told Xiao Xu that I wanted to become a delivery worker, he was surprised and said, "it's not suitable for you, too much physical work." In addition to ordinary delivery bonuses, platforms also provide different forms of bonuses to boost their orders, which include long distance deliveries, night shifts, bad weather, immediately deliveries, and big order deliveries (see Table 2). This hierarchical and "gamified" evaluation system encourages competition among individual workers, groups, and sites by acting as the basis for self-motivation and entrepreneurship. The evaluation system thus gains legitimacy not only through gamifying workers' behavioral engagement (Rosenblat and Stark, 2016) but also by integrating workers in the reproduction of the evaluation system (Gillespie, 2014).

The overall ranking system used by Baidu Deliveries is based on a point redemption scheme. In this scheme, at the end of each month, the number of points required to maintain the same level of Knight is subtracted from the total number of accumulated points. If the accumulated points are not enough to maintain the corresponding Knight level, the delivery worker is demoted to a lower level in the following month. The delivery companies' increasing capacity to collect and tabulate social dynamics as information and evaluation standards exacerbates the poor working conditions of the delivery worker by reducing them to a "mobile subject" (Platt et al., 2016, p. 2209). The higher their level, the greater the pressure is to maintain that level. "I became a Black Golden Knight last month. I didn't expect that. If I want to keep, see, as the Black Golden, I need another 832 points. This is a lot of work to do," said Xiao Xu while showing me his mobile phone. On his Xiaodu Qishi application, I saw a reminder saying, "to maintain the same level, you need another 832 points." The categorization of the labor is indicative of the governance and control that the platforms have over delivery workers. By promising workers the potential for salary increases, the categorized calculation system contributes to what Gillespie (2014) described as the creation of the "calculated worker," who is essentially an algorithmically managed laborer (Rosenblat and Stark, 2016). The worker's daily work details, upgrading, downgrading, rewards, and penalties are based on categorization and calculation in software algorithms.

The three dimensions of platform labor—temporality, emotional labor, and gamification—are indicative of the "algorithms in everyday labor" approach. This approach reveals not only the ascendance of the algorithms used by the delivery platforms but also the tension between them and their delivery workers. Food delivery platforms rely heavily on an intensive labor pool to generate massive data to substantiate its algorithms and keep them functioning properly. Hence, there is a conflict between the delivery workers and the platforms regarding making sense of the algorithms. In other words, delivery workers' making sense of the

algorithms is in conflict with the management and data-extraction logic of the platform economy (Srnicek, 2017). Instead of following the platform algorithmic system all the time, the workers create their own "organic algorithms" to manage, and in some cases, even subvert the system. Their daily work practices may pose alternative strategies to make sense of the platform company's algorithms.

Remaking Algorithms in Daily Labor

As the platform-dependent workers' labor became fully digitalized and surveilled, their literacy and understanding of the algorithms moved from unfamiliarity to variegated vernacular and discourse. In their sense-making of algorithms, the workers employed a bottom-up approach in which delivery labor and work performances become important "input" while earning income and sustainability become "output." By "inputting" diverse work practices during the delivery process, the delivery workers made sense of the underlying mechanisms and sociotechnical relations. Finally, they remade a set of "labor algorithms" that could facilitate their work performance.

For example, the delivery workers tactically gamified the platform algorithms by aligning with other players in the platform economy. In the spring of 2014 during the bonus war among the rival food-delivery platforms Baidu Deliveries, Eleme, and Meituan and in the summer of 2017 between Eleme and Meituan, delivery workers took orders online by themselves. After receiving the assigned orders, they pretended to complete them without actually delivering any food to the destinations. The delivery workers, restaurants, or food manufacturers would then share the profits. Because the platforms provided bonuses after a certain number of orders is reached, the delivery workers in one *zhandian* helped each other to create orders so that they could receive bonuses.

During rush hours, to ensure that food was delivered to the customer on time and without complaints, the delivery workers may transfer their orders to each other either formally or informally. Formally, they may use the "order transfer" (*zhuandan*) function in the delivery app to inform other workers about the order. However, they usually informally asked colleagues or even friends to complete the delivery for them through their WeChat group, which is a virtual social media community of colleagues and fellow villagers. When they met each other in restaurants, they talked about their orders and transferred them to save time and the battery on their e-bikes:

> "The order I took only got 2 minutes left. It's on the 26th floor, and the lift is busy. I happen to see one colleague is about to come, so I contacted him and left the food to him because I had another three which were about to be late."

Though the AI system was designed to make intelligent decisions based on precise time calculations, it is not immune from mistakes, such as making inaccurate time predictions or showing false delivery routes. To avoid being misled by the background system, the delivery workers learned to trust their own knowledge more than the algorithm. They strategically controlled when and where to work and when to turn on the work mode of the app to get the types of orders they preferred. Veteran workers had rich experience and knowledge regarding real-time

traffic conditions and delivery routes. These veterans usually chose the route they trusted instead of the route recommended by the algorithm.

Social networks, especially WeChat, have become a virtual community of delivery workers in mitigating their vulnerability and enriching their algorithm literacy under precarious work conditions. One delivery worker usually joins two or three WeChat groups on food delivery. The first is the *zhandian*-based courier group, the second is the Xiaozu (subunit of *zhandian*)-based courier group, and the third may comprise their friends and fellow villagers. Because food delivery platforms constantly change their bonus policies, incentive information, and other digital management regulations, WeChat groups have become important sites for information sharing and circulation among the dispersed delivery workers. It is also a critical space for building "communities of practices" (Wenger, 2000) because it allows digital workers to share their tactics of delivery, experience in communicating with customers, and tackling complaints as well as provided information about real-time traffic conditions.

Because the algorithmic order assignment is unreliable and unpredictable, the delivery workers learned to "game" and reduce uncertainty by virtually switching their work places. They downloaded many delivery apps at the same time and constantly switched their work conditions to get more orders from different delivery platforms. Yawei, a full time Eleme delivery worker, showed me his mobile phone on which there were three delivery apps: Shansong, Baidu Xiaofeixia, and Meituan Zhongbao. When there was no assigned order from Eleme, he opened the other two and signed in as a part-time courier. This approach of "planning" (Moten & Harney, 2013) their work schedules through the gamification of the background algorithms opened "adjacent possibilities" (Lobenstine & Bailey, 2014) for delivery workers to remake their "labor algorithms" and complicate the relations between their labor, the platform economy, and the use of algorithms.

Although they are under stringent algorithmic governance, the delivery workers found alternative ways to make sense of the algorithms and develop new forms of cooperation in creating strategies to circumvent the algorithms. The attempt to construct algorithmic labor extends beyond the logic of capital and the market, not only to embed inaccessible algorithms in the material condition of laboring but also to reopen the collective struggle at an algorithmic level. The virtual communities built by these workers became critical bases for individual delivery workers to make sense of and to remake algorithms that they could utilize in their daily labor.

Discussion and Conclusion

This study explored the politics of platform labor in a social context of algorithms and digitalization. The findings indicate that delivery workers make sense of algorithms in the platform economy and digitalization in China. Regarding the research questions, the study examined the ways in which the delivery workers experienced platform algorithms through three modes: temporality, emotional labor, and gamification. It was found that delivery workers who had been described as "entrepreneurial individuals" and "knights" were actually subject to stringent algorithmic control and management. Moreover, the background algorithms, which were claimed to be impartial and value-free, enhanced platform

capitalism and prioritized the objectives of the companies and the needs of their customers.

In the shared economy, it is assumed that workers can make money in their leisure time; however, a platformized ideology that prioritizes entrepreneurialism undermines the essence of platform labor. Because the algorithm used by the food-delivery platform in their order dispatching system prevented the laborers from controlling their time, many delivery workers risked working longer times and losing their reproduction time. The line between their leisure time and their work time was blurred.

In this study, the "algorithms in everyday laboring" approach was used to reconsider the interrelations among the platform economy, algorithms, and agency. In using this approach, it was found that the delivery workers had developed a variegated vernacular and discourse in making sense of algorithms, and they had developed a set of "labor algorithms" to facilitate their work performance. Based on these findings, "algorithm making and remaking" should be included in digital production and its meaning at the intersection of algorithm and labor should be rethought.

The Chinese government is still in the initial stage of regulating platform development. Hence, the logic of algorithms in food delivery platforms mainly reflects the logic of capitalism. With the continued digitalization and platformization of the Chinese economy, algorithms are becoming a new infrastructure that is transforming and reconfiguring labor politics. By linking different parties, such as platform corporations, outsourcing companies, migrant workers, and customers, an ecosystem of goods and services that prioritizes consumption while exacerbating the precariousness of platform laborers is being established.

Asymmetrical power structures reflect deep-seated social inequalities at several levels that are not limited to algorithms or programming. Evgeny Morozov (2014) contended that social biases exist regardless of whether algorithms or computers are doing the job or not. Similarly, Leurs and Shepherd (2017) argued that algorithms are a form of "methodological genocide" that disregards history, culture, context, specificity, meanings, structure, and agency. In this ethnographical study, algorithms were understood as embedded within local, contextual, and multi-layered sociotechnical relations. The study addressed not only the necessity of focusing research on algorithms and software but also the largely ignored human labor that should be at the heart of any analysis of the information society. It has been argued that algorithms could be conceptualized through not only a black-boxed approach but also everyday experiences and practices. In the present study, this approach was applied to examine delivery workers' daily communication, work performance, and "communities of practice" (Wenger, 2000) in local environments. The findings of this ethnographic study demonstrate the need to reconsider the political and sociotechnical meanings of algorithms in developing a means of platform cooperativism (Scholz, 2016) in China's transformation.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on Contributor

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