Food Delivery Platform in the United Kingdom: The Flexible Matching of Deliveroo

Qiushi Yao[✉]

University of Manchester, Manchester M13 9PR, UK
`Qiushi.yao@student.manchester.ac.uk`

Abstract. With the development of the Internet, online platforms are changing our daily life. Especially, the food delivery platform, like Deliveroo, is leading a new trend of gig economy. There is no denying that Deliveroo provides abundant jobs every year and has mature operating mechanism, but excessive automation leads to some problems, like inefficient matching process since dishonesty by riders, unreasonable work intensification and the irresponsible actions to workers by the platform. Based on the existing matching algorithm between riders and orders and salary system in Deliveroo, this paper mainly focuses on the matching algorithm of Deliveroo, and finds that current situation is not friendly to riders even influence the working performances. This paper discusses the existing problems and puts forward some suggestions to improve this situation, so as to make the work environment be more friendly to riders and improve people's life to be more convenient.

Keywords: matching algorithm · online platform · food-delivery workers · Deliveroo · piece wage

1 Introduction

Online platforms are changing our daily life to make everything is easier by providing innovative services [1]. For typical example, Deliveroo is one of the biggest food-delivery platforms which provide the take-out services. Deliveroo is established by Will Shu in 2013, which wants to bring great restaurants closer to their customers. At the first, Will Shu found that he cannot get the fast and great quantity delivered food nearly in London, so he made a platform to transform the way people think about food delivery by offering fast, transparent and reliable delivery from premium restaurants [2]. Especially, the covid-19 pandemic has heightened its importance of takeaway delivered services to some extent. The report from Deliveroo indicates that after pandemic, more than 8 out of 10 UK customers ordered deliveries more frequently in December 2021 than they did the year before [3]. Deliveroo also revealed that there is 110% increase of online orders in UK in the first of 2020 [4]. The consumers can place orders on Deliveroo without contact and get takeaway meals from riders. The coordination of the human labour of delivery is therefore automated through the algorithm, and in the process has enabled Deliveroo to make a market for food delivery in the cities [5]. In this progress,

riders play an important role that transport the orders from restaurants to consumers, and the matching model of assigning orders is also significant. But some problems are still existing and lead to inefficient matching.

As researchers in UCL [6] indicate, changing salary pattern and improving algorithm is a beneficial way. Meanwhile, rationally humanized management supervision should replace some of automation. This papery mainly focuses on the matching algorithm of Deliveroo and how to improve these problems, so as to make the platform be more efficient and better for the multiple sides of the food-delivery market.

2 Analysis of the Food Delivery Platform in the United Kingdom

2.1 Current Situation of Food Distribution Platforms in the UK

The growth of online platforms has given rise to a new and important job: riders. As the main food delivery platform in the UK, Deliveroo have around 15,000 riders for delivery [6]. Obviously, they provide the substantial job opportunities for unemployed. Woodcock thinks that these workers are a major part of the so-called "gig economy", in which work is becoming increasingly fractured across different gigs—or precarious work arrangements. Meanwhile, the platform claims that they bring together the restaurants and drivers rather than directly employing anyone [7]. These "self-employed independent contractors" status bring platform to the question of how to assign the numerous orders to every independent rider from restaurants.

2.2 The Allocating Method of Deliveroo

In 2017, Rohan Pradhan, Deliveroo's director of strategic projects, revealed their real-time dispatch algorithm: Frank [6]. Firstly, consumers place the order on Deliveroo. Meanwhile, Deliveroo is allowed to collect the real-time data from workers. When drivers log in the platform, they are tracked by the GPS [7]. And Frank takes two seconds to estimate preparation or delivery time and assign a delivery worker who has the best characteristics to fulfil that specific order, based on distance, type of location and other factors [6]. In this progress, every stage of an order is recorded in system. At the last, rider will run for this order. Obviously, Frank is operating a one-to-one model for matching orders and riders, which means the one order will be completed by one matched rider.

2.3 The Salary System of Riders in Deliveroo

To intensify work, Deliveroo chooses to use piece wage or piece rate for the couriers, which means riders will earn same from each order. This mechanism forces riders to either go faster or earn less. For example, in a piece wage zone, unit rate is £2/order while the original hourly wage is £6/h. Workers need to do an hour with minimum 3 deliveries to up to hourly wage. This means workers wring every possible deliveries as long as they can, because they never know when order volume will drop off. As a result, the work process become increasingly speed up and efficiency increases [6]. The intensification problem of algorithmic management was being solved through a piece wage

structure. However, Woodcock illustrates that the piece-rate system caused widespread resistance among workers, when they only agree to work for a higher wage and not restrict productivity measures [7].

2.4 Existing Problems of Deliveroo and Other Food Delivery Platforms

There is a significant problem about riders' dishonesty behaviour, which is mainly due to the salary system and the little loophole of the algorithm. Cant [6] illustrates that "Frank" has automated algorithmic management of every order, but it could not discipline workers. Piece wage also pushes riders to get more orders and earn more, even though get through some insidious ways. Therefore, they will tend to have some dishonesty actions or strategy. For example, some riders think the zone centre where has more restaurants is easier to get more orders, so they gather there consciously. At this time, riders in downtown will have too much orders, but other unwanted orders from further zones is hard to assign. This will slow down the delivery process and influence the original stable matching by algorithm.

Furthermore, excessive work intensification will put workers into a status without safe guarantee. A report indicates that the jobs for food delivery are low-income by precarious student workers primarily [8]. Since the instability and temporary nature of gig economy, piece wages force riders to earn salary as possible as they can in the limited time. And in some bad weather, some riders broke bones dodging potholes and going down in icy conditions and have to be off work without salary. Therefore, even though piece wage system will good for working efficiency, it also leads to the extreme work intensification to workers and makes working environment be unreasonable. Deliveroo claims that they do not have responsibility to pay for any broken devices or wages when riders are ill because of work. Meanwhile, the platform will get the considerable profits from faster speed and efficiency based on the riders. In other words, all risk is taken by riders and to a great extent, the platform achieves both the fame and fortune [6]. Moreover, Deliveroo does not provide the labour contract to them, even health insurance, work schedules or any employment relationship framework. In this situation, workers are considered collaborators without any kind of legal, labour, or social safety nets [9]. Researchers find that around 29% of the U.S. workforce participates in the gig economy, when drivers making up the majority. They do not have fixed salaries. In fact, their earnings depend on some determining factors such as distance, work done during "peak hours", or the number of times the "driver" rejects or accepts requests [9]. Therefore, workers in Deliveroo need some ways and government regulation to protect their rights and safety.

2.5 Corresponding Measures Taken by UK

To solve the dishonesty of riders, setting quotas is the straight way. The platform should limit the maximum volume of orders received by riders during the peak hours to make sure the matching and delivery process efficiently. Meanwhile, to supply the gap of salary from less order, researchers from UCL recommend that piece wages should be abolished and replaced by decent hourly wages [6]. For this situation after Pareto improvement, food deliveries will be completed efficiently and riders will receive the reasonable salary.

Furthermore, Deliveroo should organize the "bonus system", which means when riders get excellent performances in limited hours, they should get some bonuses like tips from consumers to intensive.

Besides, some compulsory regulations are needed to the platforms to protect workers and their rights. Taking some responsibilities by Deliveroo to the riders when they have troubles because of works is the best way to operate. For example, the legal strategy forced Deliveroo to introduce the reject button and substitution clause [10]. When riders feel not well or cannot make sure the safety of delivery, they should have chances to decline the orders. And Deliveroo have announced that they will offer a form of limited sick pay, as well as one-off payments for maternity and paternity [10]. This measure largely reflects the fact that platforms will shoulder some of the responsibility through subsidies.

3   Conclusion

Consequently, the matching model between riders and orders in Deliveroo is the typical algorithm in matching market. It works efficiently today but still has spaces to improve, like decrease the possibility of riders' dishonest behaviours. For wage system side, Deliveroo also need to consider the rationality of piece wage and takes some responsibilities they should do, like through the reasonable hourly wage and some welfares and legal regulations to guarantee the safety and power of workers. As a major company, Deliveroo should think about that if they will operate some humanized improvements instead of only pay attention to the profits by exploiting workforce. Based on the researches from previous scholars, we discussed the problems in the existing algorithms for the food delivery platform, but the effect of dishonesty of riders is always ignored in some papers. In this essay, we paid some attentions on this situation and hope have deeper study in the future.

Authors' Contributions.   This paper is independently completed by Qiushi Yao.

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