2021-11-17

DiDi

ANALYSIS OF ETHICAL ISSUES OF DIDI

SAY NO TO ALGORITHMIC EXPLOITATION

YIYAN YANG

Z5183946

Background

DiDi is an IT company that provides ride hailing service (RHS) through mobile internet. Internet RHS is a developing business that appeared ten years ago, started by Uber. Unlike traditional taxi service, users can request a ride through their mobile phone and wait for the platform to assign a suitable drive for their trips. The service providers apply advanced technologies and algorithms to ensure a relatively lower waiting time, more reasonable cost and better overall experience comparing to traditional taxi service (Lu, et al., 2020). With the absolute advantage, the global market volume of ride hailing industry is going to exceed 285 billion within ten years (Huston, 2017). DiDi, as one of the largest RHS companies, is providing 60 million trips per day on average in the past year. After two years' operations in Australia, this company is planning to expand services to broader areas in Australia and New Zealand. It is a great opportunity to make an investment considering the market depth and strength of the company. However, due to the unique nature of online ride hailing service, careful investigation is needed to ensure that the company we invest is ethical.

The recent studies showed that DiDi is using algorithm to exploit its customers, including passengers and drives. The algorithmic exploitation is shown in two aspects: Price discrimination and manipulating. This report will analyse the ethical issues involved with price discrimination at first and make an ethical judgement based on the arguments with evidence. Then the manipulating strategy of DiDi will be examined in the same way. In the end, an overall investment decision will be made with reference to the ACS Code of Conduct followed by the suggestions to DiDi to rectify its unethical behaviour.

Algorithmic exploitation

Price discrimination
Thanks to their enormous amount of passenger volume, DiDi is able to collect a vast range of data to improve its service quality. However, recent studies showed that it is using the big data collected to obtain excessive income by price discrimination (Lu, et al., 2020). By definition, price discrimination is a pricing strategy to offer the same product to customers with different pricing. Although it is a common practice to offer different prices to customers according to their group identification. The strategy applied by DiDi to charge customers by their maximum psychologically affordable price, usually called first degree price discrimination, is considered unethical (Elegido, 2011). As pointed out by OECD, personalised pricing is the practice of first price discrimination achieved by analysing customer behaviour to uncover their willingness-to-pay (OECD Competition Committee, 2020). By deliberately setting the prices, companies can transfer the economic surplus from consumers to firms stealthily, especially from regular customers (Chen, 2021). So, there is a potential ethical issue that DiDi is using algorithm inappropriately.

As a servicing platform, the purpose of their pricing algorithm is to set a reasonable price to achieve the market equilibrium between drivers (suppliers) and passengers (consumers) and eventually to improve the service quality. Because the service quality of RHS is usually determined by passenger satisfaction and matching efficiency (Sun, Xu, & Shi, 2020). However, DiDi is exploiting the information asymmetry to benefit from the price gap between drivers and passengers. For example, when the bid price of customer is higher than the offer price of drivers, DiDi would play the role of market maker to charge the customers at the higher price while paying the drivers at the lower offer price only. Thus, DiDi can earn abnormal profit from the price gap in addition to the commission fees. From Kantian perspective, the DiDi is not using algorithm to improve their service quality rather take advantage from it. In addition, personalised pricing transfers the economic consumer surplus to the business without providing any additional services. Harm to consumer welfare is even severer in such monopolised market like the RHS market (OECD Competition Committee, 2020). Therefore, based on the consequence, algorithmic price discrimination is also unethical.

Although some researchers suggest that earning profit from the price gap is considered as the reward of providing dynamic liquidity to the market (Han, Gao, & Deng, 2018). DiDi is still facing moral issues regarding the transparency problem. According to the OECD competition committee, personalisation is especially harmful when customers are unaware of the fact. And because the pricing algorithm is usually a black box, consumers usually can't be informed Why they are offered a certain price. In addition, the algorithms are also crucial intellectual properties of the platforms, it is impractical to censor the codes behind them. Therefore, determining whether DiDi is charging reasonable prices becomes infeasible. To solve this problem, Lu (2020) suggested a pricing auditing system for ride hailing services to detect malicious pricing by the platforms. He believes that when the price is set fairly, price discrimination can increase transportation supply and balance the surplus distribution between business and customers then increase the social welfare eventually.

Manipulative strategy

DiDi is also accused of its manipulative strategy in matching and rating algorithms. RHS is characterised by its matching algorithm which allocates drivers to passengers dynamically by analysing the traffic conditions and customer location. The algorithm can help to reduce the waiting time and empty rate so that RHS platforms can provide a more satisfying trip and increase transport capacity. Researches show that the algorithms of RHS also incorporate customer specific information such as gender, age and employment status to optimize matches (Aydin, Gokasar, & Kalan, 2020). However, Sun discovered that DiDi is taking advantage of the matching algorithm by practicing the manipulative strategy (2020). DiDi offers a wide range of choice of the car make and manufacturer with different price range. The research finds that DiDi is attempting to suggest a more expensive option by intentionally hiding the cheaper cars event they are near to the customer. Even it is intentionally understating the expected time and fees to attract users (Sun J. , 2020). This phenomenon is especially obvious on frequent users because the algorithm knows their psychology better. DiDi offers more random discount to new users to encourage them to

use more thus the company can collect their personal information for the algorithm. After collecting sufficient customer information such as consumption habit, routine and patience ceiling, DiDi can stop offering discounts and start the algorithmic exploiting. This strategy, called "Big data swindling" or "Big data killing", is becoming problematic people's reliance on smartphones grows (Hu, 2019).

As stated by Schereieck, matching algorithm is used to increase vehicle utilisation, its target is to find optimal car allocation to decrease average waiting time and to solve traffic congestion problems (2016). However, after making more than 800 trips, Sun finds that DiDi is not attempting to optimizing the trips but trying to maximize commission fee (Sun J. , 2020). DiDi promises to provide accurate and optimal matching history, that's why customers choose it and agree on the commission fee. However, DiDi is not performing its obligations as expected. In addition, the purpose of algorithm is to improve the service quality rather than make profit. Therefore, this companies' misuse of algorithm is unethical from Kant's perspective. Also, DiDi also harms customers' interest by allocating a farther and more expensive vehicle, and forcing the passengers to choose a costly option by hiding the cheaper cars. Not only passengers are affected, the interest of drivers of cheaper price range cars are also been injured. A grate proportion of drivers complained that they cannot receive the order from the customers unless the luxury car drivers decline them (Sun J. , 2020). So, it is also unethical based on the consequences.

Conclusion

After examining the algorithms with evidence, it can certain that DiDi is exploiting the algorithms to earn abnormal profit. By assessing this behavior based on duty and consequences, it can be concluded that the misuse of algorithms to achieve price discriminating and manipulative strategies is unethical. It violates the following ACS codes (Australian Computer Society, 2014):
1.   The primacy of the public interest
2.   The enhancement of quality of life
3.   Honesty
The main goal of algorithmic exploitation is private interest of the company instead of public interest. While the abuse can harm the users' interest and reduce the quality of life. Charging additional fees to customers stealthily is a serious dishonesty. Also, misleading customers by showing fake car availability information is a threat to Honesty.

Suggestion to DiDi is to offer a more transparent charging policy and to inform both drivers and passengers the commission fee of each ride. They should also fully utilize their algorithms to enhance the service quality instead of stealing surplus from customers. They should aim to provide most suitable product using the analytical algorithm rather than most expensive ones. In addition, DiDi should stop providing misleading information, and give more autonomy to drivers and passengers to let them to determine the counterparty. Market supervision department can also adopt an auditing system to audit the algorithms and the operations of

the RHS providers to ensure a fair and transparent market.

References

Australian Computer Society. (2014, April). *ACS Code of Professional Conduct.* Retrieved from acs.org.au: https://www.acs.org.au/content/dam/acs/rules-and-regulations/Code-of-Professional-Conduct_v2.1.pdf

AydinFarukOmer, GokasarIlgin, & KalanOnur. (2020). Matching algorithm for improving ride-sharing by incorporating route splits and social factors. PLoS ONE. doi:https://doi.org/10.1371/journal.pone.0229674

Chen, S. (2021, October 5). *chinamediaproject.org.* Retrieved from Big Data Swindling: https://chinamediaproject.org/the_ccp_dictionary/big-data-swindling/

Elegido, J. M. (2011). The Ethics of Price Discrimination. *Business Ethics Quarterly*, pp. 633-660. doi:doi:10.5840/beq201121439

Han, W., Gao, Y., & Deng, A. (2018, August). *Algorithmic Price Discrimination on Online Platforms and Antitrust Enforcement in China's Digital Economy.* Retrieved from Antitrust Source: https://ssrn.com/abstract=3250075

Hu, L. (2019, September). The Principle and Legal Regulation for "Big Data Swindle Acquaintances". *Proceedings of the 4th International Conference on Economy, Judicature, Administration and Humanitarian Projects (JAHP 2019)* (pp. 417-419). AtLantis Press. doi:https://doi.org/10.2991/jahp-19.2019.87

Huston, C. (2017, May 27). *Ride-hailing industry expected to grow eightfold to $285 billion by 2030.* Retrieved from marketwatch.com: https://www.marketwatch.com/story/ride-hailing-industry-expected-to-grow-eightfold-to-285-billion-by-2030-2017-05-24

Lu, Y., Qi, Y., Qi, S., Li, Y., Song, H., & Liu, Y. (2020). Say No to Price Discrimination: Decentralized and Automated Incentives for Price Auditing in Ride-hailing Services. *IEEE Transactions on Mobile Computing*, 99. doi:10.1109/TMC.2020.3008315

Maximilian Schreieck, H. S. (2016). A Matching Algorithm for Dynamic Ridesharing. *Transportation Research Procedia*, 272-285.

OECD Competition Committee. (2020). Executive Summary of the discussion on Personalised Pricing in the Digital Era. Personalised Pricing in the Digital Era. Paris: Organisation for Economic Co-operation and Development.

Sun, J. (2020). *2020 Ride-hailing software travel status survey report.* Shanghai.

Sun, Z., Xu, Q., & Shi, B. (2020). Dynamic Pricing of Ride-Hailing Platforms considering Service Quality and Supply Capacity under Demand Fluctuation. *Mathematical Problems in Engineering.* doi:https://doi.org/10.1155/2020/5620834