



Transportation Data Science Seminar Series

Balancing the Tradeoff between Profit and Fairness in Rideshare Platforms

Seminar summary

Rideshare platforms, when assigning requests to drivers, tend to maximize profit for the system and/or minimize waiting time for riders. Such platforms can exacerbate biases that drivers may have over certain types of requests. We consider the case of peak hours when the demand for rides is more than the supply of drivers. Drivers are well aware of their advantage during the peak hours and can choose to be selective about which rides to accept. Moreover, if in such a scenario, the assignment of requests to drivers (by the platform) is made only to maximize profit and/or minimize wait time for riders, requests of a certain type (e.g., from a non-popular pickup location, or to a non-popular drop-off location) might never be assigned to a driver. Such a system can be highly unfair to riders. However, increasing fairness might come at a cost of the overall profit made by the rideshare platform. To balance these conflicting goals, we present a flexible, non-adaptive algorithm NADAP, that allows the platform designer to control the profit and fairness of the system via two parameters (α , β). We model the matching problem as an online bipartite matching where the set of drivers is offline and requests arrive online. Upon the arrival of a request, we use NADAP to assign it to a driver (the driver might then choose to accept or reject it) or reject the request. We formalize the measures of profit and fairness in our setting and show that by using NADAP, the competitive ratios for profit and fairness measures would be no worse than α/e and β/e respectively. Extensive experimental results on both real-world and synthetic datasets confirm the validity of our theoretical lower bounds. Additionally, they show that NADAP under some choice of (α , β) can beat two natural heuristics, Greedy and Uniform, on both fairness and profit.

Speaker's information



Dr. Pan Xu is an Assistant Professor in the Department of Computer Science at New Jersey Institute of Technology. Before that, he got a Ph.D. in Computer Science in May 2019 from University of Maryland (UMD), College Park and another Ph.D. in Operations Research in Aug. 2012 from Iowa State University (ISU). He has been fortunate to be supported by several Fellowships and Awards including an F. Wendell Miller Fellowship (2009-2012, ISU), a Research Excellence Award (2013, ISU), an Ann G. Wylie Dissertation Fellowship (2018-2019, UMD), an Outstanding Graduate Assistant Award (2018, UMD), and a Larry S. Davis Doctoral Dissertation Award (2019, UMD). He recently won an NSF CRII Award (2020).

Time: 4:00-5:00 p.m. US Central Time (Thursday, April 15, 2021)

Zoom Meeting ID: 732 641 0814 Passcode: 575829

Direct Link: <https://tamu.zoom.us/j/7326410814?pwd=cGZKY045dmVkdzVRLy9MYWhocWorQT09>

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