

1. AI Design of Ride-hailing Platforms: A Feminist Analysis of Workers' Precarity

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Abstract

The rise of the ride-hailing sector with low barriers to entry and promise of inclusivity are opening new avenues for workers to participate in the platform economy. However, the “digital labour” is managed and controlled by efficiency-oriented AI-enabled algorithms, which often neglects the needs of disadvantaged groups, especially women, amplifies labour precarity, and increases mental stress due to the incentive-based gamification model. This chapter critically analyses the algorithm design of the ride-hailing platforms by conducting in-depth qualitative interviews with the platform representatives, platform drivers, and an AI specialist, and documents analysis of official reports on this sector. In applying Bardzell's feminist design framework committed to issues such as agency, fulfilment, identity, equity, empowerment, and social justice, this chapter provides guidance on shaping ride-hailing platforms for a more inclusive design.

Keywords: ride-hailing platforms, platform design, algorithms, women cab drivers, artificial intelligence, platform drivers

Introduction

I remember getting stranded in the middle of the road a few years ago when an Ola cab driver remarked that my trip had stopped abruptly, and he could not take me to my destination. Frantic, I still requested him to drop me home, but he refused, saying he could not complete the ride since the app

had stopped working. On another unfortunate day, I was unable to find a cab back home as the drivers kept refusing to take up what they saw as a long ride. When I eventually found a cab, the driver continuously complained about how multiple short rides benefit him more. I tried to tip him after he finished the ride, but instead he requested me to book the same cab again, for a few kilometres, as that would reap more rewards. While I wanted to oblige, I couldn't find the same driver, even though he had parked his car right outside my house. Another time, I spent the night at the airport as I was terrified to book a cab at that late hour. I regretted not checking the flight timings before confirming the booking, having overlooked the fact that women need to be cautious about these things.

Although my first response was to blame the cab drivers for what I saw as an unprofessional attitude, it slowly dawned on me that they have their own constraints. In the first scenario, the app had stopped working, so he couldn't complete the ride for fear of getting penalized, which also resulted in a bad rating by me. In the second situation, I wondered why the algorithms reward shorter rides rather than longer ones. Moreover, how do they assign drivers if proximity isn't the only factor and why was my driver not aware of that? In the third instance, why couldn't I be assigned a woman driver to make me feel safer when travelling late at night?

The rapid rise of the ride-hailing sector with increased digital connectivity, coupled with low barriers to entry, flexibility of timings, and the promise of inclusivity are opening new avenues for workers to participate in the Indian platform economy. However, in this digital matchmaking economy, algorithms are increasingly taking the role of human resource managers, middle managers, and customer service representatives (Schmidt 2017). The automation of this sector may reproduce and perhaps amplify the exploitative and gendered discriminatory practices that have long pervaded these contexts as evident in the growing literature on algorithmic unfairness and oppression (Lee et al. 2015; Page et al. 2017; Rosenblat and Stark 2016). Few workers gain insight into the "logic" of governing work and often must alter their behaviour, even if detrimental to their well-being. A few studies also point towards the reinforcement of the existing intersecting inequalities, exploitation of workers, and unequal power relations, especially based on gender, race, ethnicity, class, and migrant status with respect to the on-demand platforms in the United States (US), India, Mexico, Kenya, and South Africa (Hunt and Machingura 2016; Ticona and Mateescu 2018; van Doorn 2017). Being "worker blind" and designing only "customer-centric" platforms can reduce the gains made by these new technological opportunities for workers, especially women.

This chapter critically analyses the algorithm design of the ride-hailing platforms by drawing on data from nine semi-structured in-depth qualitative interviews with four platform representatives, four platform drivers, and an Artificial Intelligence (AI) specialist, conducted between July 2021 and January 2022. The platform representatives are the senior managers and executives working at popular ride-hailing platforms in India; the platform drivers (two men and two women)⁴ are working or have worked with mainstream platforms such as Ola and Uber; and the AI specialist (Uday Keith) is a Senior AI Developer with Wipro Digital, representing a neutral standpoint that is not influenced by the ride-hailing segment. It is further supported by carrying out an analysis of about forty documents—official reports from ride-hailing platforms, media coverage, and empirical studies in this area.

By deploying Bardzell's (2010) "Feminist Human-Computer Interaction Design" approach, it centres the lived experiences of those who encounter precarity, informality, and discrimination, and simultaneously discusses the implications for the under-represented women drivers in this sector. It is built on the feminist standpoint theory that advocates for a new domain of user research focusing on enhancing the knowledge and experiences of the "marginal" user. According to Bardzell (2010, 1301), "feminism is a natural ally to interaction design, due to its central commitments to issues such as agency, fulfilment, identity, equity, empowerment, and social justice" and it has far more to offer than just pointing out instances of sexism.

This six-point feminist design framework analyses the ride-hailing sector by using a bottom-up approach and addresses some of the questions raised in the beginning.

Acceptance Rate, Incentives, and Gamification: Quality of Participation

Digital platforms are built on the premise of enabling "flexibility" and "freedom" (Woodcock and Graham 2020), however it is rarely carried out in practice. Uber stated that declining a ride does not affect a driver's promotions⁵ and Ola specified that the driver has the sole discretion to reject a ride,⁶ but as per the cab drivers, they cannot decline or cancel any ride as

4 All names used in this chapter have been changed to protect identity.

5 <https://help.uber.com/driving-and-delivering/article/what-are-acceptance-rates?nodeId=5cccf675-778e-4495-94e7-27c619d20990>

6 <https://www.olacabs.com/tnc?doc=india-tnc-website>

it can lower their assignment acceptance rate.⁷ A twenty-six-year-old cab driver with Ola and Uber, Hari Singh, referred to this as “rating” and said, “Yes, when you cancel a booking, rating goes down on its own.” Rashid Khan, another cab driver, elaborates, “At one point if you keep on cancelling many rides, then they also suspend your account. First, they lower the rating, then they will give you a warning.”

Secondly, the platforms “transform wage labour into a game, in an often manipulative, behaviouristic manner” (Schmidt 2017, 12), for instance, by incentivizing the drivers on completing a certain number of rides and compelling them to work for longer hours. Scheiber (2017) describes this phenomenon in context to Uber as:

To keep drivers on the road, the company has exploited some people’s tendency to set earnings goals—alerting them that they are ever so close to hitting a precious target when they try to log off. It has even concocted an algorithm similar to a Netflix feature that automatically loads the next program, which many experts believe encourages binge-watching (para 8).

Driver Hari Singh said, if he completes twenty rides in twenty-four hours, he gets INR 150 (\$2) as an incentive, and though it is not mandatory, he takes up multiple rides for sustaining himself financially and repaying the car loan. The current incentive-based model brings forth two major concerns in this sector: extremely low-incentives that reinforce precarity of the blue-collar work; and staying on the road for longer hours, which causes physical fatigue and complicates the situation for women drivers as they have an additional burden of care responsibilities.

Elaborating on a *participatory* approach that is compatible with empathic user research, Bardzell suggests ongoing dialogue between designers and users to explore understanding of work practices that could inform design. This also means if the platform companies and AI developers are oblivious to the needs and concerns of labour, they may end up designing technology that could unintentionally sabotage users. In this case, Uday Keith, a Senior AI Developer with Wipro Digital, suggests the following:

To simplify the process and ensure equity in the gig economy, platform companies can advise AI developers to introduce a “rule.” This would mean fixing the number of minimum rides or tasks a platform worker

7 Acceptance rate is the number of ride requests accepted by the driver divided by the total number of requests received.

gets in a day, which can also help in ensuring a minimum wage to them and provide a certain level of income security. Further, the reward system can undergo a major overhaul. For instance, rather than incentivizing them to drive more and indulge in compulsive game-playing, platform companies can build algorithms that provide financial rewards when the drivers follow traffic rules and regulations, drive within permissible speed limits, and ensure a safe riding experience (Personal interview).

Rating Dynamics: Quality of Embodiment

In the ride-hailing sector, passengers act as “middle managers” and the ratings given by them directly impact drivers’ employment eligibility (Rosenblat and Stark 2016). Consequently, all the drivers emphasized the importance of customer ratings as the most significant performance metric but expressed discontentment in terms of how the ratings were computed. Rashid Khan, a male cab driver aged twenty-seven, said:

The customer could get angry at anything and leave a low rating. [...] Most of the time we don’t find out. [...] If the customer leaves us a one star, only then we will find out. [...] I will get a notification from Uber about what happened during this ride that the customer has given you one star. [...] Otherwise if someone leaves a two or a three, then it doesn’t really matter (Personal interview).

Hari Singh further explained that though the platforms listen and acknowledge the drivers’ side of the story, their rating still goes down as they receive comparatively fewer rides after that. Malini Tyagi, aged thirty-five, a former female cab driver with Ola, described how the passengers sometimes did not allow her to stop the car to use the toilet. In this case, she was often forced to end the trip, which “apparently” led to low ratings by the customers. However, she could not identify those low ratings and reach out to the platform executives as the drivers do not get to view the individual ratings and reviews given by the passengers. She said:

The rating is something that you could never control. Because the rating displayed to the driver [...] would always be on a weighted average system. So, we never really got to know which passenger has given us what amount of you know stars or what kind of review. That was something that we never got to know individually (Personal interview).

The above scenarios indicate two things: Firstly, the need for a transparent rating process, and the ability to challenge it. Secondly, the assessment of whether the “rating system” by itself is an ideal representation or embodiment of workers’ performance. The differential understanding in terms of the rating systems is also evident in the empirical study conducted by Raval and Dourish (2016) where they highlight the entanglement of the ratings as drivers have no control on the traffic or the customer’s mood.

Bardzell’s quality of embodiment focuses attention on the bodies, emotions, gender identities, motivating drives, and primordial urges of users. Thus, it is essential to examine if the rating systems are designed in a way that takes into account both drivers’ and passengers’ emotional state or distress, for instance. Further, she suggests acknowledging the humanness of individuals to create products that do not discriminate based on gender, religion, race, age, physical ability, or other human features. This concept should also be applied in relation to how users rate workers and whether they discriminate on the basis of appearances or other factors (Fisman and Luca 2016). Uday Keith recommends:

The platform companies have started using qualitative labels that could help users to rate the workers better. However, we do need to see whether sufficient options are listed and suggest changes accordingly. Moreover, if we want to completely avoid the numerical rating system, we can ask the users to always describe their feedback by writing a sentence or two. This can be analysed using Natural Language Processing (NLP), a subfield of Artificial Intelligence that helps in understanding human language and derive meaning (Personal interview).

Ride Allocation: Quality of Self-Disclosure

A lack of understanding of how algorithms assign tasks or allocate rides makes it difficult to hold these systems accountable. Consequently, a group of United Kingdom (UK) Uber drivers in July 2020 launched a legal bid to uncover how the app’s algorithms work—how the rides are allocated, “who gets the nice rides; who gets the short rides” (Booth 2020, para 8). A similar concern was noticed amongst the Indian drivers with one of the interview participants, Rashid Khan, questioning, “I really wish to know about it [Uber algorithmic system], but madam, who will tell us?” In this respect, Deepak Sharma, a senior executive of a popular ride-hailing app, said:

Apart from proximity, the algorithms keep in mind various parameters for assigning rides, such as past performance of the drivers, their loyalty towards the platform, feedback from the customers, if the drivers made enough money during the day etc. The weightage of these parameters keep changing and hence cannot be revealed (Personal interview).

Uday Keith explained this as follows:

Well, deep learning algorithms used by various companies have a “black box” property attached to them to a certain extent. These algorithms are dynamic in nature as they keep learning from new data during use. One can only make sense of this by continuously recording the weightage assigned to the pre-decided variables (Personal interview).

The fact is that multiple, conflicting algorithms impact the drivers’ trust in algorithms as elaborated in an ongoing study of “human-algorithm” relationships (Page et al. 2017). The research scholars discovered that Uber’s algorithms often conflict with each other while assigning tasks, for instance, drivers were expected to cover the airport area but at the same time, they received requests from a twenty-mile radius. “The algorithm that emphasizes the driver’s role to cover the airport was at odds with the algorithm that emphasizes the driver’s duty to help all customers, resulting in a tug o’ war shuffling drivers back and forth” (Ibid., 7). Similarly, conflict is often created when drivers are in the surge area and they get pings to serve customers somewhere out of the way.

Moreover, complete information about the rides become all the more relevant for women drivers, who fear unfamiliar locations and routes as expressed by female drivers during my PhD fieldwork. Hari Singh further revealed that Uber shows the nearby drop location to drivers before accepting the ride, only if they have completed a minimum of five rides. All the drivers also said that they could see the passengers’ photographs at any given point and even the names were revealed only after accepting the ride. However, passengers can view the drivers’ photographs and names immediately after the ride is allotted to them, making transparency a one-sided process in the platform economy.

The quality of self-disclosure recommended by Bardzell calls for users’ awareness of how they are being computed by the system. The design should make visible the ways in which it affects people as subjects. For instance, apart from revealing relevant information about the ride that would facilitate drivers’ agency to accept or reject a ride, the platform companies can display

the variables and the corresponding algorithmic weightage per task assigned on the smartphone screen of the workers. So, if a platform driver has not been allocated a certain ride due to his past behaviour, then the technology should be transparent to reveal that information to him. This would also help them in understanding which “algorithm” to follow when several of them are at play.

Constant Tracking, Surveillance, and Algorithmic Control: Quality of Ecology

Rakesh Arora, a senior manager of a well-known ride-hailing platform, explained their tracking practices:

The location of driver-partners is tracked every two-three seconds and if they deviate from their assigned destination, our system detects it immediately. Besides ensuring safety, this is done so that the drivers do not spoof their locations. It has been noticed that some drivers use counterfeit location technology to give fake information about their location—they could be sitting at their homes and their location would be miles away. If the system identifies anomalies in their geo-ping, we block the payment of the drivers (Personal interview).

While this appears to be a legitimate strategy to address fraud, there is no clarity on how a driver can generate evidence when there is an actual global positioning system (GPS) malfunction. Another interviewee, a person in a top management position of a ride-hailing company, said, “It is difficult to establish trust between platform companies and driver-partners, especially when we hear about drivers coming up with new strategies to outwit the system every second day.” For instance, extensive media coverage has revealed how some of the drivers had a technical hacker on board to ensure that bookings could be made via a computer rather than a smartphone (Kashyaap 2016) or artificially surged the price by collaborating with other drivers and turning their apps off and on again simultaneously (Hamilton 2019).

Though the “frauds” committed by the drivers are out in the public domain, it is seldom discussed how constant surveillance reduces productivity and amplifies frustration, resulting in “clever ways” to fight it (Möhlmann and Henfridsson 2019). Drivers are continuously tracked by ride-sharing apps, and if they fail to follow any of the instructions provided

by these apps, they either get penalized or banned from the platform. Algorithms control several aspects of the job for the drivers—from allocating rides to tracking workers' behaviour and evaluating their performance. This lack of personal contact with the supervisors and other colleagues can be dehumanizing and disempowering and can result in the weakening of worker solidarities. The technology-mediated attention can intensify drivers' negativity and can have adverse effects on their mental health and psychological well-being. An online ethnographic study of drivers found, “algorithmic interpellations and personalized management techniques lead the drivers to experience anxiety” (Pignot 2021, 218).

The quality of ecology suggested by Bardzell urges designers to consider the broadest contexts of design artefacts while having an awareness of the widest range of stakeholders. It requires us to attend to the ways design artefacts reflexively design us. If we consider the algorithms as design artefacts of the platforms, then there is a need to consider the impact of algorithmic communication on humans. The platform companies can think of adding a human element and focus on building trust that would make workers feel less like machines (Möhlmann and Henfridsson 2019). For instance, women drivers working for hybrid taxi models spoke fondly of their human supervisors during my PhD fieldwork:

They have that patience, that care, they care also. [...] If it is an emergency, I can't help it out, they arrange it very fast. Aarti does all this Superman work. Vandana madam is also very understanding. That is the thing, she understands us (Kala, 47, female driver with Taxshe, Bengaluru. Personal interview).

Data Privacy and Sharing: Quality of Advocacy

There is a dichotomy between how data is used by platform companies and how it is shared or made available to the platform drivers. For instance, Uber Privacy Notice (2021)⁸ states that it collects the location data of the driver and delivery person “when the Uber app is running in the foreground (app open and on-screen) or background (app open but not on-screen) of their mobile device.” Drivers always have an option to go to the settings of a smartphone and disable the location services, but this needs to be enabled every time they want to go on duty. This basically means the platform has access to

8 <https://www.uber.com/legal/it/document/?name=privacy-notice&country=india&lang=en>

drivers' location almost all the time, even when they are off duty. In fact, besides the location data, Uber also has access to the payment transaction information, usage, and preference information, device information, call and text data, log information such as IP addresses, and allows audio or video recordings of the trips in certain countries (currently not operational in India).

However, one of the drivers revealed how the platforms allegedly erase the drivers' data whenever they land in trouble, making this profession potentially "dangerous" for drivers, especially women:

It is dangerous because many incidents have taken place where customers snatch the car. Murders have also happened. And the company does not even take any action against them. [...] And when you go there to complain then they erase their data—"this man was not even driving with us." They erase the data. [...] And such incidents haven't happened just once or twice. So it is even more dangerous for female drivers (Rashid Khan, Personal interview).

In this case, drivers can request a copy of their personal data from ride-hailing platforms, however, they are generally not aware of this. These scenarios indicate power and information asymmetry (Woodcock and Graham 2020) even over user (driver) data that perpetuates harmful and regressive labour practices in the digital platform economy. Bardzell's quality of advocacy involves reflecting on how the technologies that one creates can bring about political emancipation and not perpetuate the status quo, leading to detrimental and asymmetrical structures. For example, collecting user data including location, forms the premise of location-based platforms, but platforms should be designed in a way that users have the freedom to not use a particular technology (Taylor 2017) or to turn off some of the features they do not want to share with the companies, and which are not directly relevant to the platforms. Moreover, the asymmetry can be rectified if the workers have easier access to their data and are allowed to share any monetary benefit arising directly or indirectly out of the data collection (Ibid.).

Bathroom Breaks and Safety Features: Quality of Pluralism

When asked if the algorithms can adjust the route for the drivers, especially for women, if they need to use the restroom, Deepak Sharma, a senior platform executive said:

They always have the option not to accept the ride if there is a need to use the washroom. The customers cannot wait if the driver stops the car for a restroom break and at the same time, who will pay for the waiting time? (Personal interview).

To this, female driver Malini Tyagi responded that men do not need bathrooms in India (as they are known to urinate in public). However, women lose the business/ride if they try to log off from duty and then look around for toilets, especially safe and clean ones. She explained further that even passengers, including women, are not willing to wait if a driver wants to use the restroom.

Further, cab drivers described how “lack of safety” and “failure to act” make it problematic for them to sustain in the ride-hailing sector. All of them shared that they received robotic responses from the customer support executives when they reported unfortunate incidents or misbehaviour of passengers. Maya Sharma, aged thirty-two, female driver with over nine years of driving experience, said:

I had a customer fully drunk and started to misbehave. [...] No action was taken except their promise to talk to the customer about it. [...] “We will look into the matter and discuss internally.” Whenever we spoke to the customer care, they said we are registering a complaint and we will forward it to the right person (Personal interview).

She eventually joined a women-led taxi company after her failure to make the mainstream ride-hailing platforms improve their safety features and act immediately in case of emergencies.

Both the platform representatives Pramod Kumar and Jagdish Chauhan, indicated that the platform companies do not think exclusively for women drivers due to their extremely low representation in this sector. Pramod Kumar said:

There is no separate policy for female drivers. We haven’t given it a thought as we are just platform providers and help in lead generation. [...] Women drivers look good on our PR [Public Relation] campaigns, we take pride in communicating to the public that we provide employment to women (Personal interview).

However, this continued ignorance is alienating women drivers. Maya remarked, “When you have thousands of men drivers working for you

and out of them twenty to twenty-five female drivers are there. Can't you do anything for those female drivers? You must do something for their safety."

Bardzell recommends integrating the quality of pluralism in the design that can take into account the marginal user. Here, an inclusive design would mean considering the viewpoint of marginalized women drivers and making provisions for bathroom breaks or adjusting the algorithms accordingly. Further, besides enabling quick responses, the action taken by the platforms should also be communicated to the drivers, as this was seen as a major cause of dissatisfaction amongst women drivers. In Bardzell's words, "Pluralist designs are likely to be more human-centred than universalizing designs simply because 'human' is too rich, too diverse, and too complex a category to bear a universal solution" (Bardzell 2010, 1306).

Conclusion

The feminist lens in this chapter has helped to identify the entrenched discrimination, exploitation, and information and power asymmetry in the platform economy. It has centred the marginalized workers, especially women, for designing an inclusive framework that would not amplify precarity; rather, commit to equity, diversity, identity, empowerment, and social justice to improve lives. Platforms need to ensure that their algorithms are designed to enable workers and not just be optimized for creating network effects and customer satisfaction. However, it is also worth specifying that deep machine learning tech is constantly dynamic, and this poses a challenge on transparency in algorithmic decision-making. But a solution needs to be found that simplifies this process and enables easier interpretation by the workers. Similarly, it is a difficult trade-off between different values and ethics—e.g., visibility of name/photo can foster discriminatory practices but also allow for increased safety for both customers and labourers. In fact, some of the issues in the platform economy cannot be fixed via only algorithmic design. For instance, ensuring clean and safely located public toilets demands a stakeholder effort with concerted investments by the ride-hailing platforms in partnership with the government. Ultimately, a feminist design, which centres workers' pressures, stresses, and concerns, is required in the platform economy. Programmers could create a more empowering pathway for women workers, who are at an intersection of exploitation and oppression. Platforms need to see the extension of

workers' satisfaction as that of customer gratification, given these two realms reinforce one another. This would also change the attitudes of the passengers, who need to see platform drivers as human drivers, facing challenges at work, like everyone else.

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