

Paper title: Sexual Harassment Prevention in Taxi Allocations under Gender Preferences

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Abstract: According to Statista.de, in 2020, 89% of people with female gender identity and 88% of people with diverse gender identity experienced sexual harassment. Especially, at the night, a taxi ride is supposed to be the safest travel option for many passengers. Unfortunately, sexual harassment takes place even there. Thus, when even the safest travel option feels unsafe for endangered passengers, it is essential to enhance existing options with sexual harassment prevention mechanisms. In fact, there are some initial efforts in this direction.

For example, the Taxi and Limousine Commission in New York established the Office of Inclusion, where drivers and passengers can report sexual harassment. We propose to use the reports and, thus, rank drivers and passengers based on their behavior. Thus, a given driver will receive a lower rank if a greater number of claims of unwanted behavior were submitted against them. Similarly, a given passenger will receive a lower rank if a greater number of offenses were submitted against them.

In this paper, we use these sexual harassment rankings in combination with gender preferences. In particular, we extend the classical 2-sided matching setting, in which drivers have profit preferences for passengers and passengers have estimated-time-of-arrival preferences for drivers, by adding an additional layer of gender preferences to each side of the problem. This gives rise to two natural extensions of the classical Gale-Shapley (GS) matching algorithm, that use the sexual harassment rankings of drivers and passengers.

The extended algorithms produce matchings that are (nearly) stable for both sides of the problem with respect to their two-layered preferences. We also conduct experiments with these algorithms. In the experiments, we collect a pool of matchings returned by these algorithms and select a matching from this pool that penalizes drivers and passengers proportionally to their ranks. Thus, a driver of a lower rank gets a lower profit from passengers and a passenger of a lower rank waits longer for a driver.

Finally, supposing that the Office of Inclusion informs taxi operators regularly of the behavior of their drivers and passengers, the taxi dispatchers can use our algorithms to penalize unwanted behavior from both sides of the problem by assigning fewer passengers to bad drivers and making bad passengers wait longer for drivers. Thus, we involve the Office of Inclusion, the taxi companies, the drivers, and the passengers in one mechanism for reducing sexual harassment.