THE UBER GAME: EXPLORING ALGORITHMIC MANAGEMENT AND RESISTANCE

Dr. James Allen-Robertson
Dept. of Sociology, University of Essex, UK

Introduction

The algorithmic oversight, optimization and evaluation of worker performance is an increasing reality in many economic sectors. For those working within the growing economic sector known as the 'gig' or 'on-demand' economy, these algorithmic processes sit at the heart of their working day. Previous research drawing on interview and forum data (Kyung Lee et al., 2015; Rosenblat and Stark, 2016) has suggested an inequity of power between the operators of an algorithmic management system, and those working under it. This inequity arises through a lack of transparency around the rules that govern their work, and a lack of options for workers to influence those rules in response to the realities of their everyday work.

This paper, based on a computer-aided content analysis of 28,458 forum threads, argues that whilst gig economy workers are governed by algorithmic systems, that same system facilitates resistance. By necessitating some form of user interaction and the provision of sufficient feedback, algorithmic management apps allow workers to collaboratively develop strategies of 'rule discovery' to continuously update their intuitions about the often hidden rules governing their everyday activity.

Knowledge and Agency in Algorithmic Systems

This paper draws upon ongoing work within the social sciences on algorithmic power (Beer, 2016; Pasquale, 2015; Gillespie, 2014; Manovich, 2013), but also draws on recent work in game studies to explore the relationship between an individual user and an algorithmic construct. This comparison has become increasingly viable due to a growing body of work that approaches games as systems of interacting mechanisms or rules (Sicart, 2008; Wardrip-Fruin, 2009; Tulloch, 2014; Bogost, 2007). In gaming, the

full extent of the rules is not necessarily apparent to the player, but must instead be discovered through interaction with the system via the mechanisms of interaction made available to them, and the resulting responses through the given interface (Wardrip-Fruin, 2009). Good game design will strategically reveal some of these rules to the player over time through their interactions.

Furthermore, it is these rules that govern player agency in relation to the algorithmic system. As the rules provide the player with a proscribed range of interactions, they do not simply 'restrict' agency but govern their agency through the selective provision of knowledge and facilitation of action within the game space (Tulloch, 2014). In good game design, this governance of agency will provide the player opportunity to slowly discover the rules of the game that may not be immediately apparent, through their interactions and resulting responses (Wardrip-Fruin, 2009). This process of rule discovery allows the player, often through failure, to work towards mastery of the game system, improving their performance (Juul, 2013).

The argument presented here is that workers in the gig economy, using the small range of feedback and influence opportunities made available to them through their employer's apps, also engage in rule discovery analogous to rule discovery in gaming. These practices often occur in an attempt to address the inequities of knowledge about, and ability to intervene in, the decision making process of the algorithmic system.

Methodology
The paper draws on a sample of 28,458 forum threads from a major international Uber driver's discussion forum using a mix of quantitative and qualitative content analysis. Data was acquired organized and analyzed using a range of available web scraping and data science packages in Python. The exploration was based on a mix of qualitative and quantitative techniques. Quantitative techniques such as k-means clustering, term frequency-inverse document frequency (tf-idf) weighting and collocations allowed the exploration of broad patterns such as the primary topics of discussion, and the most significant terms and phrases within those discussions. These techniques were applied both to the whole corpus of data, and to subsets of forum posts that contained keywords such as 'algorithm', 'surge' and 'exploit'. Thus, we were able to identify broad patterns of discussion across the forum and a range of significant terms and phrases related to particular keywords. This data was used to guide the qualitative component of the research which utilized concordance lists of terms and phrases to locate them in context. These lists were then manually coded using NVivo CAQDAS software to uncover a more nuanced understanding of driver's experiences under algorithmic management.

Findings

Preliminary findings indicate prominent discussion of the Uber algorithm with a particular focus on driver uncertainty regarding its operation.
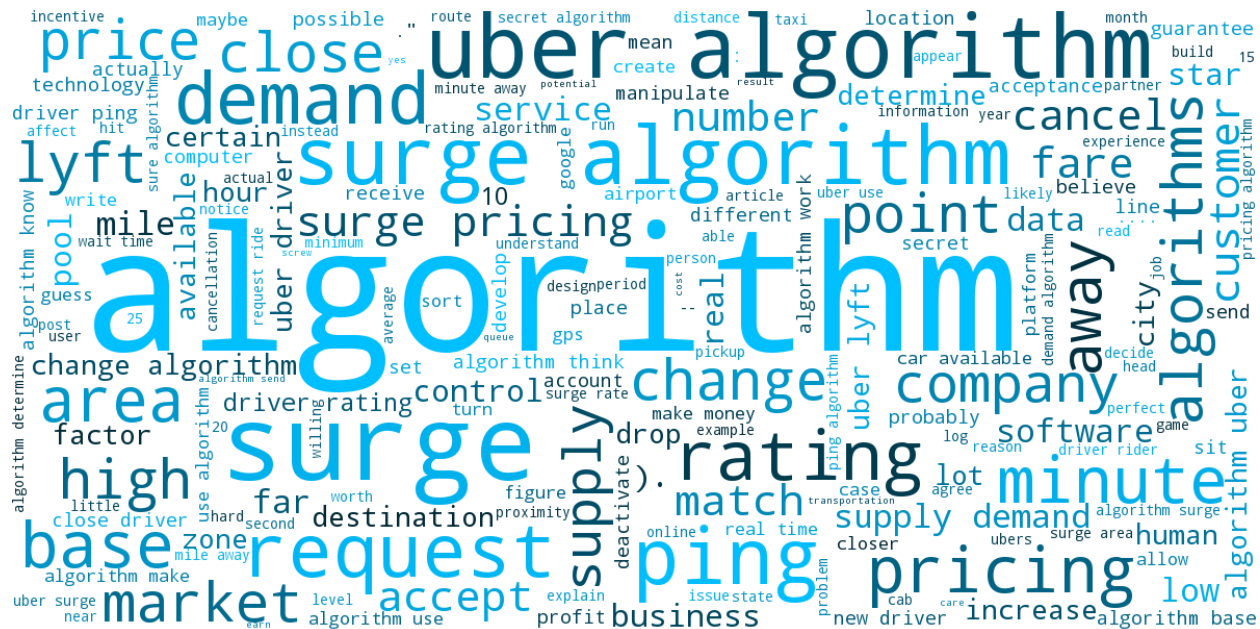

Fig.1 A wordcloud of significant phrases within the subset of posts containing the keyword 'algorithm'. Significance is based on a tf-idf weighting model trained on all collected forum posts..

Drivers frequently speculate on the rules and factors involved in the distribution of fares, fare pricing and the construction and influence of driver ratings on these systems. In posts where drivers specifically mention the term 'algorithm' the most significant terms and phrases revolved around surge pricing, the role of distance between driver and ride requests, and indicated uncertainty and discovery, for example 'possible', secret algorithm', 'maybe', 'guess', and 'algorithm determine'.

As the procedures and policies regarding the distribution of fares are embedded in the black-box of Uber's algorithmic management systems, drivers engage in 'rule discovery', attempting to uncover the rules by which they are governed by pooling together their observations of the algorithm's behavior to generate hypotheses. These hypotheses are then translated into behavioral strategies used to either generate greater income for themselves, or offset what drivers see as negative or unfair decision making embedded in the algorithmic ruleset.

Conclusion

This paper provides three contributions. First the paper demonstrates the application of natural language processing techniques in the analysis of discourse within particular online spaces. Secondly, the paper draws together literature on algorithmic power, with the field of game studies to provide complimentary insights into the knowledge and power relations between individuals and algorithmic systems. Finally, the paper argues that whilst algorithmic management can impose inequities upon its workers, they are

developing strategies for resistance and empowerment, through practices analogous to gameplay and rule discovery.

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