How do you motivate workers who are managed by an algorithm?

26 May 2020, by Sara Preto

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Many businesses turned to remote workers to continue their operations after states issued stay-at-home orders to reduce COVID-19 infections. It's a trend that is likely to continue long after the coronavirus is controlled.

To help companies ease the transition online, USC researchers studied the challenges to increasing the use of crowdwork—a manifestation of the gig economy in which companies offer ad-hoc, mundane tasks to prospects via a website. The move minimizes disruptions that organizations would experience as a result of COVID-19 or other crises.

The study, conducted in September through a collection of task responses via Amazon's Mechanical Turk crowdsourcing platform, shows that workers will need more autonomy over tasks and a clearer sense of purpose to perform often mundane work at a high level—advantages that AI assistance offers.

"Crowdwork functions similarly to Uber, but it is used to perform online tasks like clean data, train artificial intelligence and moderate content," said Gale Lucas, research assistant professor at the Institute for Creative Technologies at the USC Viterbi School of Engineering.

"As unemployment rates continue to skyrocket, it will likely become even more popular in serving as a stopgap during the current shutdown and as the economy changes due to COVID-19. We need to improve crowdwork and make it more efficient, which could involve new types of supervision assistance using AI."

The findings were presented May 11 via the International Conference On Autonomous Agents and Multi-Agent Systems in New Zealand. A video presentation is be publicly available.

Algorithmic management contributes to crowdwork

With the continuous development of AI technologies, employees and gig workers increasingly encounter software algorithms that assist in assigning their work. Many tasks performed by managers—such as hiring, evaluations and setting compensation—will increasingly use AI as a tool to help perform these functions.

These newly automated supervisory duties—called algorithmic management—already play a major role at companies like UPS, Uber and Amazon, which outsource tasks to a large pool of online workers.

New research from ICT and Fujitsu Laboratories shows that to enhance worker motivation in a crowdwork environment, worker autonomy and transparency in regard to how completed tasks have been solved is imperative.

Perceptions of autonomy can enhance productivity, especially when the work holds intrinsic meaning for workers, yet crowdwork often seems

meaningless. According to the researchers, "More problematically, the meaning of the work is sometimes hidden due to security or experimental control, like when the workers serve as subjects in a scientific experiment. Enhancing user motivation and performance through human-agent interaction is an important challenge, not only for algorithmic management but in other AI disciplines, including educational technology, personal health maintenance, computer games, personal productivity monitoring and crowdsourcing."

Researchers investigate how to maintain worker motivation

To test the management applications, ICT researchers conducted an online experiment investigating how perceptions of autonomy and the meaningfulness of work shape crowdworker motivation. Yuushi Toyoda, senior researcher for Fujitsu Laboratories, and USC researchers Jonathan Gratch and Lucas examined alternative techniques to maintain crowdworker motivation when their work is additionally managed by an algorithm.

"Given that system designers might be designing autonomous agents that perform some management tasks in the context of algorithmic management, understanding how workers might respond to these systems, especially in remote work conditions, could provide essential guidance for designers," Toyoda said.

The team found that workers are more motivated when their work has meaning and algorithmic management is framed in a way that highlights worker autonomy. For example, when performing a tedious task like counting the number of infected blood cells on a laboratory slide, workers perform better when they are told about a societally meaningful goal—such as curing an infectious disease—and when feedback supports autonomy with helpful prompts and queries.

"We found that when people knew the goal was to help cure a disease, they actually overreported the number of infected cells. Their desire to see the work succeed actually undermined the usefulness of their work," said Gratch, ICT director for virtual human research and a USC Viterbi professor of computer science.

In contrast, when the work holds no meaning, productivity is only enhanced when algorithmic management falls back on authoritative managerial control, framing the algorithm as a boss that commands conformity rather than promotes autonomy. That can be a challenge, as it is not always possible to provide the meaning behind a task because this information can sometimes bias results, the researchers said.

The new findings highlight the importance of autonomy and meaningfulness in a crowdwork environment and contribute to the growing body of literature in algorithmic management and human-AI interaction. Ride-hailing companies like Uber and Lyft currently use algorithmic management via an app that gives employees freedom in scheduling and routes, and findings by the USC research team suggest ways such systems can be improved.

Provided by University of Southern California