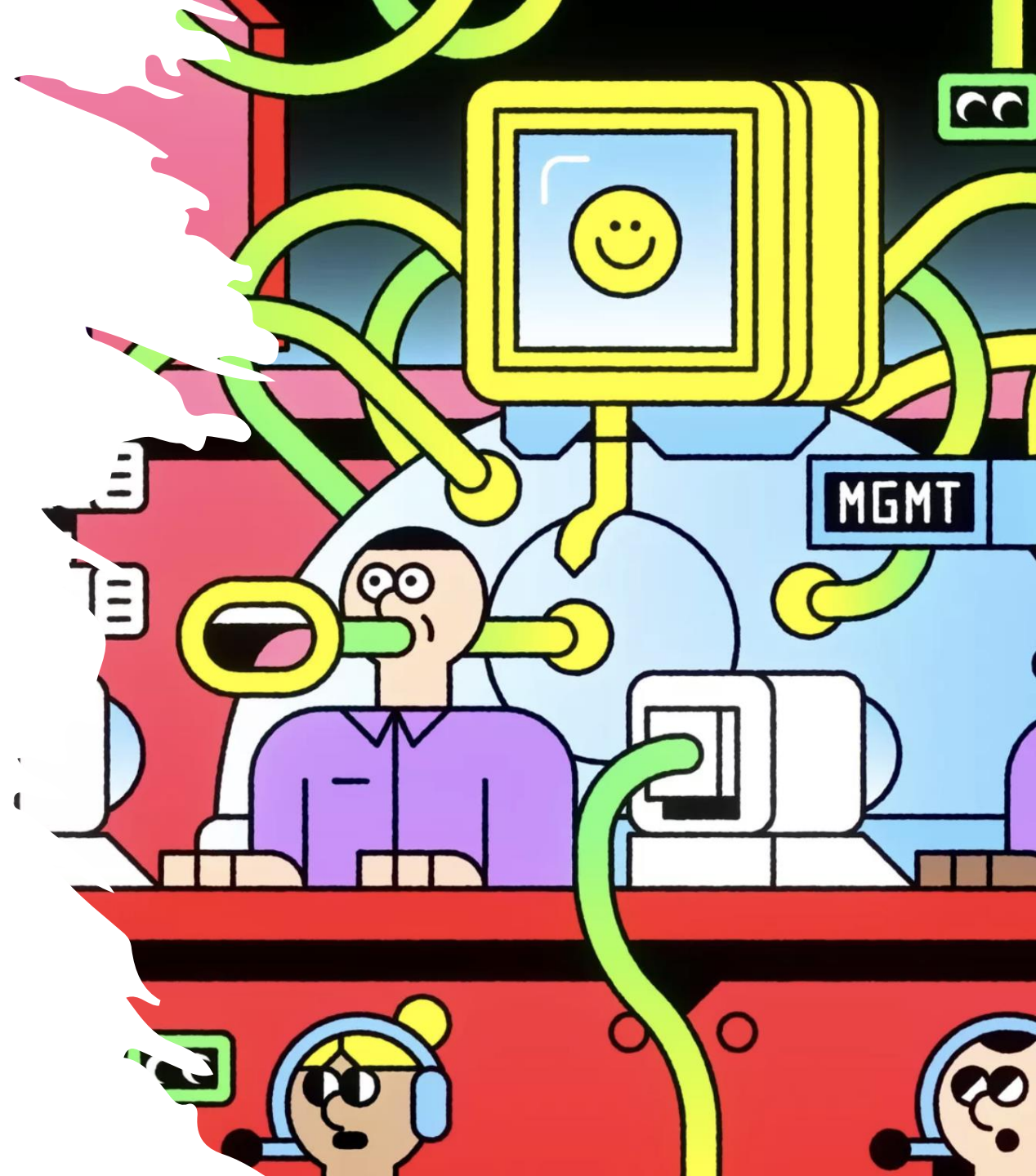


Algorithmic Management Consequences for Work Organisation and Working Conditions

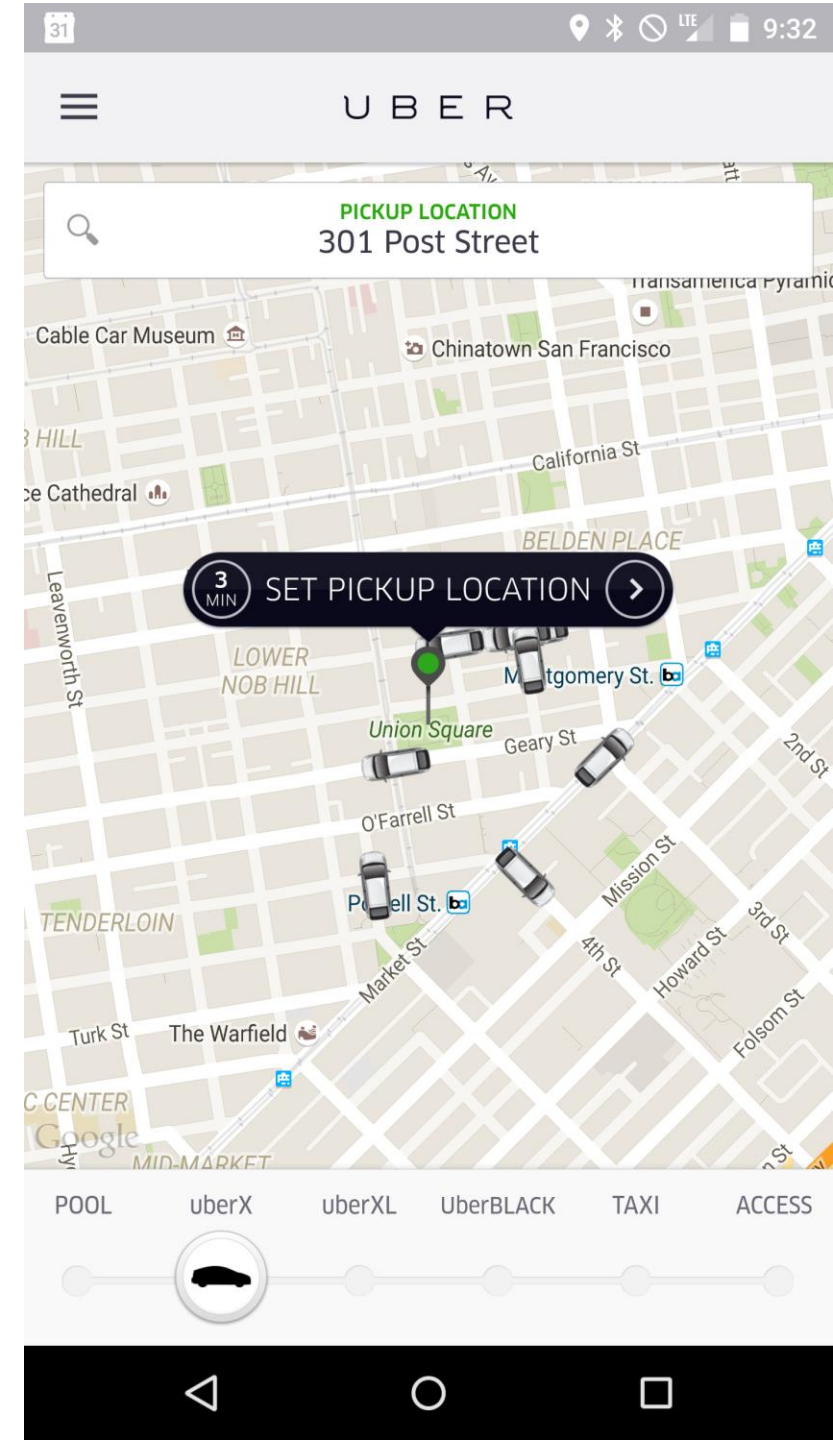
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What is algorithmic management?

- **Algorithm:** ‘process or set of rules to be followed in calculations or other problem-solving operations’ (OED Online, 2021)
- **Weber:** step-by-step, distributed and nominally objective procedures for selection and sorting that characterized decision-making in modern bureaucracies
- Explosion in computing power and digital data collection = business use of algorithms qualitatively different
- Use of software algorithms (computer-programmed procedures for transforming input data into a desired output) in **controlling an organisation**
- Lee et al. (2015) Uber ‘algorithmic management’



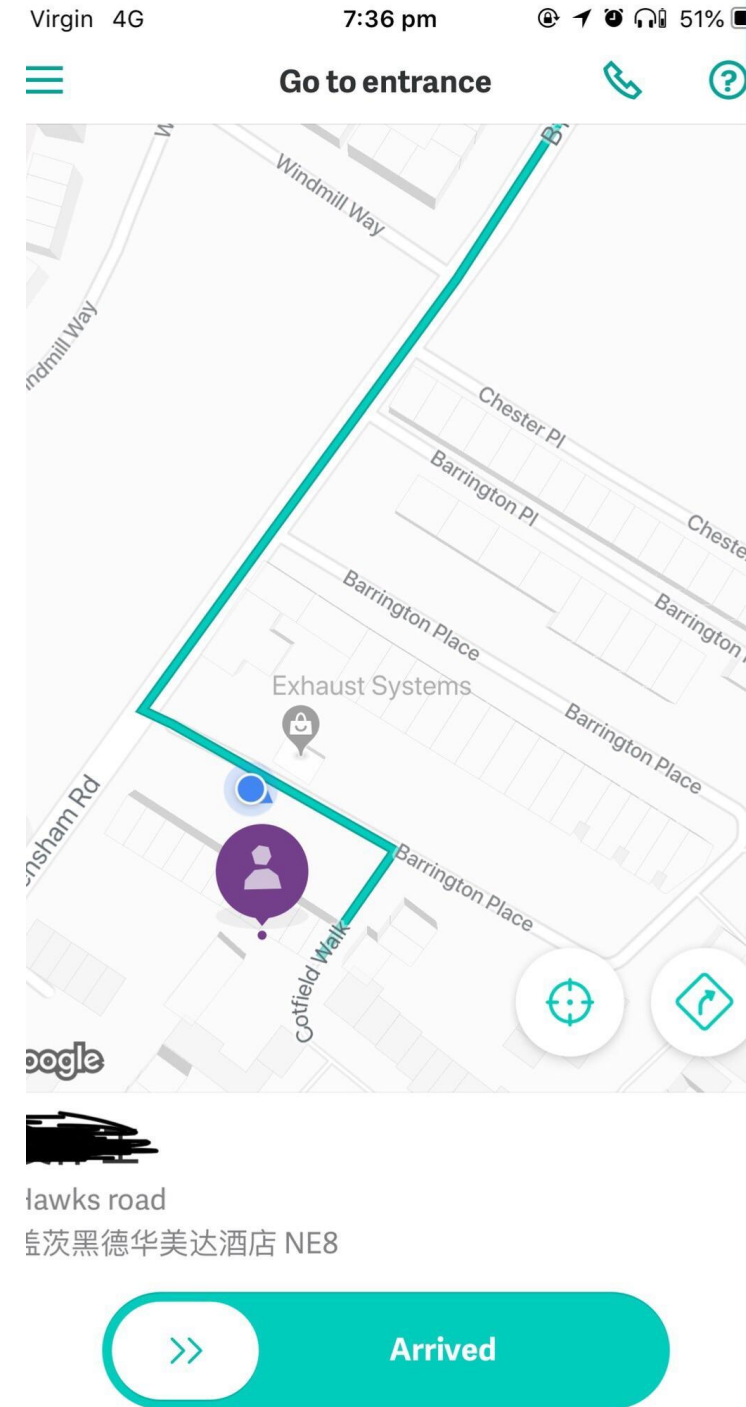
Algorithmic management of what?

- Automation of **direction** (what needs to be done, in what order and time period, and with different degrees of accuracy)
- **Evaluation** (the review of workers' activities to correct mistakes, assess performance, and identify those who are not performing adequately); and discipline (the punishment and reward of workers in order to elicit cooperation and enforce compliance).
- **Discipline** (the punishment and reward of workers in order to elicit cooperation and enforce compliance) – (Kellogg et al., 2020)
- **Platform Work**
- **Warehouses** (esp. Amazon)



Algorithmic direction in platform work

- **Ride hailing** and **food delivery** platforms automatically allocate fares/orders & provide route via GPS map
 - In theory workers can reject gigs and route
 - But ability to choose gigs limited by information asymmetries
 - **Uber** found to dock pay for not following ‘efficient route’
 - **Food delivery** workers contacted by human supervisor if headed in wrong direction or taken too long
- ‘You just do what you’re told by the app’ (Veen et al., 2020)*
- **‘Dispatchers’** *‘monitor riders and orders in real-time and help solve ‘issues’’* (Ivanova et al., 2018)



Algorithmic direction in conventional employment

- **Warehousing:** hand-held 'scan guns' or wearable devices that combine barcode scanners, motion and location tracking, and a display
- Automatically assign optimal items to workers in terms of efficiency
- Item and route communicated via text and images displayed on hand-held device. Takes into account the location of stock and other workers in real time and gives a time to complete task
- Instillation of cameras that use machine learning to alert workers when they are breaking social distancing rules



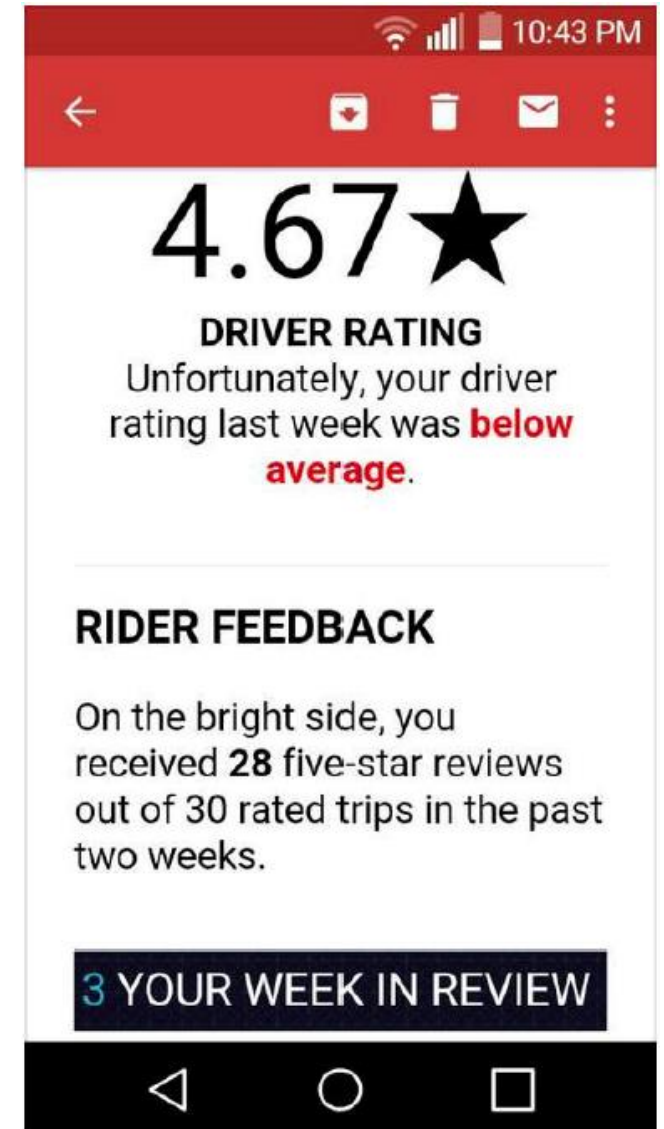
Algorithmic direction in conventional employment

- **Delivery:** AI-cameras: instruct workers to maintain safe distances, slow down, not make unplanned stops and take 15-min break if yawning
- **Retail:** combine workforce, customer traffic, sales and weather data to automatically schedule workers
- **Manufacturing:** (Siemens' Congleton): software plans production in real-time and instructs workers as to what needs to be produced each day
- **Klick Health:** alerts when projects are behind schedule, notifies outstanding and urgent things to do, reduce distractions hampering productivity
- **Publics:** assign account managers, coders, graphic designers, and copywriters to new projects



Algorithmic evaluation in platform work:

- **Ride hailing platforms:** customer ratings; work acceptance rates; braking and acceleration speeds
- **Digital service platforms:** Customer ratings, jobs completed, length of worker-client relationship, keyboard presses and screenshots etc.
- **Food delivery platforms:** weekend shifts after 8pm, average weekly hours, no-shows, late log-ins, orders per hour, tenure; time to accept orders, travel time to restaurants, travel time to customers, time at the customers, orders not accepted, customer ratings



Algorithmic evaluation in conventional sectors

- **Warehousing:** device records the number of products picked per hour – automatically compared to target based upon previously achieved pick rates in workplace
- Aggregated together to rank individual workers relative to their colleagues
- Individual speed, productivity, accuracy and errors in real-time and retrospectively are bundled into a single, composite assessment of performance and matched to a normal distribution curve.
- Lowest 10% told to speed up by human managers
- **Retail:** algorithmic task management – failure flagged to human manager
- **Hotels:** TripAdvisor ratings and reviews incorporated into individual performance management and weekly team meetings.



Algorithmic discipline in platform work

- **Ride-hailing platforms** automatically deactivate workers with low ratings
- Workers do not have a right to appeal but can ask for review & in some cities undertake a 'quality improvements course' (at their own expense)
- **Uber** claims that deactivations manually reviewed by human manager
- **Food delivery sector**: low-ranked workers have access to shifts restricted
- **Digital service platforms**: filter work to highest ranked workers through search tools



Judi Ann D.
Data Entry Professional

\$8.79 / hr

16,730 hrs

98% Job Success

I wish to be part of an organization that would challenge and enhance my



Yasir Q.
Virtual Assistant, Data Entry, Customer Service, Data Scraping/Mining

\$5.56 / hr

1,312 hrs

95% Job Success

"Over 175 Successful Projects" ...



Taimoor Ahmed
Virtual Assistant, Writing, Research and Data Entry

\$15.00 / hr

341 hrs

90% Job Success

With a professional experience of Virtual Assistant I have utilized to meet a



Md. Saddam H.
Lead Generation, LinkedIn, Web Research, Rapportive, Data Entry

\$14.00 / hr

1,606 hrs

97% Job Success

I am Expert of Lead Generation LinkedIn Web Research Rapportive Comm



Bojan Mirkovic
Graphic Design / Vector Illustration / Data Entry

\$7.00 / hr

13 hrs

100% Job Success

I am graphic designer, illustrator and vector artist. I am highly experienced



H.M Bilal
Data Entry/Admin Specialist, SEO Specialist

\$5.44 / hr

508 hrs

100% Job Success

Algorithmic discipline in conventional employment

- **Warehousing:** individual performance scores used to decide who should be fired: *'Management consists of executing decisions based on data analytics'* (Briken and Taylor 2018)
- Text messages in the mornings confirm or cancel their shifts based on their previous day's productivity metrics
- **Amazon:** terminations for low productivity generated automatically without input from supervisors – although human managers can intervene in the process
- **Delivery:** AI-cameras (Amazon) used for disciplinary actions including firings
- **Hotels:** online reviews result in workers being fired

What does this tell us about algorithmic management

Figure 1: Classification of automation in algorithmic management, adapted from the Society of Automotive Engineers' 2014 classification of self-driving vehicles

Level of automation	Narrative definition	Direction, Evaluation, Discipline	Review (in case of system failure)	Mode specific (human manager can ignore/overrule system)
No automation	Full-time performance by <i>human manager</i> of all aspects of direction, evaluation and discipline	Human manager	Human manager	n/a
Management Assistance	Assistance in either direction, evaluation or discipline with the expectation that <i>human managers</i> perform other management tasks and use own judgement to review, ignore and overrule system.	Human manager and algorithmic system	Human manager	Yes
Partial Automation	Mode specific execution of either direction, evaluation or discipline with the expectation that <i>human managers</i> perform remaining functions.	Algorithmic system or human manager	Human manager	Yes
Algorithmic management				
Conditional Automation	Mode specific execution of direction, evaluation and discipline with the expectation that <i>human managers</i> will respond appropriately to a request to intervene.	Algorithmic system	Human manager	Yes
High Automation	Full-time performance by an algorithmic system of direction, evaluation and discipline without the need for <i>human managers</i> to intervene.	Algorithmic system	Algorithmic system	Yes
Full Automation	Full-time performance by an algorithmic system of direction, evaluation and discipline without the possibility for <i>human managers</i> to intervene.	Algorithmic system	Algorithmic system	No