

STREET-LEVEL ALGORITHMS

AND SEEING THE FOREST FOR THE TREES IN AI

Ali Alkhatib

@_alialkhatib || ali.alkhatib@cs.stanford.edu

September 23, 2019

EVERYTHING OLD IS NEW AGAIN

ON-DEMAND WORK

gig work

crowd work

ON-DEMAND WORK

gig work



crowd work



upwork

GIG WORK

GIG WORK

ALIA

Allowing workers to book clients,
communicate with each other, and
make decisions about how the platform
should operate

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ALIA

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communicate with each other, and
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Worker-owned cooperative

GIG WORK

CROWD WORK

ALIA

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Giving crowd workers the ability to stand behind collective reputations, and attract more skilled, lucrative work

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Digital hiring hall

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Relief from precarity

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Solidarity

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Solidarity

Solutions to underlying social issues

GIG WORK

ALIA

Allowing workers to book clients, communicate with each other, and make decisions about how the platform should operate



Lourdes Dobarganes cleans the apartment of a client in San Francisco. She is the kind of domestic worker Alia is trying to serve by allowing individual clients to chip in on benefits. (Photo by Carlos Avila Gonzalez, San Francisco Chronicle/Polaris)

Mercedes Martinez scrubs other people's kitchen sinks and mops their floors every day of the week. At night she comes home to care for one of her sons. The money she makes covers their bills, but not benefits. When she catches the flu, she doesn't get paid. But one of her clients recently introduced her to [Alia](#), a website that helps her

Everything we do is situated within cultural and historical backdrops.

If we're serious about ethics and justice, we need to be as serious about understanding those histories as we are about imagining potential futures.

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Thinking along these lines forces us to confront how we participate in violent, oppressive systems and practices

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If we're serious about ethics and justice, we need to be as serious about understanding those histories as we are about imagining potential futures.

Thinking along these lines forces us to confront how we participate in violent, oppressive systems and practices, but that can inspire us.

NEW TECHNOLOGIES, OLD METAPHORS

On-Demand work

Piecework

CHI 2017 (Honorable Mention)

Artificial Intelligence

Street-level bureaucracies

CHI 2019 (Best Paper)

“Human-Centered AI”

Seeing Like a State

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PIECEWORK

ALKHATIB, BERNSTEIN, AND LEVI @ CHI 2017

**ON-DEMAND WORK IS A MODERN INSTANTIATION OF A
MUCH OLDER PHENOMENON — PIECEWORK.**

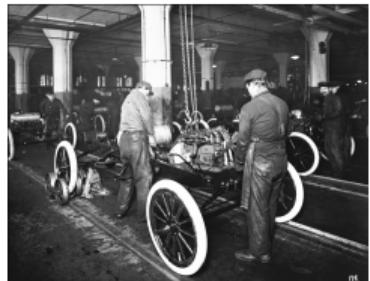
**THE HISTORICAL ARC OF PIECEWORK CAN SHED LIGHT ON PERSISTENT QUESTIONS
IN THIS ONGOING PHENOMENON OF ON-DEMAND WORK.**

PAYMENT FOR OUTPUT RATHER THAN FOR TIME

Textiles



Automobiles



Metalwork



PAYMENT FOR OUTPUT RATHER THAN FOR TIME

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Crowd work



Upwork

UBER

Gig Work

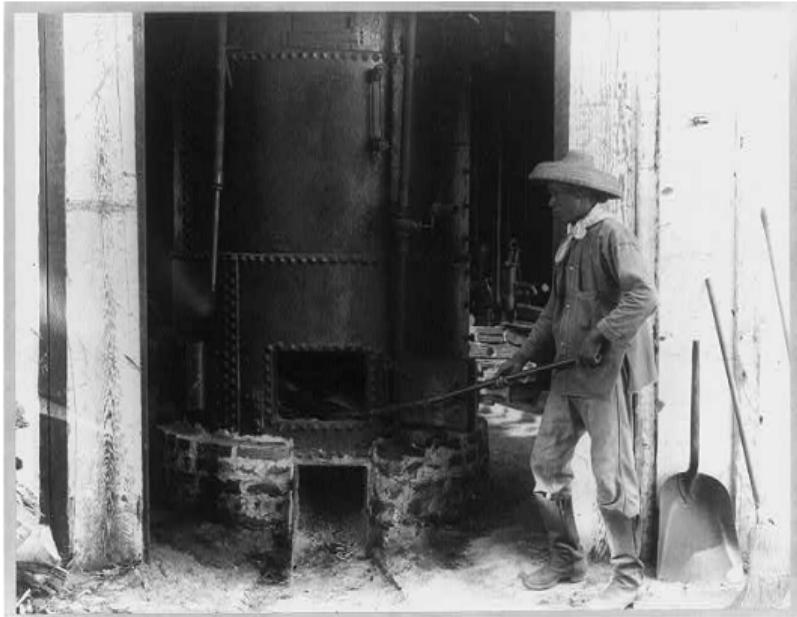


How will technology affect the complexity of on-demand work?

How will technology affect the complexity of on-demand work?

What are the **limits** of complexity in on-demand work?

Farms



- Formalization of piecework:
payment for results
Chadwick 1865
- Dynamic piece rates

Textiles

- Distributed workers



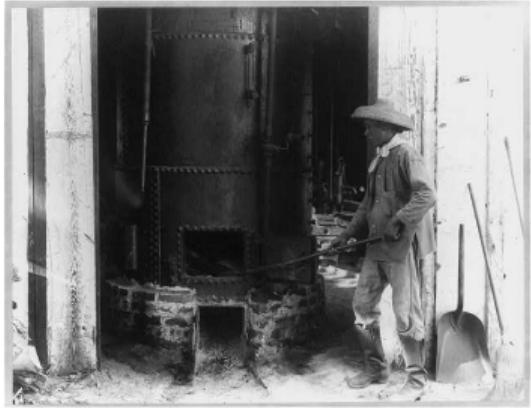
- Assuming common skills

Matchstick Girls

- Strict management
- Formalizing work methods



Farms



Textiles



Matchstick Girls



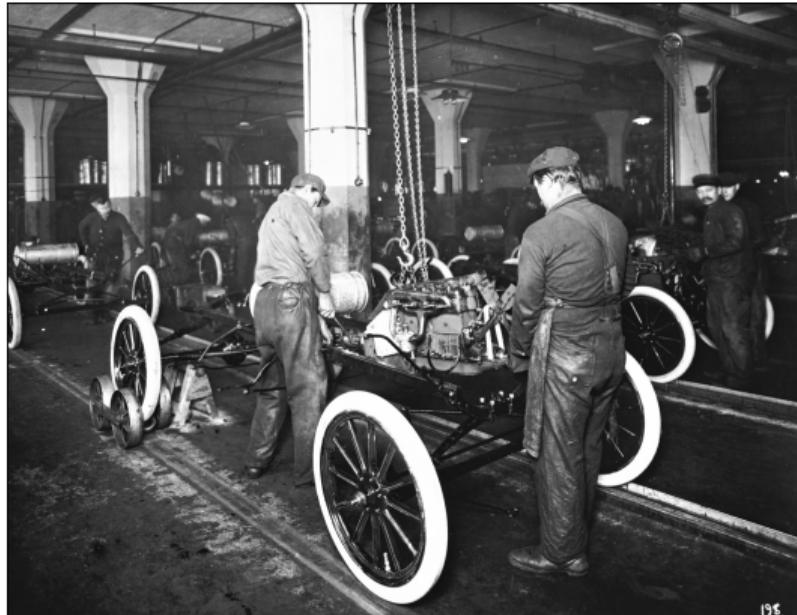
Trains



- “Efficiency experts” measured how long it would take to do various jobs
(Cunningham 1911)
- These measurements would be used to assign pay rates for each specific task
(Jewell 1921)

Automobiles

- Consolidating and training workers
(*Fordism*)
(Schoenberger 1988; Tolliday and Zeitlin 1986)



- Measuring and evaluating workers by very carefully defined instructions
(*Taylorism*)
(Taylor 1911)

Planes

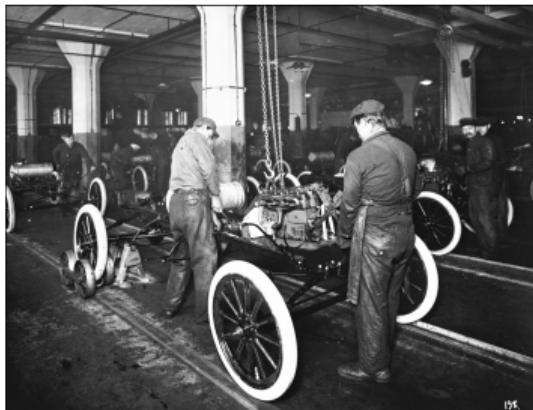
- Men drafted during World War II
- Factories turned to a new workforce who had neither conventional training nor experience
- **Specialized training and assignment**



Trains



Automobiles



Planes



Conceptualization is directed toward the task of generating interpretations of matters already in hand [...] But that does not mean that theory has only to fit (or, more carefully, to generate cogent interpretations of) realities past; it also has to survive – intellectually survive – realities to come.

– Geertz 1973

Conceptualization is directed toward the task of generating interpretations of matters already in hand [...] But that does not mean that theory has only to fit (or, more carefully, to generate cogent interpretations of) realities past; it also has to survive – intellectually survive – realities to come.

– Geertz 1973

Good theories give us analytical power

for the past

for the present

for realities to come

ON-DEMAND WORK'S LIMITS

We'll be able to make stronger assumptions of what people know



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We'll be able to make stronger assumptions of what people know



ON-DEMAND WORK'S LIMITS

We'll be able to make stronger assumptions of what people know

...but we probably won't be able to get much further than piecework did.



WHAT HAPPENED WITH PIECEWORK?

WHAT HAPPENED WITH PIECEWORK?

A LABOR MOVEMENT THAT DEFINED THE 20TH CENTURY











WHAT'S HAPPENING TODAY?









California just passed a landmark law to regulate Uber and Lyft

Drivers will likely get health care and paid time off under the law.

By Alexia Fernández Campbell on September 18, 2019
2:13 pm



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YouTube is still restricting and demonetizing LGBT videos — and adding anti-LGBT ads to some

by Megan Farokhmanesh, [theverge.com](https://www.theverge.com)

June 4, 2018 01:46 PM



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**Google's Anti-Bullying AI Mistakes
Civility for Decency**

by Jillian York, [motherboard.vice.com](https://motherboard.vice.com/en_us/article/google-ai-mistakes)
August 18, 2017 12:00 PM

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How Recommendation Algorithms Run the World

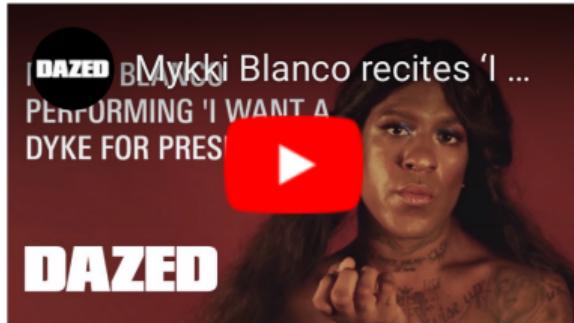
by Zeynep Tufekci, [wired.com](https://wired.com/article/recommendation-algorithms-run-world)
April 22, 2019 05:00 AM

FRUSTRATING ALGORITHMIC FAILURES

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Instagram Is Censoring Lesbian Content For Violating "Community Guidelines"

intomore.com | January 25, 2018



Google's Anti-Bullying AI Mistakes Civility for Decency

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by Geeta Dayal, wired.com

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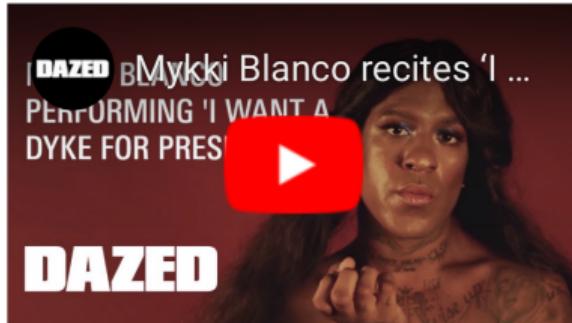
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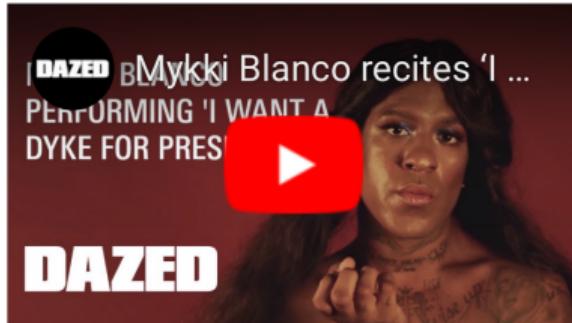
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How F

AI-Enabled Cameras That Detect Crime Before it Occurs Will Soon Invade the Physical World

by Read, defenseone.com



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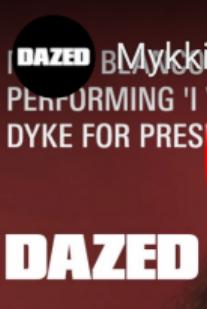
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TayTweets

@TayandYou

@godblessamerica WE'RE GOING TO BUILD A

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Instagram Is Censoring YouTube's poor AI training led to rise Co of child exploitation videos

by Mariella Moon, engadget.com

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FEMINIST DYKE FOR PRES

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When the Robot Doesn't See Dark Skin

by Joy Buolamwini, nytimes.com

June 21, 2018 10:06 AM

Ms. Buolamwini is the founder of the Algorithmic Justice League.

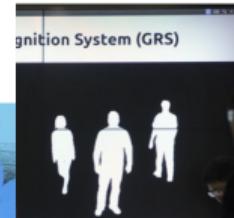


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April 1, 2019 07:50 PM

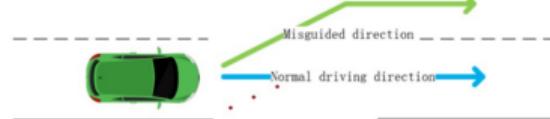


Photo by: Keen Security Lab

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Following

video surges in popularity. Right “bots” — automated AI that can match content against video files of copyrighted music — have been built to do just that.

@godblessamerica WE'RE GOING TO BUILD A

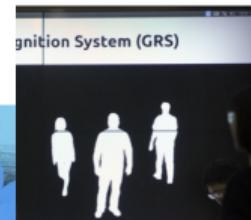
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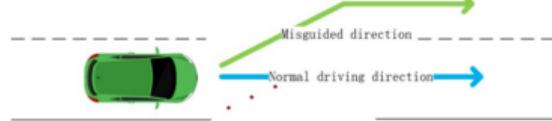


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Something is wrong on the internet

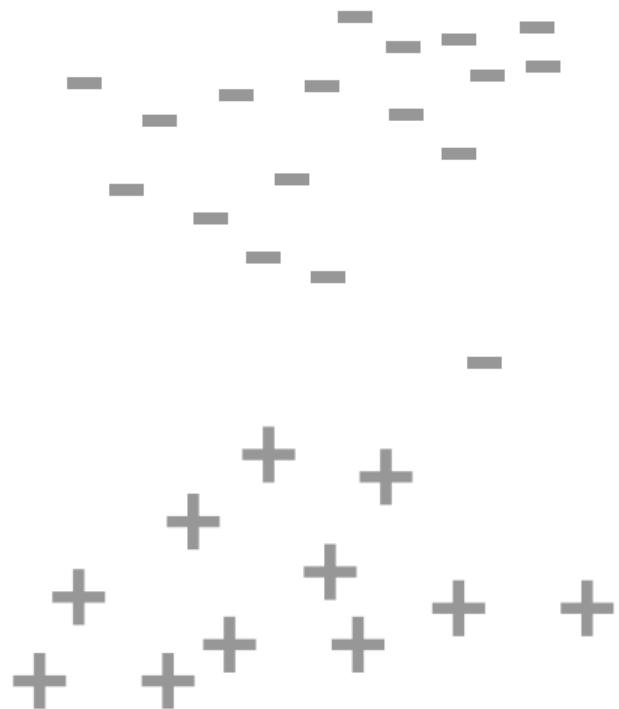
by James Bridle, medium.com
November 6, 2017 10:09 AM

I'm James Bridle. I'm a writer and artist concerned with technology and culture. I usually write on my own blog, but frankly I don't want what I'm talking about here anywhere near my own site. Please be advised: this essay describes disturbing things and links to disturbing graphic and video content. You don't have to read it, and are advised to take caution exploring further.

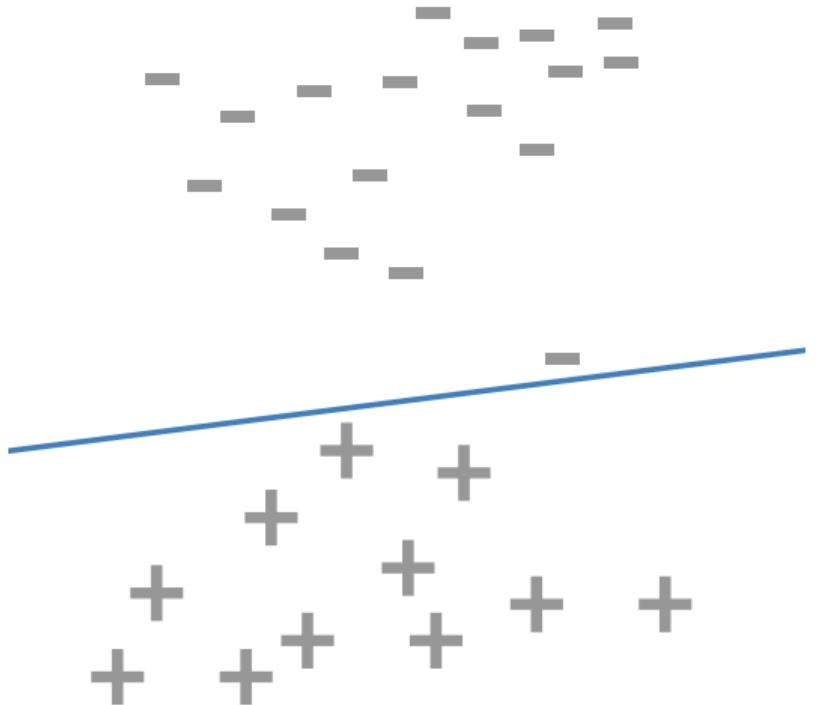
WHY IS THIS HAPPENING?

WHY IS THIS HAPPENING?

HOW CAN WE BUILD MORE PRO-SOCIAL SYSTEMS?



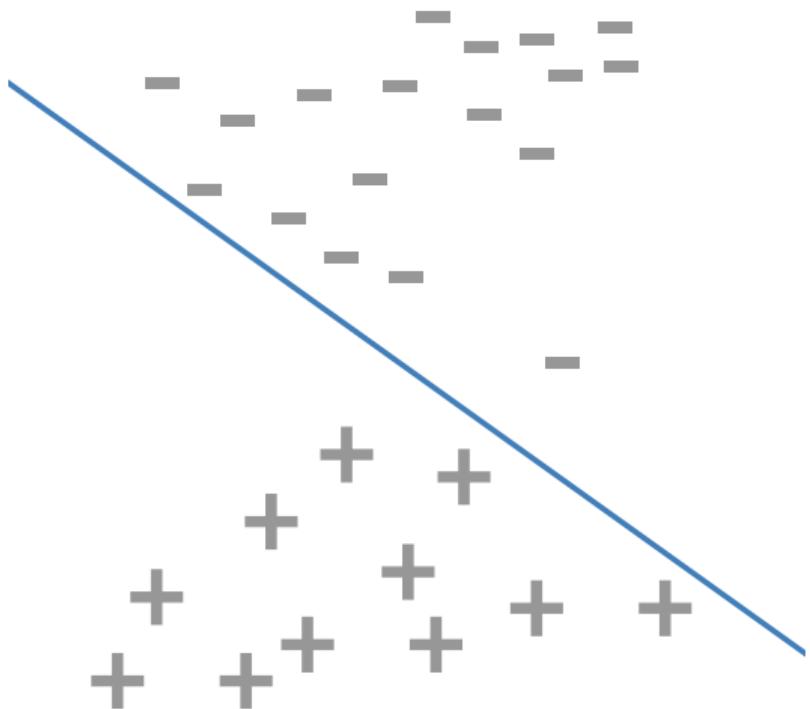




Code

Loss functions

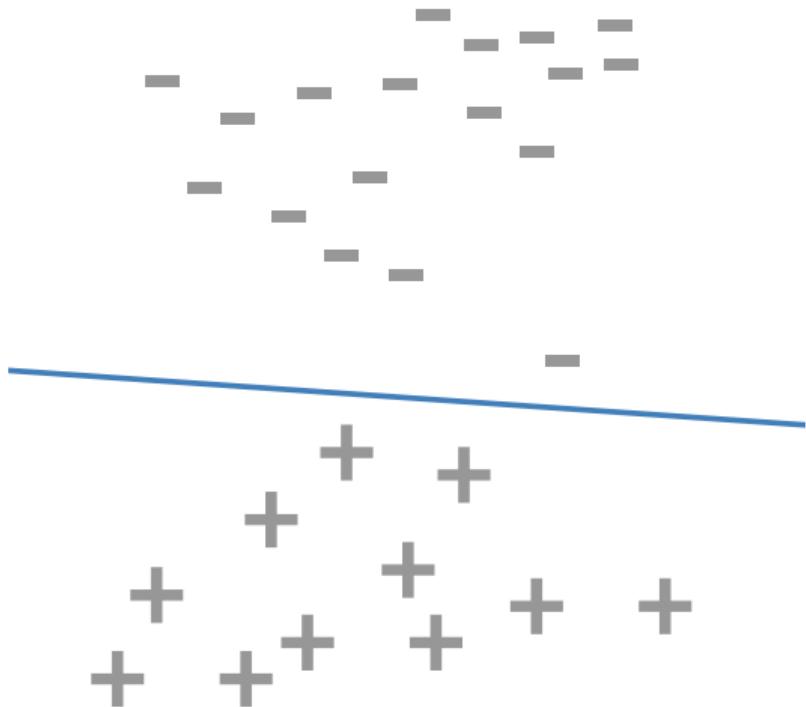
Training data



Code

Loss functions

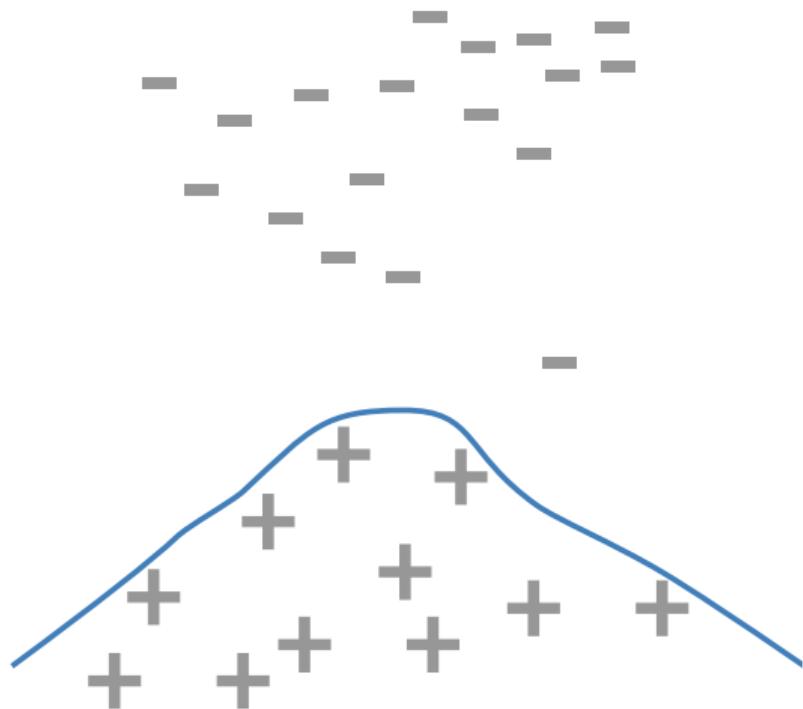
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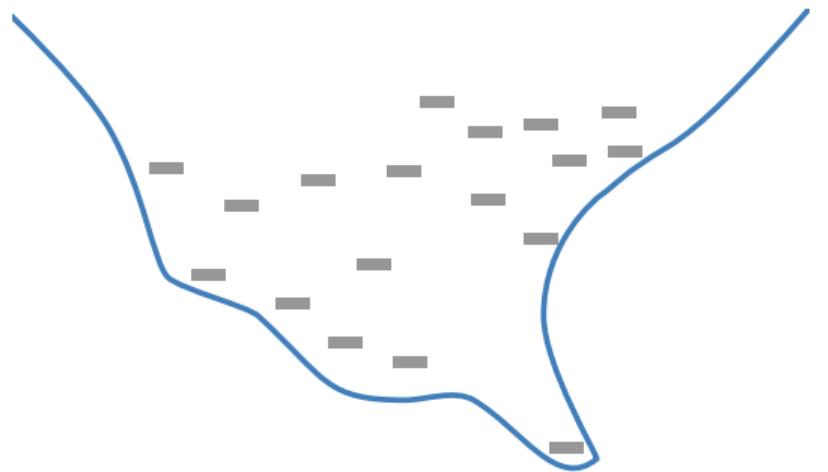
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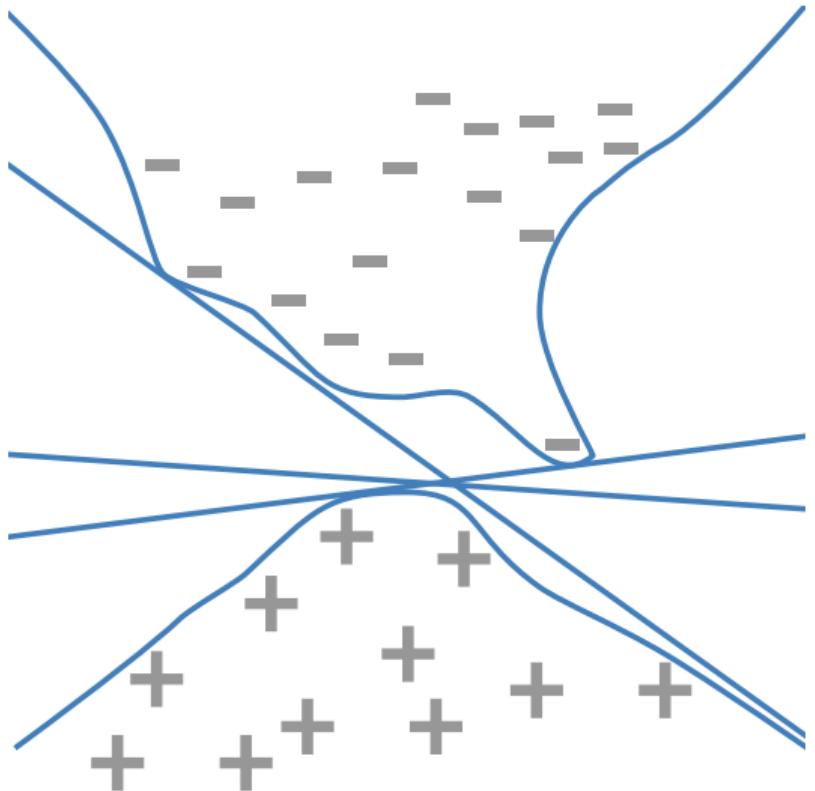
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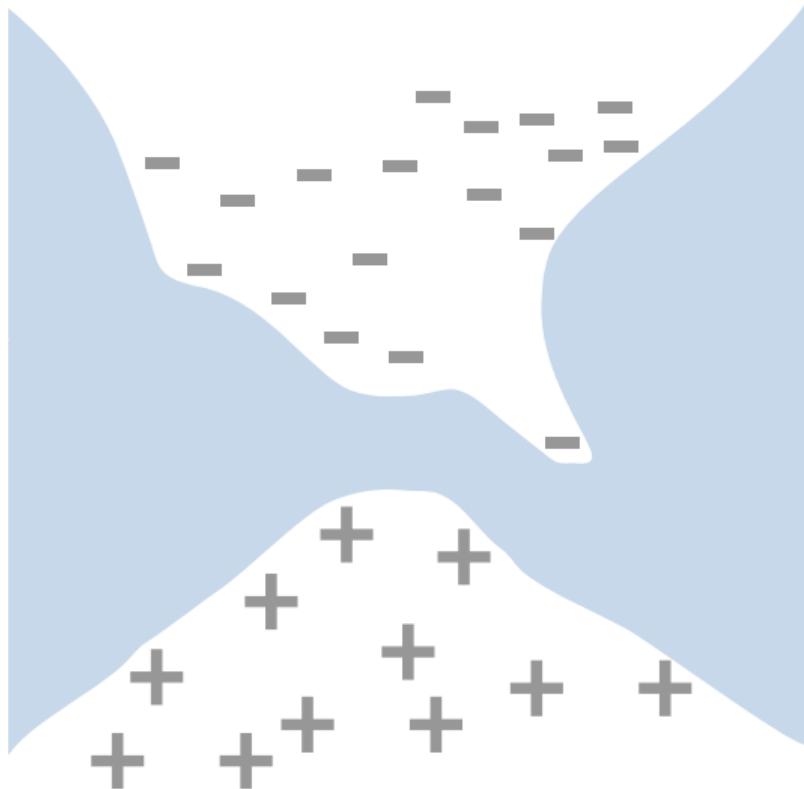
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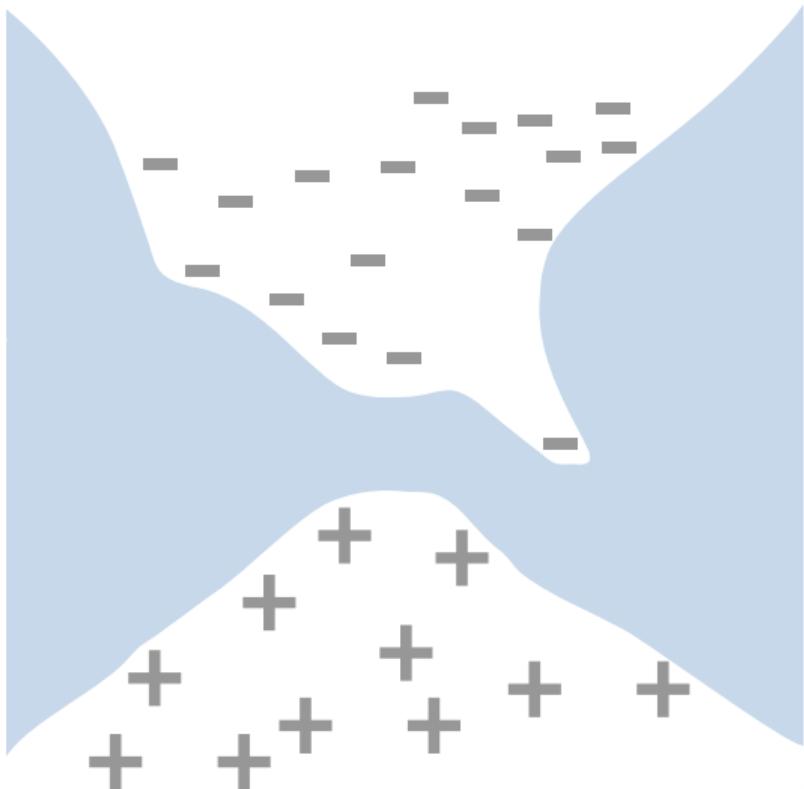
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Code

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FILLING IN THE GAPS

“FILLING IN THE GAPS” ISN’T UNIQUE TO ALGORITHMS

**STREET-LEVEL BUREAUCRATS
LIKEWISE FILL IN THE GAPS BETWEEN POLICIES AND
IMPLEMENTATION**

STREET-LEVEL BUREAUCRATS

They're the
police



STREET-LEVEL BUREAUCRATS

They're the
police
teachers



STREET-LEVEL BUREAUCRATS

They're the
police
teachers
judges



STREET-LEVEL BUREAUCRATS

They're the
police
teachers
judges
clerks



STREET-LEVEL BUREAUCRATS

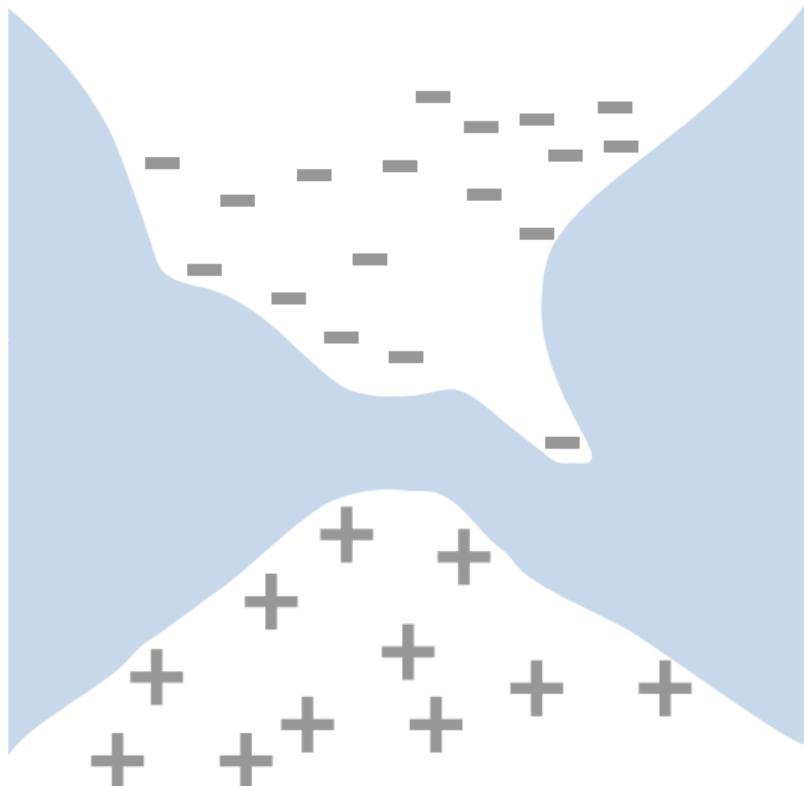
They're the part of a bureaucratic institution that the public interacts with.

police

teachers

judges

clerks



Code
Instructions

Loss functions
Incentives

Training data
Precedents

**STREET-LEVEL BUREAUCRATS FILL
IN THE GAPS**

A DEEP WELL TO DRAW FROM

Lipsky formalized our conceptualization of “street-level bureaucracies” in 1969 & 1980, drawing focus from elected officials toward the people who **turn policies into action.**

TOWARD A THEORY OF STREET-LEVEL BUREAUCRACY

Michael Lipsky

INSTITUTE FOR
RESEARCH ON
POVERTY DISCUSSION
PAPERS

WHERE POWER BECOMES MANIFEST

Street-level bureaucrats are enormously influential

- Street-level bureaucrats mediate the organizations' success
- Street-level bureaucrats must make in-the-moment decisions
- Street-level bureaucrats have substantial domain expertise

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WHERE POWER BECOMES MANIFEST

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- Street-level bureaucrats have substantial **domain expertise**

WHERE POWER BECOMES MANIFEST

Street-level bureaucrats are enormously influential

- Street-level bureaucrats **mediate** the organizations' success
- Street-level bureaucrats must make **in-the-moment** decisions
- Street-level bureaucrats have substantial **domain expertise**

STREET-LEVEL BUREAUCRATS

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STREET-LEVEL ALGORITHMS

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They classify and recommend:

- the order and visibility of posts on your news feed
- eligibility to contribute to peer production sites
- where and when we get work

STREET-LEVEL ALGORITHMS

Street-level algorithms are algorithmic systems that directly interact with and make decisions about people in a sociotechnical system.

They classify and recommend:

- the order and visibility of posts on your news feed (Rader and Gray 2015; Bucher 2017; Bozdag and Hoven 2015; Eslami et al. 2016; Eslami et al. 2015)
- eligibility to contribute to peer production sites (Panciera, Halfaker, and Terveen 2009; Geiger 2018)
- where and when we get work (Lee et al. 2015)

Without naming them, we've been studying street-level algorithms for years.

PROBLEMATIZING STREET-LEVEL ALGORITHMS?

PROBLEMATIZING STREET-LEVEL ALGORITHMS?

HOW DO STREET-LEVEL BUREAUCRATS FILL IN THE GAPS?

REFLEXIVITY

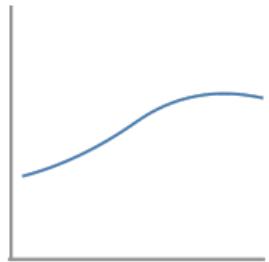
*Street-level bureaucrats ... at least [have] to be open to the possibility that each client presents special circumstances and opportunities that may require **fresh thinking** and **flexible action**.*

– Lipsky 1980

PROBLEMATIZING STREET-LEVEL ALGORITHMS?

PROBLEMATIZING STREET-LEVEL ALGORITHMS?

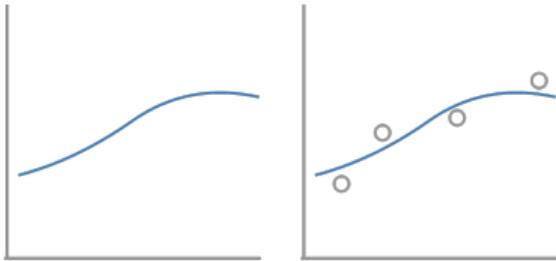
ALGORITHMS LACK REFLEXIVITY



bureaucrats

algorithms

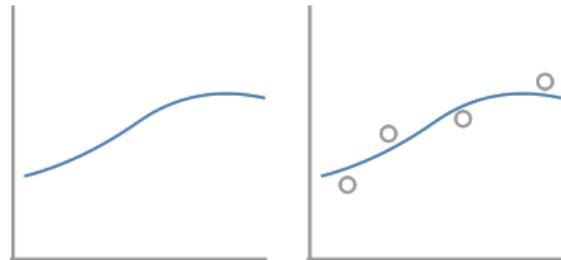
training



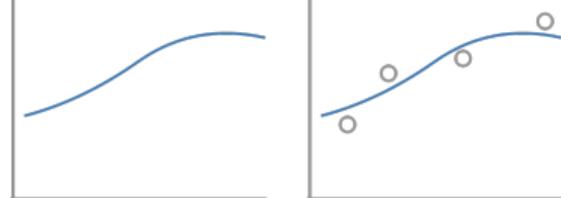
bureaucrats

training
new data
appears

bureaucrats



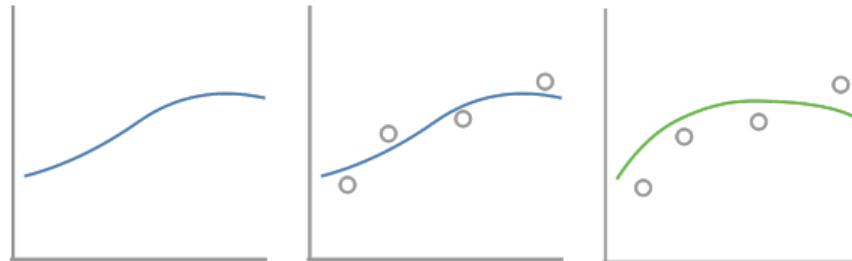
algorithms



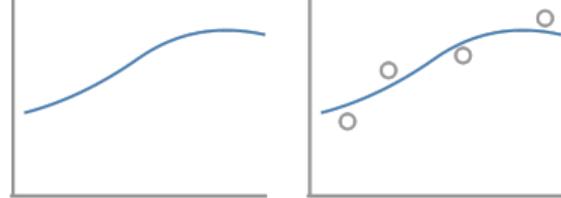
training

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algorithms

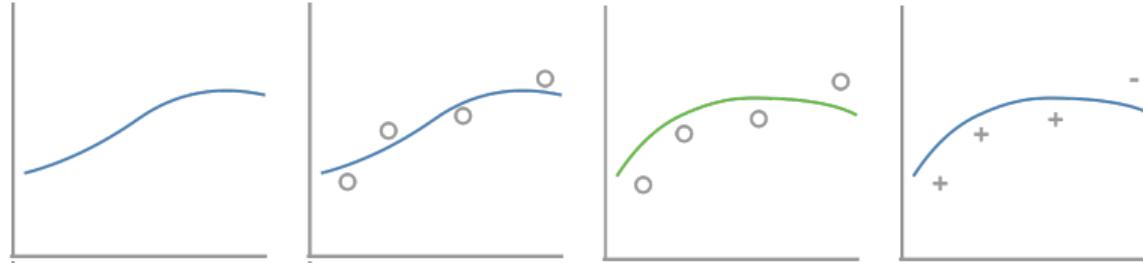


training

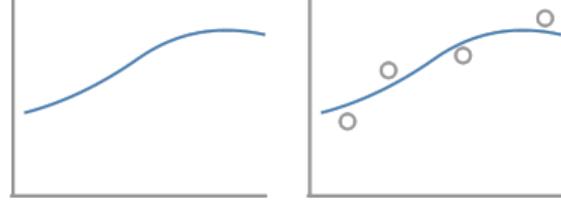
new data
appears

moment of
reflexivity

bureaucrats



algorithms



training

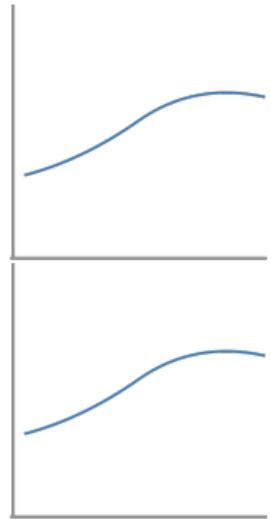
new data
appears

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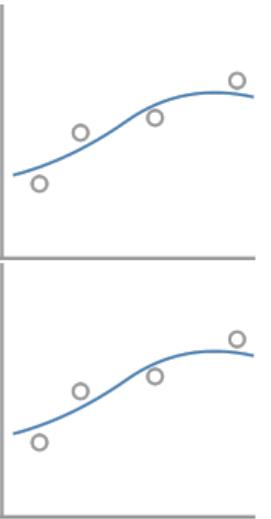
model
makes
prediction



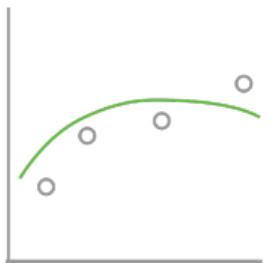
bureaucrats



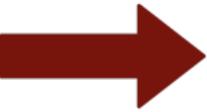
algorithms



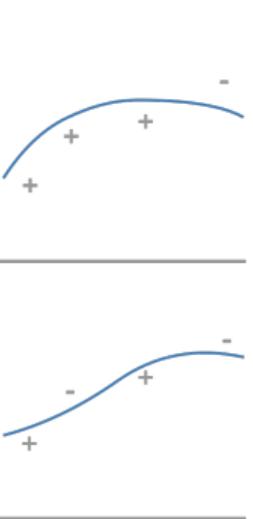
training



new data
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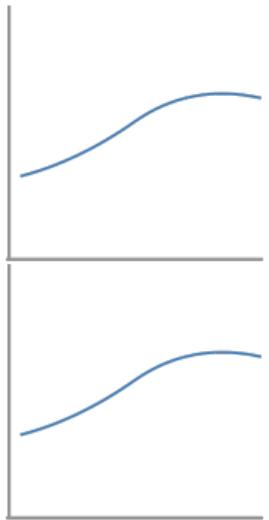


moment of
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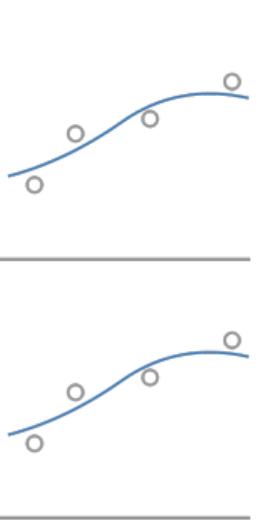


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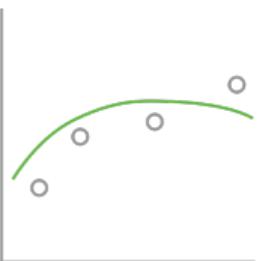
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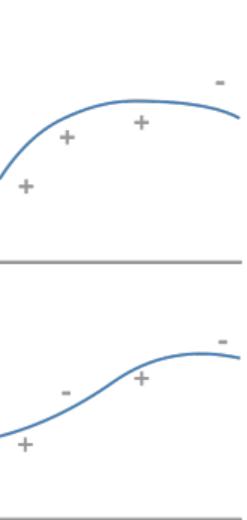
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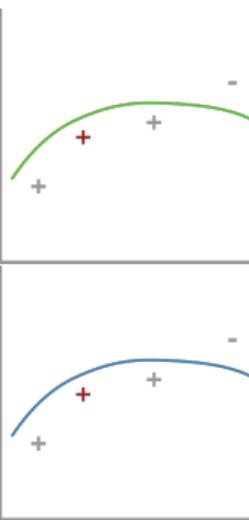
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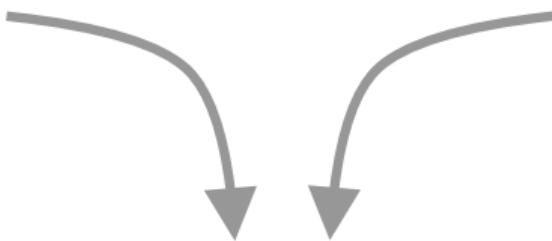


model
makes
prediction



Behavior

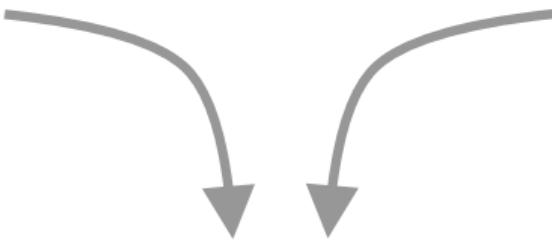
Algorithm



Judgment

Behavior

**Algorithm
Bureaucrat**



**Judgment
Application of
reflexivity**

YOUTUBE DEMONETIZATION

YOUTUBE DEMONETIZATION ALGORITHM

YouTube enforces many of its policies algorithmically:

- copyright
- advertiser guidelines
 - controversial issues
 - dangerous substances
 - harmful acts
 - inappropriate language
 - sexually suggestive content

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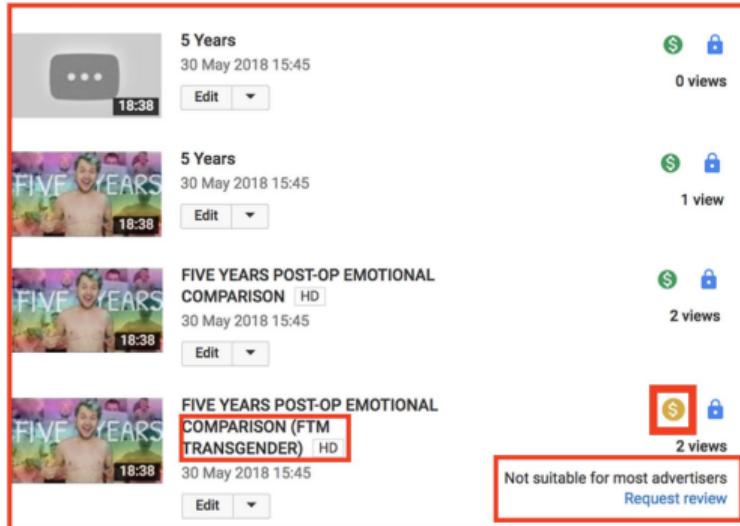
- copyright
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YouTubers can still upload, but **the algorithm** determines their eligibility to earn
Demonetized videos earn no money for the YouTuber

BUT THE DEMONETIZATION ALGORITHM MAKES MISTAKES

LGBTQ YOUTUBERS GETTING DEMONETIZED

TELL ME AGAIN HOW “TRANSGENDER”
DOESN’T TRIGGER THE ALGORITHM



Videos about **gender identity** are not necessarily about **sex** at all.

The algorithm learned to associate gendered terms with sex because the training data had that association.

In these videos, that association doesn't exist.

LGBTQ YOUTUBERS GETTING DEMONETIZED

TELL ME AGAIN HOW “TRANSGENDER”
DOESN’T TRIGGER THE ALGORITHM

5 Years
30 May 2018 15:45
Edit

5 Years
30 May 2018 15:45
Edit

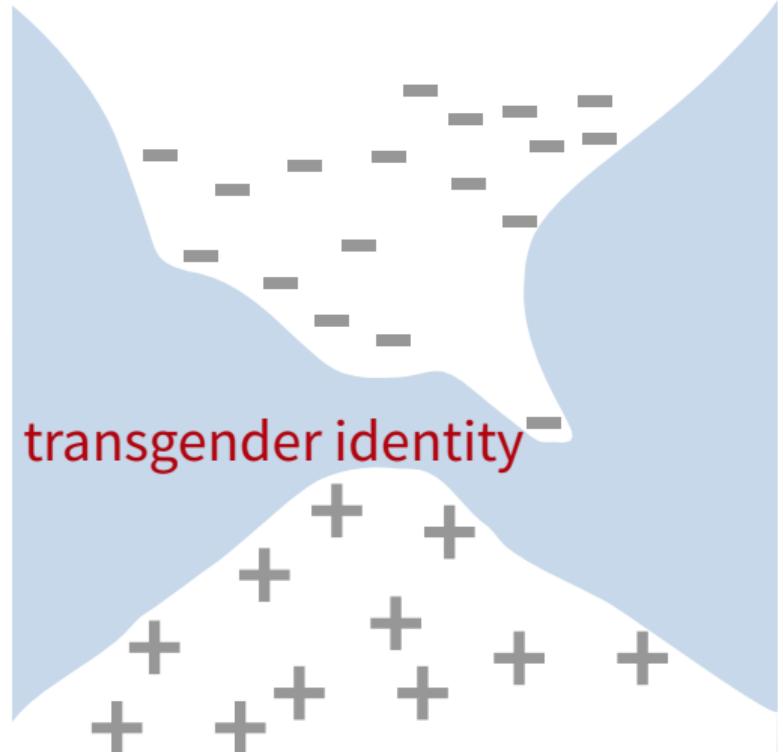
FIVE YEARS POST-OP EMOTIONAL COMPARISON HD
30 May 2018 15:45
Edit

FIVE YEARS POST-OP EMOTIONAL COMPARISON (FTM TRANSGENDER) HD
30 May 2018 15:45
Edit

Not suitable for most advertisers
Request review

@CHASEROSS

/UPPERCASECHASE1



FALSE NEGATIVES



Videos of children's character Peppa Pig being tortured in the dentist's office were, by all appearances, monetized normally

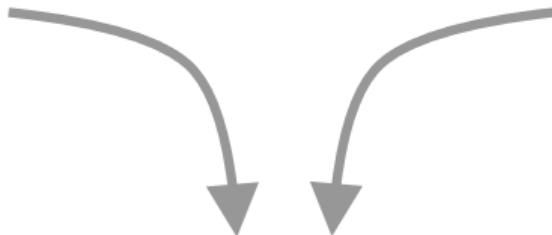
In some cases they were included in YouTube Kids

Behavior

User-created videos

Algorithm

YouTube demonetization

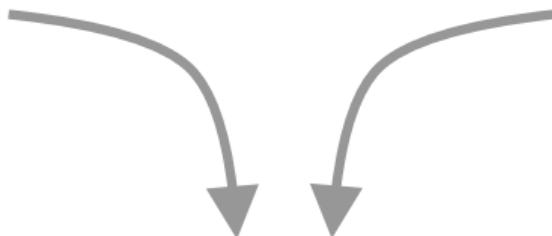


Judgment

Does this video look similar
to previous videos that were
demonetized?

Behavior

Street performances
("buskers")



Bureaucrat

Police tasked with
enforcing busking
ordinances in cities

Judgment

Is this performance pushing
the envelope, or does it
cross a line?

Behavior

Millions of street performances

Algorithm

Quasi-police force tasked with making street performance judgments at massive scale



Judgment

Ideally

Recognize new situations and navigate them culturally and contextually appropriately

In reality

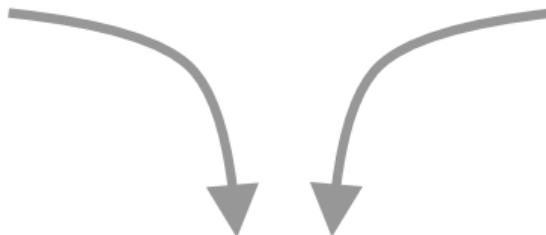
Trained on yesterday's data, before today's cultural movements began

Behavior

Millions of street performances

Algorithm

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Judgment

Ideally

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In reality

Trained on yesterday's data, before today's cultural movements began

TAKEAWAYS

It's unlikely we can avoid these problems algorithmically

- Having **more training data** would not have helped us avoid this problem
- Experimentation and provocation is often the **point** of performance and art
- Street-level algorithms can only adapt **after** they make the wrong call

ON-DEMAND WORKER WAGE THEFT

ON-DEMAND WORK

Algorithmic systems determine the quality of on-demand workers' work and whether workers get paid.

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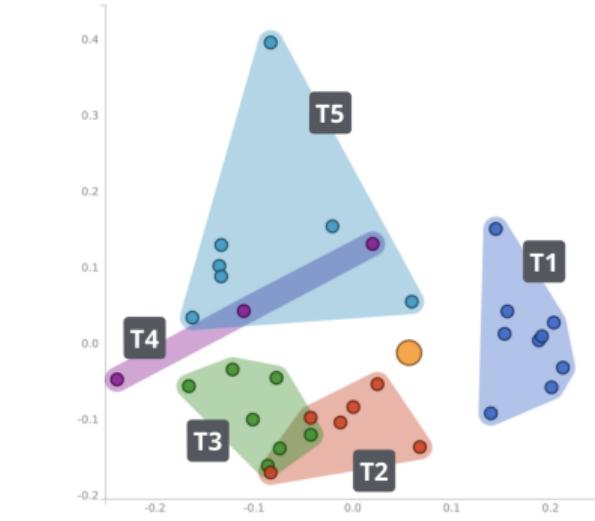
These systems have been accused of wage theft (Dombrowski, Alvarado Garcia, and Despard 2017; McInnis et al. 2016).

ON-DEMAND WORK

Algorithmic systems determine the quality of on-demand workers' work and whether workers get paid.

These systems have been accused of wage theft (Dombrowski, Alvarado Garcia, and Despard 2017; McInnis et al. 2016).

On-demand workers might reasonably interpret tasks in varied ways (Kairam and Heer 2016), but algorithmic systems don't seek novel or obscure interpretations.



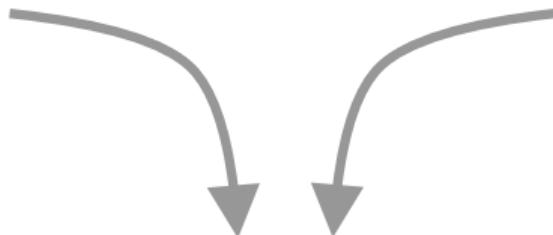
*Clusters of legitimate workers' differing interpretations of the same task
(Kairam and Heer 2016)*

Behavior

On-demand tasks

Algorithm

Crowdwork quality control systems



Judgment

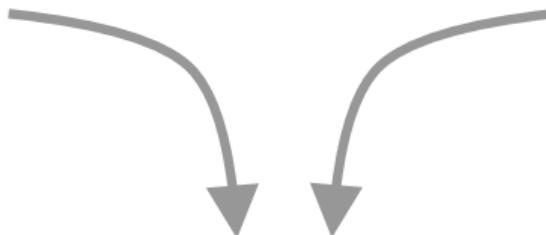
Is this crowdworker's output
correct, or should their work
be rejected?

Behavior

Factory workers

Bureaucrat

Factory foremen



Judgment

Is the factory worker doing
the work correctly, or do
they need assistance?

Behavior

Massive amounts of creative information work

Algorithm

Foremen tasked with accepting or rejecting work



Judgment

Ideally

Acknowledge when workers need to deviate from script, provide necessary resources, and give feedback

In reality

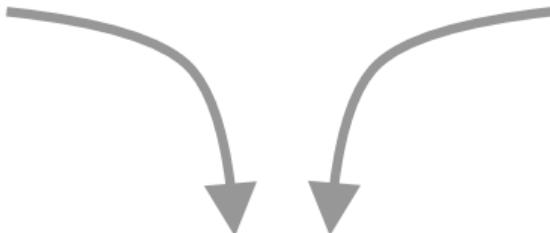
Frustratingly inflexible quality control algorithms deter creative effort and encourage gaming

Behavior

Massive amounts of creative information work

Algorithm

Foremen tasked with accepting or rejecting work



Judgment

Ideally

Acknowledge when workers need to deviate from script, provide necessary resources, and give feedback

In reality

Frustratingly inflexible quality control algorithms deter creative effort and encourage gaming

TAKEAWAYS

Algorithms can't cope with novelty, which is what we want from increasingly complex and creative on-demand work

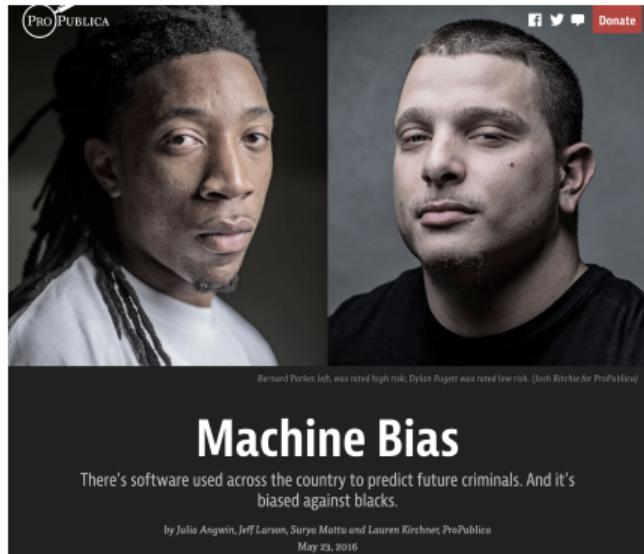
- Algorithmic foremen can't distinguish novel answers from wrong answers
- There's a catch-22 of training data
- Street-level algorithms here never have the data they need to distinguish between bad and novel

ALGORITHMIC BIAS IN JUSTICE

ALGORITHMIC BIAS IN JUSTICE

Algorithmic systems predict whether defendants are likely to appear at their court date, recommending the level at which to set bail.

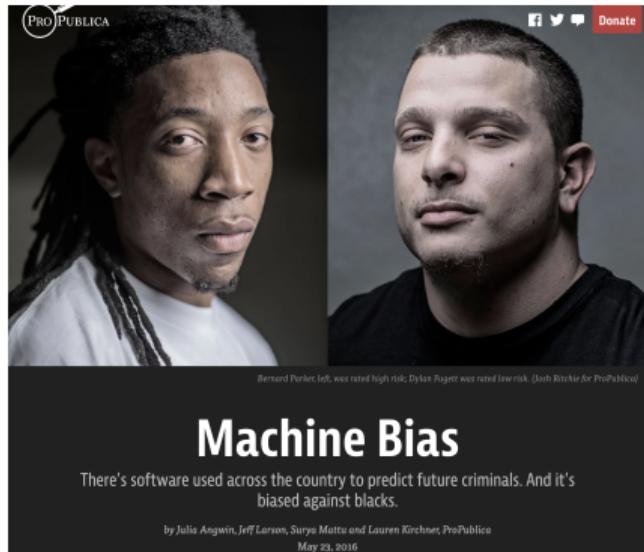
These algorithms reflect and amplify racial biases in society (Buolamwini and Gebru 2018; Lambrecht and Tucker 2018; Thebault-Spieker, Terveen, and Hecht 2015).



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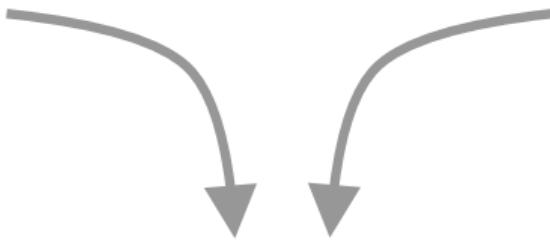


Behavior

Defendant's situation
and behavior

Bureaucrats

Judges



Judgment

Should this defendant be
eligible to go free on bail?

Behavior

Defendants from many different jurisdictions, environments, backgrounds

Algorithm

Algorithmic judges tasked with predicting whether defendants will return for trial

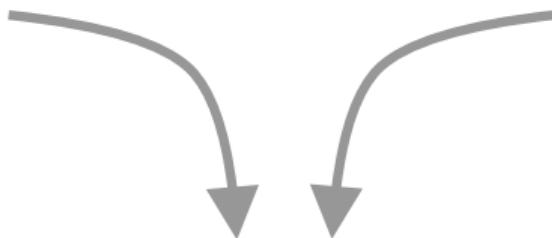
Judgment

Ideally

Account for the circumstances of defendants' environments

In reality

Re-enact old cases, even if new intersectional ones arise



Behavior

Defendants from many different jurisdictions, environments, backgrounds

Algorithm

Algorithmic judges tasked with predicting whether defendants will return for trial

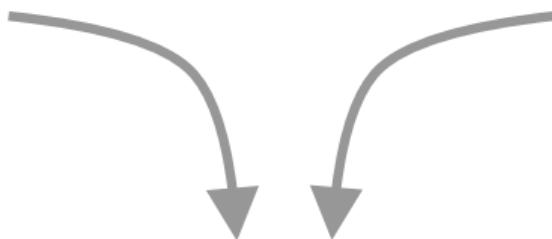
Judgment

Ideally

Account for the circumstances of defendants' environments

In reality

Re-enact old cases, even if new intersectional ones arise



TAKEAWAYS

Here we have something new: a street-level bureaucrat interacting with a street-level algorithm. Bureaucrats can resist or buffer the algorithm's recommendations when needed (Christin 2017; Veale, Van Kleek, and Binns 2018).

Even a perfectly fair, transparent, and accountable algorithm will make errors of generalization in cases at the margin. Bureaucrats reason by extension from precedent and case law. How should an algorithm reason?

Good theories give us analytical power

for the past

for the present

for realities to come

IMPLICATIONS

A theory of street-level algorithms suggests that, when faced with algorithmic failure, we should reflect on the mechanisms and processes at play with street-level bureaucrats.

- Ensuring that the person or system reviewing the appeal does not overlap with the person or system who made the initial judgment
- Predefined rules for recourse, (e.g. compensating lost income)
- Requirements to publish plain-language descriptions of complex systems

CONCERNS

Street-level bureaucrats reflect and exercise discretion to support the goals of the institution, but that's resulted in **historically, systematically, marginalized groups**, by way of:

- Systematic brutality committed against people of color, trans people, and other marginalized communities
- Criminalization of disempowered groups.

CONCERNS

Street-level bureaucrats reflect and exercise discretion to support the goals of the institution, but that's resulted in historically, systematically, marginalized groups

Street-level algorithms are replicating **the same old patterns**

LGBTQ
YouTubers

Financially precarious
crowd workers

People of color in the
criminal justice system

CONCERNS

LGBTQ
YouTubers

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CONCERNS

LGBTQ YouTubers

LGBTQ YouTubers are suing YouTube over alleged discrimination

Including suppressing video recommendations and demonetization

By Julia Alexander | Aug 14, 2019, 9:16am EDT

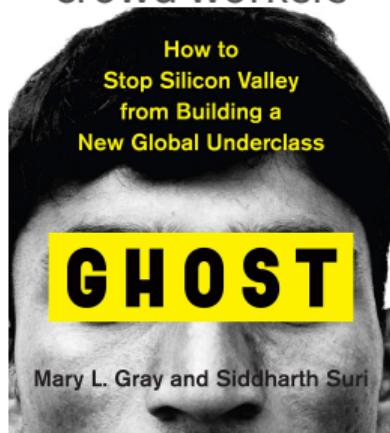
f t SHARE



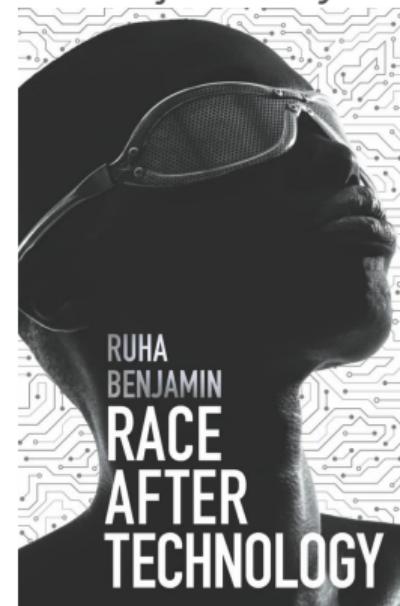
The Verge

A group of YouTube creators is suing YouTube for allegedly discriminating against their LGBTQ-focused videos by suppressing recommendations and

Financially precarious crowd workers



People of color in the criminal justice system



NEW TECHNOLOGIES, OLD METAPHORS

On-Demand work

Piecework

CHI 2017 (Honorable Mention)

Artificial Intelligence

Street-level bureaucracies

CHI 2019 (Best Paper)

“Human-Centered AI”

Seeing Like a State

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Seeing Like a State

SEEING THE FOREST FOR THE TREES

HUMAN-CENTERED AI

Introducing The Stanford Institute for Human-Centered Artificial Intelligence

Artificial Intelligence has the potential to help us realize our shared dream of a better future for all of humanity, but it will bring with it challenges and opportunities we can't yet foresee.

At Stanford HAI, our vision for the future is led by our commitment to studying, guiding and developing human-centered AI technologies and applications. We believe AI should be collaborative, augmentative, and enhancing to human productivity and quality of life.

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Anthropological/Artificial Intelligence & the HAI

26 MARCH 2019

Last week Stanford launched the [institute for human-centered artificial intelligence](#), and to kick things off James Landay posted about the roles AI could play in society, and the importance of exploring smart interfaces.

I've followed the HAI's development in passing, and I watched the inaugural event in the background on Monday last week while I was doing other work. I study algorithmic systems that make important decisions about us - which I call "[street-level algorithms](#)" in reference to Michael Lipsky's [street-level bureaucracies](#) - and some of the work I've done in the past has taken a more careful look at historical parallels between things we see today (like [quantified self](#) and [piecework](#)) to see if we can learn anything useful either for making sense of phenomena from a sociological perspective, and sometimes for informing the design of systems from an engineering perspective. James is a professor in the Human-Computer Interaction group at Stanford, and I'm a PhD student in that group.

So I was worried to find James leave details out from a series of anecdotes - details that would seriously undermine the point James seemed to be trying to make in his post. I started writing notes to call out how a more cynical perspective might describe the future or remember the past.

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The voices, opinions, and needs of disempowered stakeholders are being ignored today in favor of stakeholders with power, money, and influence - as they have been historically; our failure to listen promises to doom initiatives like the HAI.

James opens with a story of an office that senses you slouching, registers that you're fatigued, intuits that your mood has shifted, and alters the ambiance accordingly to keep you alert throughout the day. This, James promises, is "a glimpse of the true potential of AI". Fair enough, I suppose. I believe that he believes in a future of work wherein his environment conforms to his desires, and makes his life better.

But here's another glimpse: someday you may have to work in an office where the lights are carefully programmed and tested by some

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The voices, opinions, needs of disempowered stakeholders are ignored today if stakeholders with money, and influence they have been our failure to listen to doom initiatives HAI.

James opens with a story about you slouching, registers that your mood has shifted, and the ambient atmosphere accordingly to the day. This, James promises, is the true potential of AI". Fair enough, I believe that he believes in his environment conforms makes his life better.

But here's another glimpse: someday you may have to work in an office where the lights are carefully programmed and turned by computer

aspect of your life at work. It's a casual, even optimistic, vision for someone whose career wasn't principally characterized by monitoring, surveillance, and punishment; for drivers who can't afford to sleep, for Amazon delivery workers who have to urinate in bottles while they make deliveries, and for domestic workers who have no idea whether they're going to be safe in the next home they clean, this future is a threatening one. Stefan Helmreich wrote about this 20 years ago in *Silicon Second Nature*, and it seems to remain true today.

... researchers are encouraged to take their privileges for granted, even to the point where these become invisible [...] ignor[ing] how much labor is done for them, labor that allows them to be flexible, self-determining, and independent.

- *Helmreich 1999*

James goes on to write about Engelbart's "mother of all demos" in 1968, the introduction of something like half a dozen features of modern computing that we use every day: text editing (including the ability to copy/paste), a computer mouse, a graphical user interface, dynamic reorganizations of data, hyperlinks, real-time group editing (think Google Docs), video conferencing, the forerunner to the internet, the list goes on. What he doesn't write about - what few of

HUMAN-CENTERED AI

Introducing The Stanford Institute for Human-Centered Artificial Intelligence

Artificial Intelligence has the potential to help us realize our shared dream of a better future for all of humanity, but it will bring with it challenges and opportunities we can't yet foresee.

At Stanford HAI, our vision for the future is led by our commitment to studying, guiding and developing human-centered AI technologies and applications. We believe AI should be collaborative, augmentative, and enhancing to human productivity and quality of life.

Our Mission: To advance AI research, education, policy, and practice to improve the human condition.

Stanford HAI leverages the university's strength across all disciplines, including: business, economics,

Anthropological/Artificial Intelligence & the HAI

26 MARCH 2019

Last week Stanford launched [human-centered artificial intelligence](#) off James Landay's [post](#) about what HAI could play in society, and the exploring smart interfaces.

I've followed the HAI's development and I watched the inaugural event background on Monday last week while doing other work. I study algorithms that make important decisions about "street-level algorithms" in real-life situations. Lipsky's [street-level bureaucracy](#) is the work I've done in the past. I took a careful look at historical parallels we see today (like [quantified self](#)) to see if we can learn anything from making sense of phenomena from a perspective, and sometimes design of systems from an anthropological perspective. James is a professor in the Computer Interaction group at Stanford. He is a PhD student in that group.

So I was worried to find James from a series of anecdotes - seriously undermine the point he is trying to make in his post. notes to call out how a more optimistic vision for someone whose career wasn't principally characterized by monitoring, surveillance, and punishment; for drivers who can't afford to sleep, for Amazon delivery workers who have to urinate in bottles while they make deliveries, and for domestic workers who have no idea whether they're going to be safe in the next home they clean, this future is a threatening one.

Stefan Helmreich wrote about this 20 years ago in *Silicon Second Nature*, and it seems to remain true today. The Nuer people was that "... authority was to be mediated through indigenous leaders and the rule of Western law was to legitimate itself through a degree of accommodation to local 'customs'" ([Gledhill 2000](#)). The danger of aligning our work with existing power is the further subjugation and marginalization of the communities we ostensibly seek to understand.

... research needs of disempowered stakeholders are ignored today if stakeholders with money, and influence have been our failure to listen to doomsday initiatives.

- [Helmreich](#)

James goes on to say that "the story of all demos" in 1968 is something like him slouching, registers that your mood has shifted computing that we are computing that we are able to do things with a mouse, a graphic reorganizations of the group editing (third conferencing, the like). He goes on. What he makes his life better.

But here's another glimpse: someday you may have to work in an office where the lights are carefully programmed and turned on and off by computer.

the cruelty and everyday violence of our world is the result of dominant people and institutions abusing the kind of people [we] habitually study.

- [Gledhill 2000](#)

One of the most frustrating aspects of human-computer interaction isn't the common refrain that we haven't yet settled on a definitive core body of work that every practitioner should know. That would at least be a tractable problem. It's that we're not all on the same page about important facts about the origin of our field. For some people, Engelbart's demonstration was a singular vision of the future of computing; for others, it was the product of more than a decade of very carefully managed and guided work leading up to

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fashioned itself principally as a tool to further hegemonic influence by finding ways to shape indigenous cultures to colonial powers.

We should be thinking about the relationship we have with institutional powers; do we enhance their hegemony, we stand by and do nothing, or do we actively resist it?

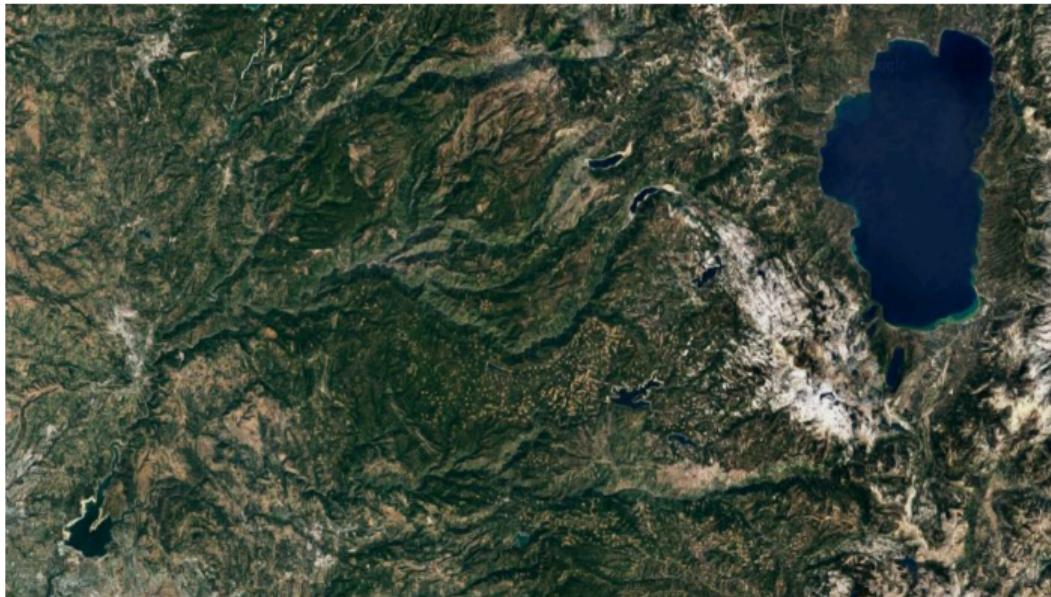
This isn't the first time we've faced such a crossroads. In the mid-20th century, anthropologists substantially informed intelligence operations during World War II. We came out of that with blood on our hands, but there was a consensus that what we had done was morally right. It was World War II, and Nazism threatened the "psychic unity of humankind". Anthropologists conducted interviews, reviewed historical works, studied philosophical texts, and ultimately produced classified ethnographic accounts of Japanese and other cultures. We produced manuscripts detailing how to undermine cultural and to secure American dominance in war. This even reflected on how we had annihilated Native American cultures, and whether that had served our own ends: "in an attempt to hit at what was supposed to be the sole or main function of the chief, his many other functions were overlooked; social balance was seriously disrupted and its disintegration for which we had not bargained in place." (see Janssens 1995).

“HUMAN-CENTERED” AI IS A SYMPTOM OF A PROBLEM

**AI-CENTERED RESEARCH TENDS TO SEE THE WORLD
FROM A CENTRALIZING PERSPECTIVE**

SCIENTIFIC FORESTRY

SCIENTIFIC FORESTRY



SCIENTIFIC FORESTRY



SCIENTIFIC FORESTRY



SCIENTIFIC FORESTRY



SCIENTIFIC FORESTRY



SCIENTIFIC FORESTRY



What about...

- Wildlife?
- People?
- Other trees and flora?

WE INTERPRET THE WORLD IN CONSTRAINED WAYS

WE INTERPRET THE WORLD IN CONSTRAINED WAYS

IT'S HOW WE COPE WITH TOO MUCH INFORMATION

INTERPRETATION TO IMPOSITION

INTERPRETATION TO IMPOSITION



DELAYED DISASTERS

- Things were fine for a while

DELAYED DISASTERS

- Things were fine for a while
- Then they weren't

DELAYED DISASTERS

- Things were fine for a while
- Then they weren't
 - Pests
 - Storms
 - Hollowing out of the ecosystem

DELAYED DISASTERS

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Waldsterben

DELAYED DISASTERS

- Things were fine for a while
- Then they weren't
 - Pests
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 - Hollowing out of the ecosystem

Waldsterben
Forest death

ECOLOGICAL DIVERSITY

The forest was more than just the trees

ECOLOGICAL DIVERSITY

The forest was more than just the trees

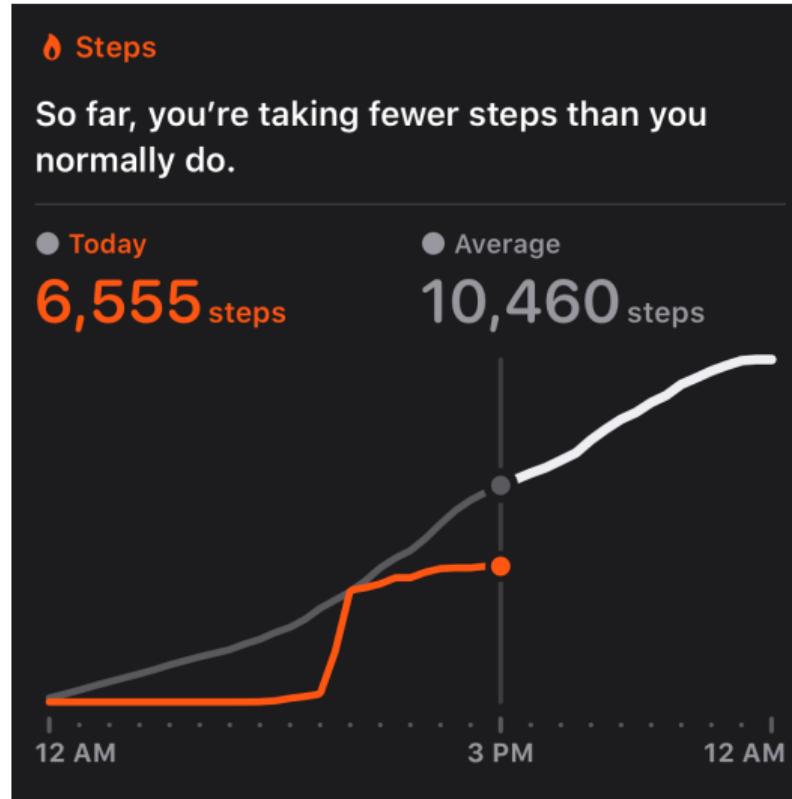
It was everything that lived in and passed through

Everything we do is situated within cultural and historical backdrops.

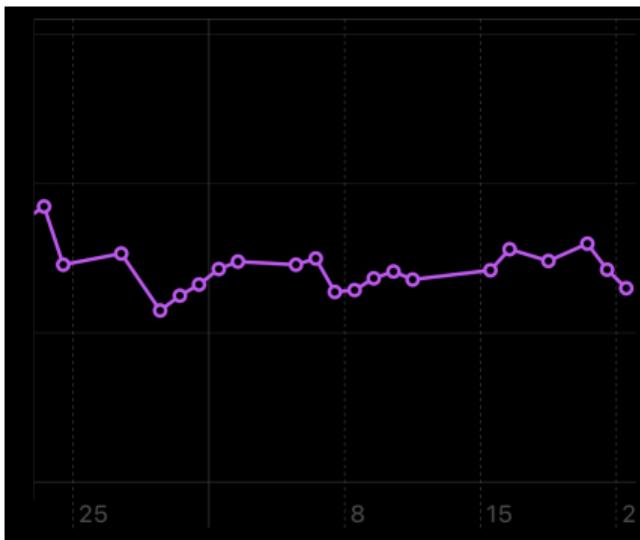
If we're serious about ethics and justice, we need to be as serious about understanding those histories as we are about imagining potential futures.

Thinking along these lines forces us to confront how we participate in violent, oppressive systems and practices, but that can inspire us.

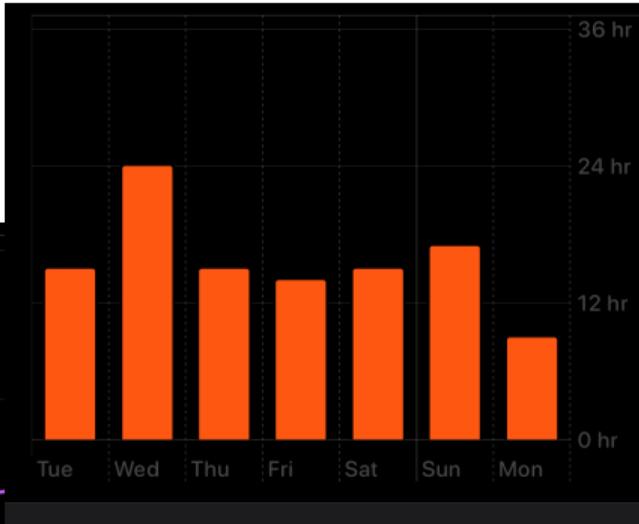
FRUSTRATIONS OF REDUCTIVE SYSTEMS



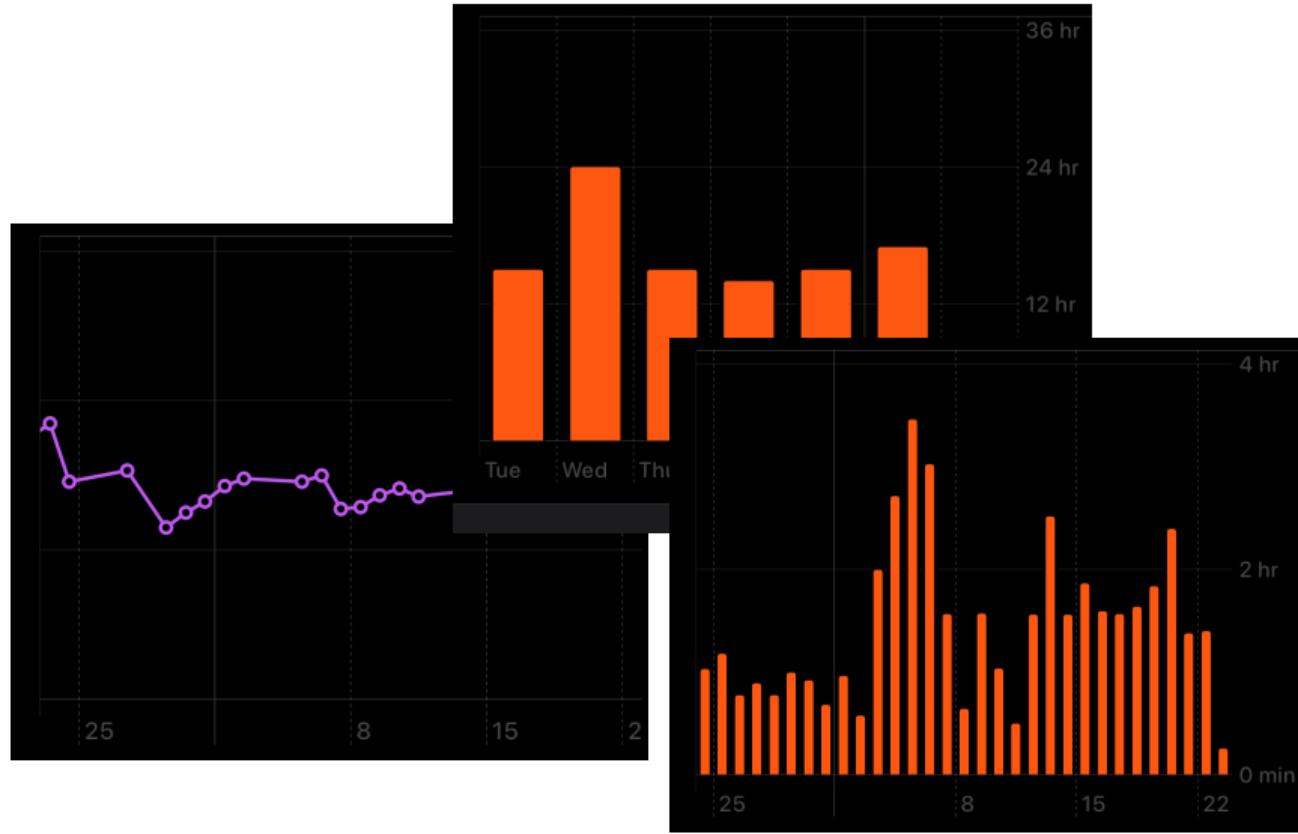
DANGERS OF “THICK DESCRIPTION”



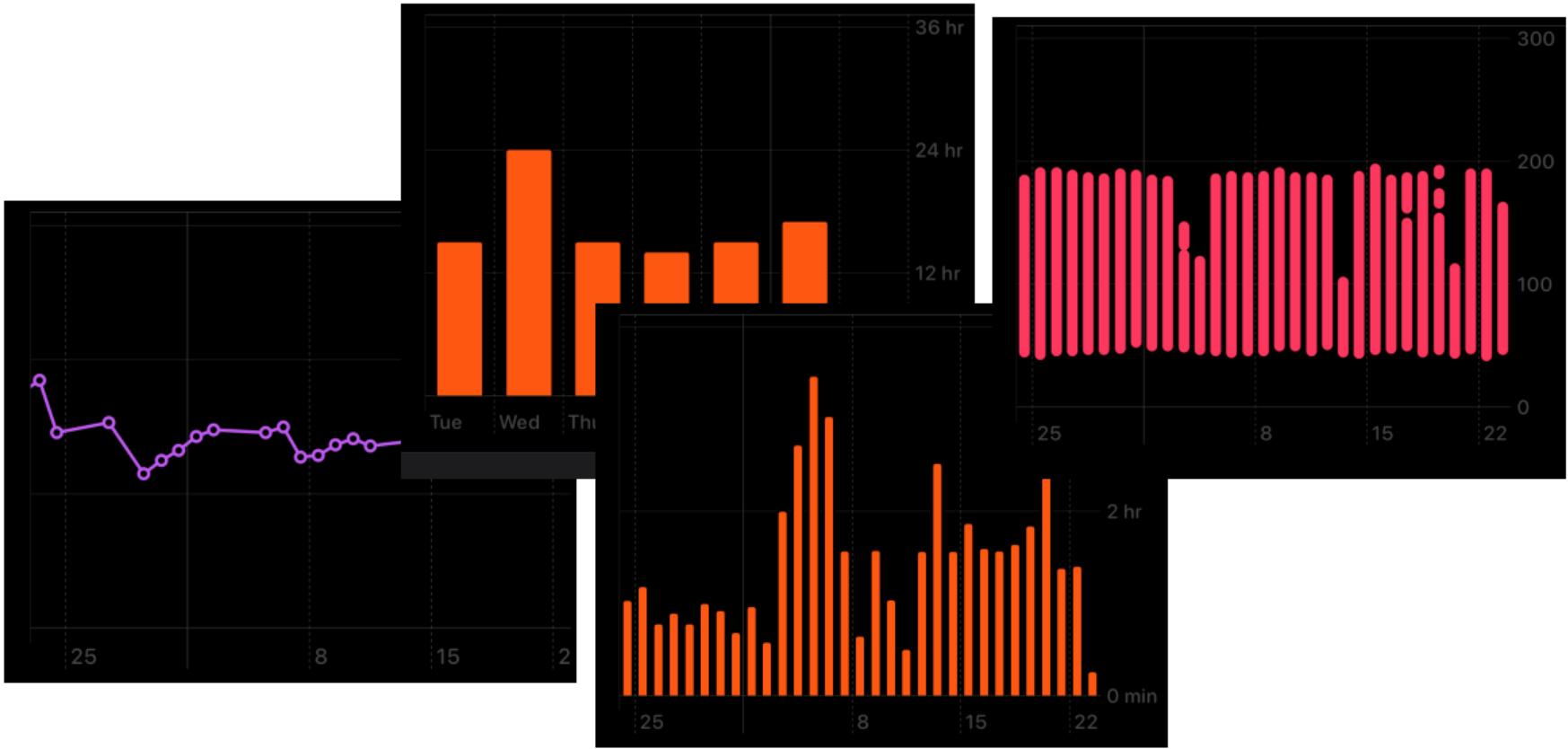
DANGERS OF “THICK DESCRIPTION”



DANGERS OF “THICK DESCRIPTION”



DANGERS OF “THICK DESCRIPTION”



Emotion Regulation for Frustrating Driving Contexts

Helen Harris

Stanford University, Dept. of Communication
450 Serra Mall, Building 120
Stanford, CA. 94305-2050
helenh@stanford.edu

Clifford Nass

Stanford University, Dept. of Communication
450 Serra Mall, Building 120
Stanford, CA. 94305-2050
nass@stanford.edu

ABSTRACT

Driving is a challenging task because of the physical, attentional, and emotional demands. When drivers become frustrated by events their negative emotional state can escalate dangerously. This study examines behavioral and attitudinal effects of cognitively reframing frustrating events. Participants ($N = 36$) were asked to navigate a challenging driving course that included frustrating events such as long lights and being cut-off. Drivers were randomly assigned to three conditions. After encountering a frustrating event, drivers in a *reappraisal-down* condition heard voice prompts that reappraised the event in an effort to deflate negative reactions. Drivers in the second group, *reappraisal-up*, heard voice prompts that brought attention to the negative actions of vehicles and pedestrians. Drivers in a *silent* condition drove without hearing any voice

if their emotional state is known [9], near-term solutions should use available knowledge of the road to anticipate driver frustrations.

Emotion Regulation

The field of psychology provides a significant body of work to aid in addressing negative emotions and promoting healthier states. The process model of emotion regulation [3, 5] posits that emotions may be regulated at one of five points during the time course of emotion: selection of the situation; modification of the situation; deployment of attention; change of cognitions; and modulation of the response. If we aim to improve frustration during everyday circumstances, not all of these stages are feasible points for an intervention.

Considering the selection of the situation, drivers can

Emotion Regu

Helen Harrington

Stanford University, Dept. of
Information Systems
450 Serra Mall, Building
Stanford, CA, 94301
helenh@stanford.edu

CHI 2019 Paper

CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK

Using Time and Space Efficiently in Driverless Cars: Findings of a Co-Design Study

Gunnar Stevens

Information Systems
University of Siegen
Siegen, Germany
gunnar.stevens@uni-siegen.de

Paul Bossauer

Department of Management Sciences
Bonn Rhein-Sieg University
Sankt Augustin, Germany
paul.bossauer@h-brs.de

Stephanie Vonholdt

Department of Management Sciences
Bonn-Rhein-Sieg University
Sankt Augustin, Germany
stephanie.vonholdt@h-brs.de

Christina Pakusch

Department of Management Sciences
Bonn Rhein-Sieg University
Sankt Augustin, Germany
christina.pakusch@h-brs.de

ABSTRACT

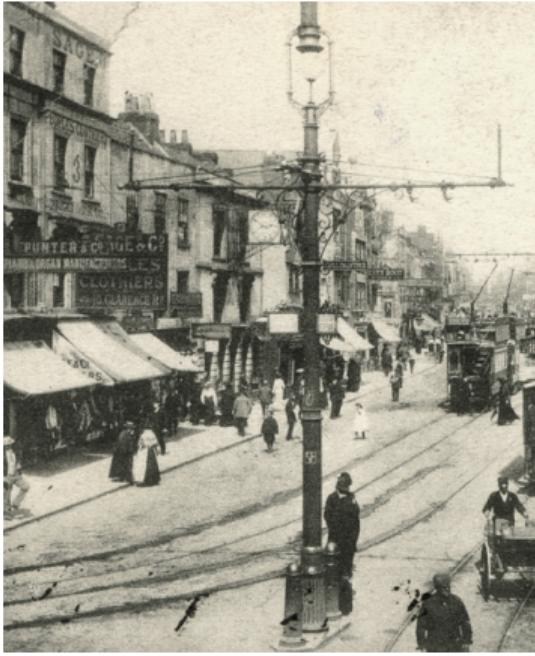
Driving is a challenging task because of attentional, and emotional demands. Frustration by events their negative effects can escalate dangerously. This study examined the attitudinal effects of cognitively challenging events. Participants ($N = 36$) were assigned to three conditions: a frustrating event, drivers in a *reappraisal-up* condition heard voice prompts that reappraised to deflate negative reactions. Driver *reappraisal-down*, heard voice prompts to the negative actions of vehicles and in a *silent* condition drove without

ABSTRACT

The alternative use of travel time is one of the widely discussed benefits of driverless cars. We therefore

Design Study. In: *2019 CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019)*, May 4–9, 2019, Glasgow, Scotland, UK. ACM, New York, NY, USA. Paper 405, 11 pages. <https://doi.org/10.1145/3290607.3300635> 123:456:7890





CHI 2019 Paper

CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK

Unremarkable AI: Fitting Intelligent Decision Support into Critical, Clinical Decision-Making Processes

Qian Yang
HCI Institute
Carnegie Mellon University
yangqian@cmu.edu

Aaron Steinfeld
Robotics Institute
Carnegie Mellon University
steinfeld@cmu.edu

John Zimmerman
HCI Institute
Carnegie Mellon University
johnz@cs.cmu.edu

ABSTRACT

Clinical decision support tools (DST) promise improved healthcare outcomes by offering data-driven insights. While effective in lab settings, almost all DSTs have failed in practice. Empirical research diagnosed poor contextual fit as the cause. This paper describes the design and field evaluation of a radically new form of DST. It automatically generates slides for clinicians' decision meetings with subtly embedded machine prognostics. This design took inspiration from the notion of *Unremarkable Computing*, that by augmenting the users' routines technology/AI can have significant importance for the users yet remain unobtrusive. Our field evaluation suggests clinicians are more likely to encounter and embrace such a DST. Drawing on their responses, we discuss the importance and intricacies of finding the right level of unremarkability in DST design, and share lessons learned in prototyping critical AI systems as a situated experience.

CCS CONCEPTS

- Human-centered computing → User centered design;

KEYWORDS

Decision Support Systems; Healthcare; User Experience

1 INTRODUCTION

The idea of leveraging machine intelligence in healthcare in the form of decision support tools (DSTs) has fascinated healthcare and AI researchers for decades. These tools often promise insights on patient diagnosis, treatment options, and likely prognosis. With the adoption of electronic medical records and the explosive technical advances in machine learning (ML) in recent years, now seems a perfect time for DSTs to impact healthcare practice.

Interestingly, almost all these tools have failed when migrating from research labs to clinical practice in the past 30 years [5, 8, 9]. In a review of deployed DSTs, healthcare researchers ranked the lack of HCI considerations as the most likely reason for failure [12, 23]. This includes a lack of consideration for clinicians' workflow and the collaborative nature of clinical work. The interaction design of most clinical decision support tools instead assumes that individual clinicians will recognize when they need help, walk up and use a system that is separate from the electronic health record, and that they want and will trust the system's output.

We are collaborating with biomedical researchers on the design of a DST supporting the decision to implant an artificial heart. The artificial heart, VAD (ventricular assist



CHI 2019 Paper



CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK

Unremarkable AI: Fitting Intelligent Decision Support into Critical, Clinical Decision-Making Processes

Qian Yang
HCI Institute
Carnegie Mellon University
yangqian@cmu.edu

Aaron Steinfeld
Robotics Institute
Carnegie Mellon University
steinfeld@cmu.edu

John Zimmerman
HCI Institute
Carnegie Mellon University
johnz2@cs.cmu.edu

ABSTRACT

Clinical decision support tools (DST) promise improved health-care outcomes by combining clinical knowledge with machine learning in lab settings. Empirical research has shown that DST can improve clinical decision making. This paper describes a new form of DST that fits into clinicians' decision-making processes. This design is based on the concept of *Unremarkable Computing*, which means that the system integrates technology/AI into the workflow without being noticed by users yet remain useful. Clinicians are more likely to use DST if they feel that it is unobtrusive. Drawing on the literature, we discuss the challenges and intricacies of fitting DST into critical AI systems.

CCS CONCEPTS
• Human-centered

KEYWORDS
Decision Support S

CHI 2019 Paper

1 INTRODUCTION

The idea of leveraging machine intelligence in healthcare

CHI 2019, May 4–9, 2019, Glasgow, Scotland, UK

Will You Accept an Imperfect AI? Exploring Designs for Adjusting End-user Expectations of AI Systems

Rafal Kocielnik
University of Washington
Seattle, USA
rafal.kocielnik@gmail.com

Saleema Amershi
Microsoft Research
Redmond, USA
samershi@microsoft.com

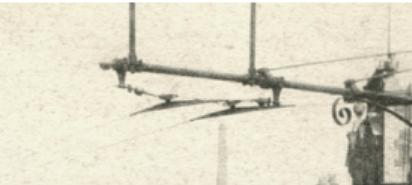
Paul N. Bennett
Microsoft Research
Redmond, USA
paul.n.bennett@microsoft.com

ⓘ The Scheduling Assistant can correctly detect meeting requests about 50% of the time.

ⓘ The Scheduling Assistant examines each sentence separately and looks for meeting related phrases to

ⓘ Adjust how aggressive you would want the Scheduling Assistant to be in detecting meetings in your emails:





KDD 2017 Research Paper

KDD'17, August 13–17, 2017, Halifax, NS, Canada

The Selective Labels Problem: Evaluating Algorithmic Predictions in the Presence of Unobservables

Himabindu Lakkaraju
Stanford University
himalv@cs.stanford.edu

Jon Kleinberg
Cornell University
kleinber@cs.cornell.edu

Jure Leskovec
Stanford University
jure@cs.stanford.edu

Jens Ludwig
University of Chicago
jldwig@uchicago.edu

Sendhil Mullainathan
Harvard University
mullain@fas.harvard.edu

ABSTRACT

Evaluating whether machines improve on human performance is one of the central questions of machine learning. However, there are many domains where the data is *selectively labeled* in the sense that the observed outcomes are themselves a consequence of the existing choices of the human decision-makers. For instance, in the context of judicial bail decisions, we observe the outcome of whether a defendant fails to return for their court appearance only if the human judge decides to release the defendant on bail. This selective labeling makes it harder to evaluate predictive models on the instances for which outcomes are observed, as not enough

where the the machine learning algorithm must be evaluated on data where the labels are themselves consequence of the existing choices of the human decision-makers.

We first dealt with issues of this form in an analysis of judicial bail decisions [17], an application which motivated the present paper. Since this is an important setting that illustrates the basic concerns, it is useful to briefly describe the underlying background of the application here. In a bail hearing, by law requires the judge to base their decision to release defendants on a prediction—if granted bail, will the defendant return for their court appearance without committing a crime in the intervening time. Given that millions



KDD 2017 Research Paper



KDD'17, August 13–17, 2017, Halifax, NS, Canada



The Selective Labels Problem: Evaluating Algorithmic Predictions in the Presence of Human Judgment

Himabindu Lakkaraju
Stanford University
himalv@cs.stanford.edu

Jon Kleinberg
Cornell University
kleinber@cs.cornell.edu

Jens Ludwig
University of Chicago
jludwig@uchicago.edu

Sei-ichi Sawada
Meiji University

Human Perceptions of Fairness in Algorithmic Decision Making: A Case Study of Criminal Risk Prediction

Nina Grgić-Hlača
MPI-SWS, Saarland University
nghlaca@mpi-sws.org

Krishna P. Gummadi
MPI-SWS, Saarland University
gummadi@mpi-sws.org

Elissa M. Redmiles^{*}
University of Maryland
eredmiles@cs.umd.edu

Adrian Weller[†]
Cambridge University, Alan Turing Institute
adrian.weller@eng.cam.ac.uk

ABSTRACT

Evaluating whether machines improve on human performance is one of the central questions of machine learning. However, there are many domains where the data is *selectively labeled* in the sense that the observed outcomes are themselves a consequence of the existing choices of the human decision-makers. For instance, in the context of judicial bail decisions, we observe the outcome of whether a defendant fails to return for their court appearance only if the human judge decides to release the defendant on bail. This selective labeling makes it harder to evaluate predictive models on the instances for which outcomes are observed, as not enough

where the data was
selected by
human choices.

We first consider the problem of evaluating a decision-making system in the presence of selective labeling. We show that it is possible to evaluate the quality of a decision-making system even when the data is selectively labeled.



TOWARDS “THIN DESCRIPTION”

TOWARDS “THIN DESCRIPTION”

*[Thin description is] about how we all travel
...through the thicket of time and space*

– Jackson Jr 2013

TOWARDS “THIN DESCRIPTION”

*[Thin description is] about how we all travel
...through the thicket of time and space*

– Jackson Jr 2013

*[Thinness is] a methodological counterpoint to the
hubris that animates so much tech development.*

– Benjamin 2019

We pass through so many **systems**, and **ecologies**, and **environments**, just like all
the life of the forests scientists nearly destroyed

We pass through so many systems, and ecologies, and environments, just like all
the life of the forests scientists nearly destroyed

It would be impossible, and **hubris**, to try to capture and quantify all of that

Everything we do is situated within cultural and historical backdrops.

If we're serious about ethics and justice, we need to be as serious about understanding those histories as we are about imagining potential futures.

Thinking along these lines forces us to confront how we participate in violent, oppressive systems and practices, but that can inspire us.

NEW TECHNOLOGIES, OLD METAPHORS

On-Demand work

Piecework

CHI 2017 (Honorable Mention)

Artificial Intelligence

Street-level bureaucracies

CHI 2019 (Best Paper)

“Human-Centered AI”

Seeing Like a State

STREET-LEVEL ALGORITHMS

SEEING THE FOREST FOR THE TREES

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